

4th Congress of the European Society for Vascular Medicine

Prague, Czech Republic
March 18–20

43rd Czech Angiology Days 2018

Prague, Czech Republic
March 18–20

Book of Abstracts

Organizers:



Distinguished Colleagues and Dear Friends,

We are pleased and honored to welcome all of you who have decided to participate in the 4th Congress of the European Society for Vascular Medicine combined with the traditional Czech Angiology Days in Prague. We hope that, besides the scientific program, you will enjoy the already incoming spring weather and the beauty of Prague, a city in the heart of Europe. Prague has much to offer in its art and architecture from Gothic, Renaissance, Baroque and Classicist periods.

The rich scientific program focuses on selected topics of vascular medicine presented by leading experts in specific fields. In addition, the program includes many incoming abstracts and a comprehensive endovascular/interventional part – the extensive full-day program including live transmissions from four cathetrization labs (Austrian, German and Czech).

Let's take a quick look at the program: there will be a total of six hands-on workshops focused on different vascular territories on Sunday afternoon. Then, two key lectures will be given by prominent lecturers (Prof. Nicolaides from UK/Cyprus and Prof. Linhart from the Czech Republic) just after the official opening of the congress.

On Monday, in addition to the all-day interventional angiology session, there will be symposia on recent advances in atherosclerosis (prepared by the European Atherosclerosis Society) and early detection of peripheral arterial disease, lymphedema. In parallel, interesting lectures on hypertension (arterial and venous) and the therapeutic strategies of venous thromboembolism, supported by pharmaceutical companies, will be held.

On Tuesday, results will be presented from the most important recent trials in the Hotlines session. We will also await news at the American-European Forum and the rousing discussion of controversies in vascular medicine presented by two opponents. Tuesday is also devoted to venous thrombosis and chronic venous diseases extensively, in addition to the diabetic foot symposium and comprehensive lectures on antithrombotic therapy in peripheral arterial disease. We also must not forget the sections on non-atherosclerotic diseases in angiology and problems of microcirculation examination, as well as interesting afternoon presentations of the most complicated cases presented by those who solved them. A good contribution will also be informative symposia prepared by different national societies (Belgian, Swiss or Slovenian) and many others that cannot be mentioned now.

We hope we will spend a pleasant time together in our beautiful city and will leave with extended knowledge, good experiences and new personal contacts. We'll do it all!

On behalf of the Local Organizing Committee,

*Karel Roztocil,
President of the 4th Congress of the European Society for Vascular Medicine*

*Debora Karetova,
President of the Czech Society of Angiology*



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Abstracts are published as they were received and are unmodified by the Program Committee of the congress.

4th Congress of the European Society for Vascular Medicine

NON-INFECTIOUS AORTITIS

Alari G., Alari G., Caccia R., Bona V., Fumagalli M., Ghislandi C., Croce S., Franchini B., Bolis M.

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Introduction: In this article, we consider non-infectious aortitis: an inflammatory condition of the aorta of non-infectious etiology, normally delivered by immunological disorders such as vasculitides or connective tissue disease, mainly of unknown etiology.

Such state of the aorta can be the cause for dilation resulting in aortic insufficiency, or else, for fibrose thickening resulting in stenosis of the aorta and subsequently of its main branches, leading to severe and widespread ischemic complications, that, if treated belatedly and inappropriately can become devastating. This is why such “uncommon, not rare diseases”, must be studied in depth, with the aim of recognising them and appropriately treating them.

Methods: We considered the latest acquisitions and results of scientific papers in literature (Pubmed), keyword: non-infectious aortitis. We also took in consideration the recent ESC Guidelines on the diagnosis and treatment of Aortic Diseases.

We closely looked through its physiopathological and histopathological aspects. Also, we considered it within the specific case of Takayasu Arteritis, pathognomically affecting the aorta and its main branches, in comparison to Giant-Cells Arteritis.

Also, with the aid of several documented clinical cases, we analysed the most effective treatments, both pharmacologic and surgical, and the responsiveness of the various diseases to each.

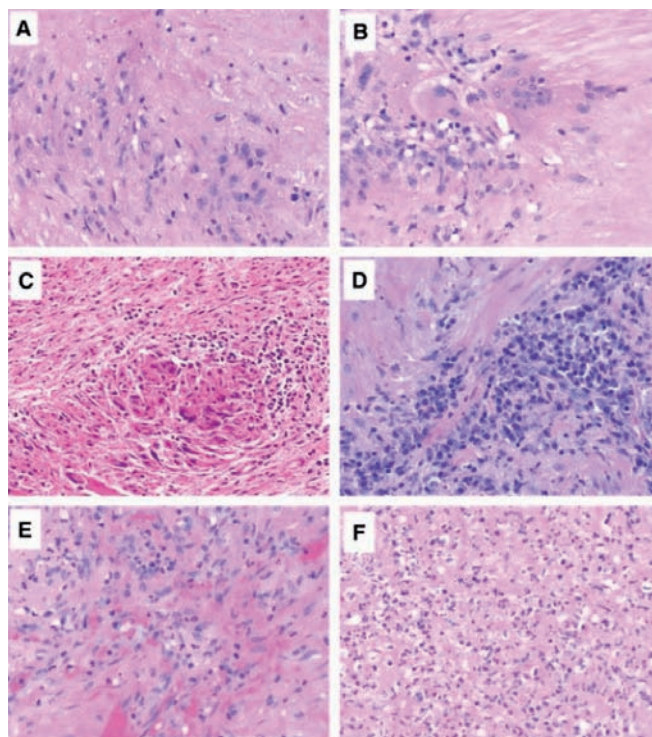
Results: The most significant pathologies for non-infectious aortitis are Takayasu Arteritis and Giant-Cells Arteritis (although it can be spotted in many more autoimmune diseases). The diagnosis is mostly clinical, as the laboratory tests are not specific enough.

The clinical and laboratory diagnosis has to be supported by ultrasonographic, radiographic and, since recently, nuclear imaging techniques.

The treatment is always initially clinical; surgery only plays a complementary role.

Conclusions: The uncommon frequency of this group of diseases requires in-depth knowledge, in order to favour an early diagnosis ensuring therefore optimal treatment.

Figure: Inflammatory patterns for aortitis and periaortitis (A–C) The granulomatous/giant cell pattern is comprised of clusters of epithelioid macrophages (A), giant cells (B), and/or compact well-formed granulomas (C). (D) Lymphoplasmacytic pattern. (E) Mixed inflammatory pattern. (F) Suppurative pattern.



LOOKING WITH THE POISEUILLE'S GLASSES – A PROPOSAL OF A NOVEL HYPOTHETICAL METHOD TO INCREASE THE DIMENSIONS OF THE CORONARY ARTERIES WHEN REQUIRED

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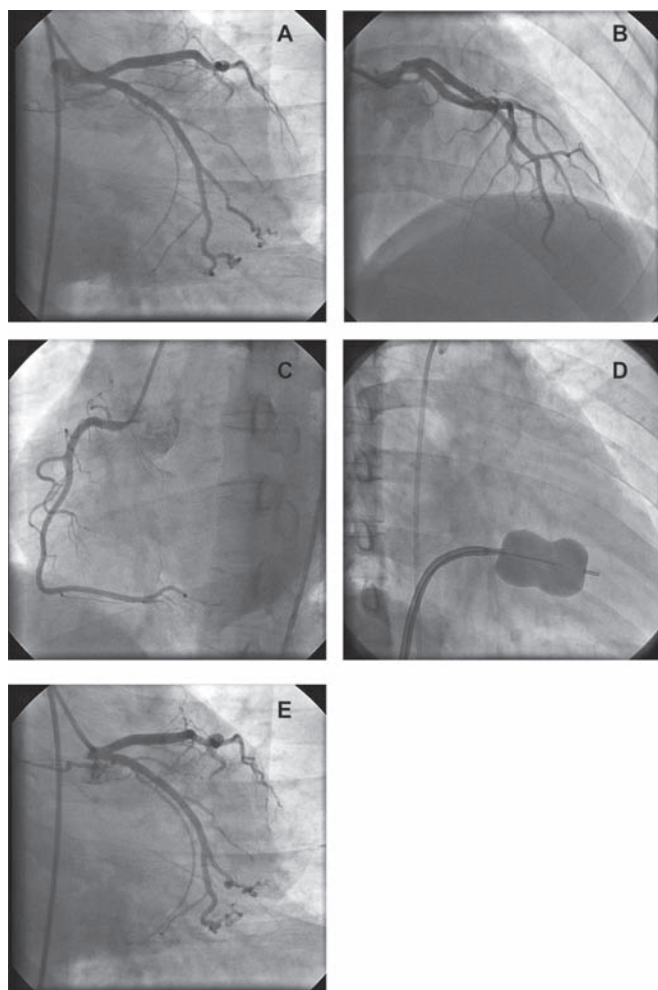
Background: The purpose was to develop a novel hypothetical method to increase the dimensions of coronary arteries.

Methods: In the long-term observation, the coronary sizes were dilated in three unexpected scenarios. The coronary artery sizes were observed in patients with mitral stenosis patients (n=12) by angiogram before surgery or valvuloplasty (Figure). The coronaries of patients with patent ductus arteriosus who underwent surgical/coil closure in the past (n=7) were examined by echocardiogram. These patients also had normal aortic and left ventricular dimensions, and all had surgeries/coil closure more than four years prior to this observation. Patients with renal failure on long-term dialysis through peripheral arterio-venous fistula without left ventricular hypertrophy (n=13) were studied by echocardiography for coronary dimensions. Normal age and sex-matched coronary

sizes served as controls in the study. All these observations were made over a period of 10 years.

Results: The sizes of coronaries in patients with mitral stenosis were greater than 22% (± 4) of the normal. The coronary sizes were 32% (± 4) higher than normal in patients with patent ductus arteriosus without left ventricular or aortic dilatation. Patients with renal failure on haemodialysis without left ventricular hypertrophy had coronary sizes 28% (± 5) higher than similarly sized ventricles. Reducing the diastolic blood pressures, the increase in coronary angulation by sine (θ) function, and increase in the coronary length and diameters can be achieved by observing the differential equations of Poiseuille's. A hypothetical model to increase the coronary sizes could be developed based on the analysis of the differential equations. The proposed method is creating a peripheral arterio-venous fistula, which can be closed later by a percutaneous method/surgery. The closure time needs to be determined by experimental studies. The other methods could be a continuous exercise program or usage of beta-blockers.

Conclusion: A novel hypothetical method of peripheral arteriovenous fistula formation could potentially increase the size of the coronaries. Further experiments need to be performed to observe the results.



EFFECTS OF FAR INFRARED IRRADIATION ON VASCULAR FUNCTION IN HEALTHY SUBJECTS

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Introduction: Far infrared (FIR) are invisible electromagnetic waves involved in a range of biological effects. FIR improves endothelial dysfunction and vascular access in patients with chronic heart failure and renal failure. This study aims to investigate the effects of FIR on vascular compliance and endothelial function in healthy subjects.

Methods: 40 healthy, non-smoking volunteers (30 ± 11 years) participated in this study. Participants were divided into 4 groups (10 in each group). Two of the groups received FIR on either the back or forearm using a FIR device, one group received heat alone (38°C) and one group (placebo) received no FIR or heat. The latter two interventions were delivered to the back only. 4 sessions of FIR, heat or placebo were given over 2 weeks, and each session lasted for 40 minutes. Arterial stiffness was measured using pulse wave analysis to determine augmentation index (AIx) using Sphygmocor. Endothelial function was assessed using laser Doppler imaging with iontophoresis of acetylcholine (ACh) and sodium nitroprusside (SNP). These assessments were performed at three different occasions including baseline, immediately after the 1st session (FIR, heat or placebo), and 24 hours after the last session.

Results: AIx significantly improved when compared with baseline after FIR session(s) to the back (mean difference baseline to single session $3.1 \pm 0.7\%$ and baseline to the 4th session $4.5 \pm 1.2\%$ overall $p < 0.001$) whereas no significant improvement was observed to those received FIR to the forearm. No significant changes were seen in the heat only and control groups. No significant improvement was seen in endothelial function after FIR (back and forearm), heat or placebo when compared with baseline.

Conclusion: FIR non-thermally improves vascular wall elasticity of healthy subjects when irradiating large areas i.e. back, which might be a promising modality to promote vascular health.

ACUTE AND SUBACUTE LIMB ISCHEMIA – APPROACH OF OUR DEPARTMENT

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The main cause of acute and subacute limb ischaemia of the lower extremity is peripheral arterial disease (e.g., atherosclerosis, thromboembolism). Over the past decades major advancements have been made in its treatment and currently TASC C and D lesions are increasingly being handled using an endovascular approach. Beside the effective thrombus removal, the main task remained regarding the treatment of the heavily calcified femoropopliteal lesions, where the high incidence of dissections impacts patency and the durability of the treated vessel. Despite the good success of DCB in the SFA, in case of very calcified artery with a complete circumferential distribution of calcium (360°) the PTA or DCB catheters are not able to provide the same effect.

The purpose of this presentation is to introduce the novel technology of rotational atherectomy with continuous aspiration, luminal gain and thrombus/plaque removal, allowing the vessel to be more compliant for further treatment. The system allows to treat the thrombus and the underlying lesion in the same time especially in complex vascular lesions. The aim is to reduce dissections, bail out stenting and vessel barotrauma, protecting the outflow vessels, and reducing smooth muscle cell proliferation with addition of drug-eluting therapies. Single centre studies indicate that by using atherectomy to take out the calcium and then following up with a DCB in very heavily calcified occlusions and long lesions, we can get good results with high long-term patency rates.

Conclusion: Our experience suggests that rotational and aspiration atherectomy can accomplish the task of vessel preparation, reducing dissections and bail out stenting. Proper technique is essential for excellent results; embolic protection devices have added a level of protection to the outflow vessels. Eccentric lesions remain a challenge with this technology, respect the limitations no single device is right for every case.

DIAGNOSIS AND MANAGEMENT OF LIPEDEMA IN 2018

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Lipedema is a chronic condition that includes excessive and disproportionate fatty tissue deposition most often affecting the thighs, buttocks and lower legs. Many patients are overweight or obese. In those who are not overweight, their lower body shape is disproportionately larger than their upper body, producing a pear-shaped appearance.

The cause of lipedema is unknown. Some patients have affected female family members. Lipedema usually starts after puberty, pregnancy or menopause and is aggravated by weight gain.

Symptoms include painful and symmetrical leg (less commonly arms) pain and swelling that ends abruptly just above the ankles, sparing the feet (or hands). The swelling is usually non-pitting, unless the patient also has other reasons for edema.

Complications are medical (joint problems and difficulty walking) and psychological (low self-esteem, anxiety and depression).

The diagnosis of lipedema depends on the clinical experience of the physician and is confirmed by a thorough history and comprehensive physical exam. Lipedema is often confused with lymphedema, chronic venous insufficiency and obesity.

The management of lipedema involves exercise, diet and nutrition, emotional support and management of other co-existing causes of lower extremity swelling.

Compression stockings are useful when edema is present and may help prevent the progression of lipedema into lipolymphedema. Manual lymph drainage (MLD) and intermittent pneumatic compression therapy can be tried with varying degrees of success. Herbal medications such as horse chestnut or diosmin are often tried with varying results.

Water jet-assisted liposuction, a lymph-sparing procedure that removes excess fat is useful for patients who have not improved with conservative measures. Many patients report improved walking ability, less pain, and a better quality of life. Unfortunately, these procedures are not widely available and are not covered by most insurance providers.

HISTORY AND ORGANIZATION OF THE SOCIETY FOR VASCULAR MEDICINE

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The Society for Vascular Medicine was founded in 1989 with the vision of making vascular care better for the patient. It was originally known as the Society for Vascular Medicine and

Biology. The First Annual Scientific Session was held in New Orleans, Louisiana in March 1990 and the first Journal, The Journal of Vascular Medicine and Biology began in 1989 as a peer reviewed publication. The name was later changed to be known simply as Vascular Medicine.

The mission of the Society then and now is three-fold:

- 1) To promote and advance the field of Vascular Medicine and Biology and to maintain the highest standards of practice, research, education and exchange of scientific information.
- 2) To stimulate the formation of fellowship training programs in Vascular Medicine and research and the teaching of these disciplines to medical schools in house officer training programs.
- 3) To provide consultation to educational institutions, government agencies and other such organizations or collaboration.

The Society is distinguished by its emphasis on clinical approaches to vascular disorders. We have long recognized that optimal vascular care is best accomplished by the collegial interaction of a community of vascular professionals, including individuals with expertise in vascular medicine, vascular surgery, interventional radiology, vascular nursing, vascular technology and other disciplines.

The Society is organized structurally as follows: Past President, President, and President elect. The leadership includes the Board of Trustees and 15 committees.

RARE CAUSE OF VENOUS EMBOLISM IN YOUNG WOMAN – CASE REPORT

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We report a case of 32-year-old female admitted after cardiopulmonary resuscitation for cardiac arrest caused by acute pulmonary embolism. Patient was successfully treated by thrombolysis. Source of emboli was found in iliac vein aneurysm, which was clarified by duplex ultrasound. Other significant risk factors of venous embolism were not revealed, thrombophilia screen was negative. After three months of oral anticoagulation by VKA, uncomplicated surgical repair of iliac vein aneurysm (tangential resection with lateral venography) was realized.



CAROTID TOTAL PLAQUE THICKNESS AND PLAQUE AREA ARE FACTORS OF PROGNOSIS OF PATIENTS WITH AORTIC STENOSIS

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The aim of this study was to define carotid ultrasound and echocardiography markers that significantly influence prognosis of patients with aortic stenosis.

Methods: 45 cohorts with moderate aortic stenosis (AS) and severe AS with preserved ejection fraction (EF) were prospectively followed up over a 1-year period. In addition to clinical examination of risk factors (arterial hypertension, hyperlipidemia, obesity, and diabetes), carotid ultrasound for total plaque thickness (TPT) and plaque area (PA) determination was done. The echocardiography parameters: EF, maximal aortic-jet velocity (AV Vmax), trans-valve maximal gradient and aortic valve area, were included in the predictive model, together with risk factors and carotid measurements.

Results: At the end of follow up clinical symptoms occurred in 3 patients (pts). There was a need for aortic valvular reconstruction (AVR), either transcatheter or surgical, in 7 pts, because of progression of aortic jet velocity or clinical symptomatology. Number of carotid bifurcations with plaques are strongly associated with the two- and three-vessel coronary artery disease, documented with angiography OR 1.8 (1.2–2.1). Occurrence of symptoms was determinate with AV Vmax OR 2.3 (2.1–2.6), despite a need for AVR was predicted by carotid TPT OR 1.4 (1.2–1.6).

Conclusion: These results warrant multi-site ultrasound investigation in patients with moderate aortic stenosis and severe aortic stenosis with preserved ejection fraction in order to predict their prognosis.

COAGULATION PROFILES IN PREGNANT WOMEN WITH INCREASED RISK OF VENOUS THROMBOEMBOLISM

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Background: Pregnant women at increased risk of venous thromboembolism usually receive thromboprophylaxis with low-molecular weight heparin (LMWH) throughout pregnancy and postpartum. Regular laboratory monitoring of therapy is not recommended, therefore, little is known about anti-Xa levels and their correlation with hypercoagulation in this patient population.

Methods: In consecution, pregnant women requiring thromboprophylaxis blood was drawn at gestational weeks 11–15, 16–20, 21–25, 26–30, 31–35, 36–40 and 4–5 weeks postpartum

each time 4 hours after the last LMWH dose. Twenty-eight healthy pregnant women were included as controls. In plasma anti-Xa, prothrombin fragment 1+2 (F1+2), thrombin-anti-thrombin complex (TAT), D-dimer and thrombin generation were measured.

Results: During pregnancy, there was no significant fluctuation in the average anti-Xa level, however, postpartum anti-Xa levels were significantly higher (Table).

Table: Anti-Xa activity in 112 pregnant women receiving 5,000 IU dalteparin daily

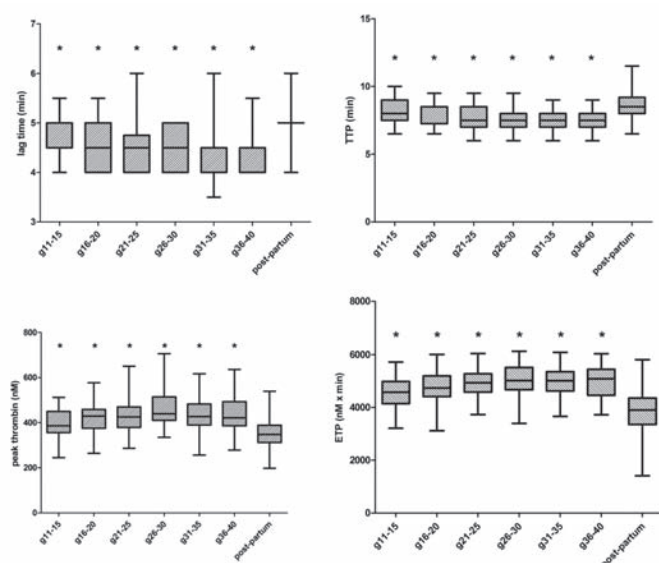
Week of gestation	Arithmetic mean \pm SD
11–15	0.33 \pm 0.17*
16–20	0.35 \pm 0.19*
21–25	0.35 \pm 0.16*
26–30	0.29 \pm 0.15*
31–35	0.32 \pm 0.15*
36–40	0.27 \pm 0.14*
postpartum	0.46 \pm 0.11

Post-hoc ANOVA $p < 0.05$ compared to postpartum

Markers of coagulation activation F1+2, TAT and D-dimer increased throughout pregnancy, but were comparable to levels in the control group. Thrombin generation lag time and time to peak were significantly shorter from gestational week 11 forward compared to postpartum, while peak thrombin and ETP were increased showing a prothrombotic profile (Figure). Despite the increased hypercoagulability the rate of VTE recurrence was low (0.9%).

Figure: Thrombin generation during pregnancy (at 11–15, 16–20, 21–25, 26–30, 31–35 and 36–40 weeks of gestation and postpartum) in women receiving thromboprophylaxis

* $p < 0.05$ compared to postpartum



Conclusions: In our study, anti-Xa levels were significantly lower during pregnancy compared to postpartum period. At the same time hypercoagulability was detected with markers

of coagulation activation and thrombin generation throughout pregnancy compared to postpartum that did not result in an increased VTE event rate.

EVALUATION OF BENEFITS AND RISKS OF DUAL ANTIPLATELET THERAPY AFTER PERIPHERAL ARTERIAL INTERVENTIONS

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Objective: Dual antiplatelet therapy (DAPT) is recommended after peripheral arterial interventions to prevent thrombotic complications. However, only few studies have investigated the efficacy and safety of DAPT in this context. We assessed on treatment platelet reactivity and clinical outcome over 6 months in patients with peripheral artery disease (PAD) undergoing lower limb endovascular revascularization.

Methods: Patient received DAPT (100 mg aspirin and 75 mg clopidogrel) after peripheral interventions for one month and long-term aspirin thereafter. Patients on oral anticoagulation were excluded. Clopidogrel responsiveness was assessed with the VASP assay and high on-treatment platelet reactivity (HTPR) was defined as a platelet reactivity index (PRI) $> 50\%$. PRI $< 16\%$ was labelled low on-treatment platelet reactivity (LTPR). Aspirin responsiveness was assessed with light transmission aggregometry (LTA). Aggregation $> 20\%$ was defined as HTPR to aspirin. Efficacy end-points were platelet reactivity on clopidogrel therapy, symptomatic improvement, and target lesion revascularization (TLR) at 6 months. Safety end points were major adverse cardiac and cerebrovascular events (MACCE) and bleeding complications according to the Bleeding Academic Research Consortium classification (BARC).

Results: From the 51 patients, 22 were treated for intermittent claudication (IC; 43%) and 29 (57%) for critical limb ischemia (CLI, $n=19$ rest pain, $n=17$ ulcer). HTPR to clopidogrel was detected in 29 patients (57%), HTPR to Aspirin was detected in 14 patients (28%). LTPR to clopidogrel was detected in 5 patients (9.8%). The technical success rate was 100% and there were no procedure related complications including contrast induced nephropathy or access site complications. At six months, none of the patients had rest pain and only 2 patients still had ulcers. In IC, the pain free walking distance was significantly increased in all patients. Only in 8 IC patients, the pain still occurred at < 200 m on treadmill (12% slope, 3.2 km/h) and 38 patients were now classified as Fontaine IIa because of a pain free walking distance of more than 200 m. Overall, in IC the mean pain free walking distance improved from baseline 71 ± 6 m to 328 ± 18 m at six months follow up ($p < 0.0001$). Seven patients (14%) had to undergo clinically driven target lesion revascularization. Within IC, patients with HTPR suffered significantly more often from clinically driven TLR than all other groups ($p < 0.05$ IC with HTPR vs IC with

without HTPR and CLI with and without HTPR). MACCE occurred in ten patients (20%) during follow up. MACCE rates did not differ significantly between HTPR and no HTPR patients ($p=0.37$). CLI patients with HTPR suffered significantly more often from MACCE than all other groups ($p=0.0221$ CLI with HTPR vs without HTPR and IC with and without HTPR). In CLI, MACCE was mainly driven by fatal GI-bleeding ($n=3$). Overall BARC bleeding occurred in 13 patients (25%). BARC bleeding rates did not differ between HTPR and no HTPR patients. Bleeding occurred significantly more often in CLI than in IC patients ($p=0.0037$).

Conclusion: While endovascular therapy is an effective means of treating PAD, the incidence of clopidogrel resistance is high in PAD patients. Claudicants with HTPR are at risk for re-interventions. Bleeding rates were not associated with platelet function but with clinical stage with CLI patients being at increased risk for major bleeding under DAPT.

HIGH-RISK PERIPHERAL ARTERY DISEASE: WHICH ANTITHROMBOTIC THERAPY IS NEEDED?

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Introduction: Peripheral artery disease (PAD) is even more common than previously thought condition, at high risk of cardiovascular (CV) morbidity and mortality.

Among guideline-directed management and therapy antiplatelet drugs are recommended for primary and secondary prevention of CV events as well as for the relief of lower-extremity symptoms and critical ischemia in patients with PAD. Nevertheless, antithrombotic therapy best regimen and length in PAD is still an issue due to limited and conflicting data.

Methods: This review aims in discussing recent evidence on the topic of antithrombotic therapy in PAD patients, with a special focus on current practice and future research.

Results: ACC/AHA/ESC guidelines recommend aspirin or clopidogrel as first-line therapy in the prevention of atherothrombotic events in patients with PAD.

Among the ADP receptor P2Y₁₂ inhibitors, ticagrelor was not shown to be superior to clopidogrel for the reduction of CV events.

Dual-antiplatelet therapy (aspirin and clopidogrel) may be reasonable to reduce the risk of limb-related events in patients with symptomatic PAD after lower extremity revascularization.

The overall clinical benefit of vorapaxar added to existing antiplatelet therapy in patients with symptomatic PAD is uncertain.

The addition of warfarin to antiplatelet monotherapy in patients with symptomatic PAD is associated with an increased risk of bleeding, without benefit in terms of adverse CV events or graft patency in case of previous surgical revascularization

Conclusion: There have been no large trials focusing on patients with PAD, which has led to limited direct evidence to support any guideline recommendations for specific antithrombotic therapies in such patients; for now, Class I, Level of Evidence A center around aspirin with clopidogrel as an alternative agent.

Ongoing trials investigating the use of antiplatelet and direct oral anticoagulants will provide useful data in terms of antithrombotic management of patients with PAD.

TREATMENT OF RAYNAUD'S PHENOMENON

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Symptomatic treatment of uncomplicated Raynaud's phenomenon (RP) aims to improve patients' quality of life and prevent severe complications. When general measures and lifestyle modification fail to reduce the frequency and severity of RP, a pharmacologic approach is needed, usually early in secondary RP (SRP) related to connective tissue disorders. Calcium channel blockers (CCBs) are recommended as first choice treatment for both PRP and SRP, in ESVM and EULAR guidelines. CCBs proved effective in RCTs, mostly evaluating nifedipine. Slow-release formulations are currently preferred due to fewer side effects. Long-acting CCBs, e.g. amlodipine or felodipine, seem to be better tolerated too. If CCBs are not tolerated or ineffective, other oral vasodilators can be used, though with limited evidence: angiotensin receptor antagonist losartan, ACE-inhibitors, α -blockers or selective serotonin reuptake inhibitors. As for oral vasodilators, recent therapeutic advances concern the novel selective type 5 phosphodiesterase inhibitors sildenafil, tadalafil and vardenafil, which proved effective in SSc-related RP in short-term RCTs. These drugs increase the availability of NO through inhibiting the degradation of cGMP. An increasing use of 5PDE inhibitors, for severe SRP and also digital ulcers, unresponsive to CCBs, is reported by SSc experts, even if none of these agents has been approved for use in RP. Vasodilatory side effects may limit their use. Multiple RCTs, systematic reviews and meta-analyses have provided very good evidence to recommend iloprost use in disabling, painful attacks and digital ulcers in SRP, not responding to oral vasodilators and topical nitrates. Hospitalization may be avoided if facilities for infusion therapies are available for outpatients. If ulcers recur, the endothelin-1 receptor antagonist bosentan is indicated, since it reduced the number of new ulcers by 30% vs placebo in RCTs. Digital sympathectomy may be considered in refractory ulcers.

EUROPEAN EDUCATION IN ANGIOLOGY/VASCULAR MEDICINE: IDEAS AND FACTS

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Europe has a high cultural, social and legislative complexity that obviously also influences education and training. The aim for positive European development in Education is not to uniform and flatten diversity but harmonize (term introduced by UEMS) the offer and paths of the different countries, respecting quality criteria and equity. In particular, harmonization should guarantee three targets: health professionals, patients and general population. The EU now guarantees free health professional mobility and several University exchange programs facilitate interaction and mutual experiences. Patients mobility rights have been legally regulated by a 2011 Directive and the WHO provides indications on prevention to national governments with relevant results. Focalizing on health professionals, it has to be noted that some EU Member States benefit more from free mobility and in some cases, it may reinforce intra-EU disparities due to the relevant differences in the economic offer, limiting also the weight of some European projects on European Education.

Concerning Angiology/Vascular Medicine the intra-European countries differences are significant in terms of recognition of the Specialty, the presence of Centre and the possible advantages given by European educational proposals. They are less relevant concerning the distribution of vascular disease, the need for prevention, early diagnosis and the relevance of the more advanced stages of these diseases. Almost all European countries have been involved in the process to implement education in this area of medicine, some since the beginning (1991 when VAS started as a Working Group) and some along the way (all the European countries are now involved in at least one of the VAS educational activities).

From the first European project to now, both ideas and results proved to be robust. European Education is the soul of every transformation. Education, research and clinics are tightly linked in every VAS project. Both personal European recognition as a specialist, as well as recognition for the Angiology/Vascular Medicine Centers and for the Specialty have been followed. Applying as a person or as a Centre for each of the existing different proposals makes it possible to strengthen at the same time the individual, his Centre and the specialty.

UEMS Division of Angiology/Vascular Medicine (obtained by VAS in 2007) where VAS acts also as its educa-

tional body, has a fundamental role in officializing our projects and in including Angiology/Vascular Medicine among the other Specialties and the common European efforts for harmonization.

There are four relevant projects/results areas where everyone can find a place to collaborate as part of the European process (www.vas-int.net):

For the individual doctors/specialists: There are two recognitions: the UEMS European Diploma to be obtained, after passing the CESMA-UEMS European Exam by EBEAVM and the European Fellowship of Excellence (EFE-VAS).

For the Centre of Angiology/Vascular Medicine: Following the UEMS ETR on Angiology/Vascular Medicine Document¹, Centre can apply for UEMS Accreditation as European Training Centre.

For the specialists, MDs or graduated students: There are several European educationals: VAS European Book on Angiology/Vascular Medicine, European Master (Academic Diploma and EACCME credits), European Postgraduate Course (Academic certificate and EACCME credits), several collaborating European E-Learning courses on the VAS-Campus Platform), some summer courses (IUA and others).

For specialists, Teachers and Institutions: There is a huge stimulating collaboration and the place to support educational activities.

The European education power is based on quality but also on collaboration and continuous updating of information and interactive methods as well as on the mutual reinforcement of results.

**in 2018 to be officially confirmed as VAS-European Independent Foundation in Angiology/Vascular Medicine*

Sources

Catalano, M., Poredos, P., Brodmann, M. et al. UEMS training requirements for angiology and vascular medicine: European standards of postgraduate medical specialist training (ETR Document). *Int Angiol* 35, 2: 217–231, 2016.

PREVALENCE AND VASCULAR RISK TREATMENT IN PATIENTS WITH CHRONIC VENOUS DISEASE AND LOWER EXTREMITY DISEASE IN SLOVAKIA

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Objective: The aim of the present project was to determine prevalence, risk factor profile and describe global vascular treatment in patients with chronic venous disease (CVD) and lower extremity artery disease (LEAD) in Slovakia.

Method: Observational and descriptive project was carried out in 10,838 patients by 96 ambulatory vascular specialists during 2014–2016. CVD was determined by clinical examination,

patients with acute deep vein thrombosis were excluded. LEAD was determined by ankle brachial index (ABI) <0.9.

Results: A total of 7,590 (70%, median age 63 years, 70% female) had CVD, 3,923 (36.8%, median age 68, 33% female) enrolled patients had LEAD, and 9% of all patients had both clinical signs of CVD and LEAD. Profile of CVD patients was: CEAP C₀ 2%, C₁ 8%, C₂ 29%, C₃ 37%, C_{4a} 15%, C_{4b} 3%, C₅ 4%, C₆ 3%, arterial hypertension (AH) 55.1%, diabetes mellitus (DM) type 2 11%, dyslipidemia 23%, active smoking 9%, smoking in the past 10%, BMI 28.6 kg/m². Profile of symptomatic and asymptomatic (55%) LEAD patients was: AH 69.6%, DM type 2 36%, dyslipidemia 44 %, active smoking 27%, smoking in the past 32%, BMI 27.8 kg/m². Most of patients received nonoperative treatment consisted of lifestyle advice combined with vasoactive drugs. CVD patients were treated by sulodexide in 77%, by diosmin 63% and local therapy in 9%. Such a therapy showed no changes in 75% patients, improving CEAP classification in 21% and worsening in 3% at third visit (average 6 months). LEAD patients received naftidrofuryl in 61%, antiplatelet therapy in 66%, and sulodexide in 87%. After 6 months, there were 79% patients of no changes, 14% of improving and 7 % of worsening Fontaine classification.

Conclusions: Our project confirmed high prevalence of CVD in Slovakia. There is also high portion of asymptomatic LEAD patients with increased cardio-cerebro-vascular mortality and morbidity that can be detected by ABI. The project results showed us proportion of patients in whom we can improve disease stage (21% in CVD, 14% in LEAD) or stabilize the progression of the disease (75% in CVD, 79% in LEAD) by such a patients' management. Global vascular risk treatment is underestimated in clinical practice in vascular patients. Strategy of sulodexide one pill for 3 vascular beds – arteries, veins and microcirculation is convenient in polymorbid vascular patients.

EVALUATION OF CRITERIA FOR OUTPATIENT TREATMENT OF PULMONARY EMBOLISM AND ITS ECONOMIC ASPECTS

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Background: Outpatient treatment of venous thromboembolism (VTE), despite well-documented facts about its potential and safety in well-selected patient populations, is not widespread in the management of therapy in the emergency departments and a significant proportion of patients with low risk of complications are hospitalized.

Objective: Select appropriate patients with proven acute pulmonary embolism (PE) for outpatient treatment based on the

risk of complications (S-PESI and ESC) or pragmatic criteria (HESTIA) with the cost-impact analysis of the outpatient treatment approach.

Patients and methods: Retrospective monocentric study in patients with acute PE performed at the Emergency Medicine Department of the University Hospital in Hradec Králové from 2014 to 2016. The VTE risk factors, treatment options, outpatient treatment criteria, complication criteria, 30-day outcomes (recurrence of VTE, bleeding, death) and the economic costs of hospitalized individuals who would be potential candidates for home treatment have been evaluated.

Results: Of the total number of 181 patients who were evaluated, 53 (29.3%) had low S-PESI, 33 (18.2%) had low risk of complications according to ESC and 45 (24.9%) would be suitable for outpatient treatment according to the HESTIA criteria. Only 7 patients (3.9%) from the group have actually been treated at home. One patient from the low PE risk group had minor clinically relevant bleeding during the next 30 days of therapy. The financial costs of hospitalization have been calculated for patients potentially eligible for home treatment.

Conclusion: Although a considerable proportion of carefully selected patients with acute PE could be safely treated at home, it is not so in the real practice. This fact also involves higher financial costs for these hospitalized individuals.

STENTGRAFT OPEN EXCISION FOR REPEATED ENDOLEAK AND GIANT GROWING AAA IN A HEART TRANSPLANT PATIENT: A CASE REPORT

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Introduction: Endovascular aneurysm repair (EVAR) is a gold standard treatment for patients with abdominal aortic aneurysm (AAA) who are unfit for open repair (OR). However, life-long surveillance for endoleak and/or aneurysm growth is needed. Endovascular re-interventions are performed in up to 30%. If they fail, stentgraft excision may be required. This is a complex high-risk surgery.

Case report: Male 54-year-old patient was treated by EVAR for sub-renal AAA (51 mm). His medical history included heart transplant at the age of 46 for coronary heart disease and dilated cardiomyopathy, history of pre-transplant smoking, hypertension and chronic renal failure (creatinine 120 µmol/l) due to cyclosporine nephrotoxicity. During next 11 years, he underwent 5 endovascular and 1 open re-interventions for endoleaks of types Ib, II, III and endotension: distal extension

graft (3x), embolization of lumbar and internal iliac artery, surgical ligation of sacral median artery and percutaneous sack puncture. Despite that the aneurysm has grown up to 11 cm and surgical resection was indicated at the age of 65. The aneurysm was approached through midline laparotomy. Proximal vessel control was achieved through balloon occlusion to avoid suprarenal aortic clamping. The stentgraft was excised and the aneurysm was replaced with aortic-bi-iliac prosthetic graft. Proximal neck part of the stentgraft was left *in situ* to avoid injury of renal arteries. Blood loss was 3000 ml, blood recuperation was used. Combined inotropic support was needed. Recovery of the patient was uneventful. Unfortunately, he died of lung cancer 10 months after the aortic resection. This may partially be attributed to the long-term use of immunosuppression.

Conclusion: Open repair of AAA after previous failed EVAR is a challenging surgery. It should be considered in persistent endoleak and/or growing aneurysm based on careful risk/benefit assessment. In our case the stentgraft excision was safely performed without major complications.

A UNIQUE APPROACH IN THE MANAGEMENT OF VENA ILIACA HYPOPLASIA IN A PATIENT WITH KLIPPEL-TRÉNAUNAY SYNDROME

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Background: Klippel-Trénaunay syndrome (KTS) is a rare and complex malformation. Anomalies of the deep veins of the involved extremity, including hypoplasia, atresia, aplasia and valvular agenesis can be dreaded components of this rare syndrome. Treatment of the KTS is not easy. Neither a cure nor a restoration of the vascular system can be achieved. However, early detection plays an important role for further treatment planning. This makes it possible to avoid a severe course of disease or late sequelae by timely treatment. An isolated congenital hypoplasia is very rare and predisposes especially in the young adult age for pelvic or leg vein thromboses. In this disease, surgical reconstruction is rarely performed.

Main observation: We present a case with clinical success and a unique approach in the management of vena iliaca hypoplasia in a patient with Klippel-Trénaunay syndrome. A 32-year-old woman presented herself in 1992 in Kazakhstan with massive swelling and severe pain in the area of the right leg without skin changes and ulceration. A phlebography

showed a hypoplasia in the area of the right iliac vein without a thrombosis and the diagnosis of KTS was made. A classical Palma operation with transposition of the contralateral vena saphena magna was performed as a venous crossover bypass. The patient was discharged without lifelong anticoagulation, only with compression therapy. At the 25-years follow-up, the patient had no oedema, skin changes or varicosis. A subsequent venous CT angiography showed good continuity of the Palma bypass with no evidence for stenosis or aneurysm.

Conclusion: This case shows an excellent result 25 years after Palma operation. The Palma method can be a treatment option for patients who have no or frustrated endovascular treatment.

PBMNC IN NO-OPTION CLI PATIENTS

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Introduction: Cell therapy is an innovative and promising approach for the regeneration of damaged tissues. In particular, numerous clinical evidences indicated the “mononucleate” peripheral blood mononucleosis (*Peripheral Blood Mononuclear Cells PBMNC*) as angiogenetic high capacity cells, is able to create new vessels in patients with critical limb ischemia no more revascularized or went through bankruptcy of revascularization.

Methods: From June 2013 to September 2017 we treated 43 patients with PBMNC. Of these 11 patients were in stage III, 32 patients were in stage IV. Each patient was not amenable to revascularization.

Results: All the patients had positive clinical results, which included the reduction and/or resolution of ischemic pain (VAS -53% 90 days), healing of the ulcer (ulcer size -51% 90 days), the increase of the TcPO₂ (+38% 90 days), the reduction of major and minor amputations.

Conclusion: Positive clinical results with PBMNC can be expected with present technology in significant proportion of patients otherwise destined to major limb amputations.

References

1. Benoit, E., O'Donnell, T. F., Patel, A. N. Safety and Efficacy of Autologous Cell Therapy in Critical Limb Ischemia: A Systematic Review. *Cell Transplantation* 22, 3: 545–562, 2013.
2. Liew, A., Bhattacharya, V., Shaw, J., Stansby, G. Cell Therapy for Critical Limb Ischaemia: A Meta-Analysis of Randomised Controlled Trials. *Angiology* 67, 5: 444–455, 2016.

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TRANSCRANIAL ULTRASOUND IN ACUTE PHASE OF ISCHEMIC STROKE

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In the acute phase of stroke early detection of etiology is of primary importance in order to set the correct therapy.

In our Emergency Department, we have designed a diagnostic trial that involves ultrasound screening for all patients who are suspected of acute cerebrovascular accident.

CT scan without contrast medium that is performed in the acute phase of the stroke allows to exclude the presence of a cerebral haemorrhage but is not able to identify the etiology of an ischemic event.

Vascular ultrasound, in fact, is an economic, repeatable, versatile investigation that allows to locate the site of the obstructive process and to lead the healthcare in the best immediate therapeutic way.

The presence of atheromas of an intracranial vessel can be diagnosed, with the contribution of trans-cranial ultrasound, in a very short time. This is extraordinarily important considering that it is a pathology that can cause disabling strokes. Moreover, transient ischemic attacks due to the stenosis of a cerebral artery, are at high risk of evolving towards a severe stroke, Transcranial Colour-Doppler sonography may be considered a synergic tool to be applied with neuroradiological diagnostics used in the acute phase of cerebrovascular events.

OSTEOPROTEGERIN – BIOMARKER WITH MULTIPLE FUNCTIONS

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Background: Osteoprotegerin (OPG) plays a role in the development of several bone diseases. In addition, osteoprotegerin may contribute to the development of vascular disease. Little is known about the association between serum osteoprotegerin levels and presence or severity of peripheral arterial disease (PAD).

Aim: The aim of this study was to examine the association between serum osteoprotegerin levels and both the presence and severity of lower extremity arterial disease in patients with type 2 diabetes (T2D).

Patients and methods: The study included 165 consecutive patients with T2D (57% males, mean age 65.0±0.7 years). PAD was diagnosed by measurement of toe-brachial index (TBI). Serum osteoprotegerin was measured using ELISA.

Results: Mean osteoprotegerin level was significantly higher in patients with PAD in comparison to patients without PAD (18.2±1.0 vs. 13.1±2.0 pmol/L, p=0.014). Significant univariate correlations between TBI and osteoprotegerin level (r=-0.308; p<0.001), age, BMI and HDL cholesterol were observed. In the multivariate linear regression analysis serum osteoprotegerin (β=-0.005; p=0.020), higher age and male gender were significant predictors of TBI. When 25(OH)vitamin D was introduced into the mentioned model, OPG was no longer significant predictor of TBI, and was replaced in the model by vitamin D (β=0.009, p=0.001). This finding suggests a role of OPG as a mediator of the effects of 25(OH)vitamin D.

Conclusions: Serum osteoprotegerin level is significantly associated with both the presence and severity of PAD in patients with T2D. Osteoprotegerin might be a biomarker for the presence of atherosclerotic disease in patients with T2D.

COOPERATION OF GENERAL PRACTITIONERS AND ANGIOLOGISTS IN THE DIAGNOSIS AND TREATMENT OF PERIPHERAL ARTERIAL DISEASE

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Peripheral arterial disease prevalence and incidence are age-related, rising >10% among patients after 60 s. With aging of the global population, it seems likely that PAD will be more common in the future. The presence PAD determined by measurement of ankle-brachial index (ABI).

Slovak Angiological Society of Slovak Medical Society and Slovak Society of General Practice have for years arranged intensive educational activities in ABI measurements.

The starting point of the joint effort was the pilot study: In 2009, the results of it were published: 24 general practitioners under supervision of 7 angiologists carried out ABI examinations in 2,207 consecutive patients older than 60 years. 67.4% of patients had normal ABI (0.9–1.2), 9.4% of patients had a decreased ABI (<0.9) and 23.2% of patients had increased ABI (>1.2).

This study, common workshops and other educational activities resulted in the inclusion of ABI measurements by automatic devices to preventive examination (expanding the basic diagnostic armamentarium of practitioner consisting of medical history and clinical examination) carried out by general practitioners in the Slovak Republic in order to screen PAO and as well as clarify of cardio-vascular risk. General practitioner in the preventive examination (Dg Z 00.0) perform ABI measurement (oscillometric method) in patients with risk factors for over 50 years and in all over 60 years and it is covered by health insurance from 01.04.2016.

After evaluating the patient's history and careful clinical examination, the ABI measurement confirms or disproves our suspicion of peripheral arterial disease. The general practitioner then consults an angiologist specialist. The common goal is to prevent the occurrence of critical limb ischemia and amputation on the one hand and fatal cardiovascular events on the other. Managing risk factors of atherosclerosis and monitoring nonpharmacological measures is the domain of both the general practitioner and the angiologist.

DIABETIC FOOT AS THE FIRST MANIFESTATION OF DIABETES MELLITUS

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Diabetic foot is a devastating complication of diabetes. It is defined as a foot affected by ulceration associated with neuropathy and peripheral arterial disease of the lower limb in a patient with diabetes. The prevalence is 4–10% in the diabetic population.

Method: Both our case reports illustrate that a neglect of preventive examinations at the family doctor, a diabetic foot becomes the first symptom of diabetes.

Results: 45-year-old patient was hospitalized because of sepsis of unknown etiology. Present ulcer of the left foot led to until unknown diagnosis of diabetes mellitus with diabetic neuropathy without serious peripheral arterial disease. Ulcer healed promptly.

The 70-year-old man, unfortunately avoided the preventive examination at the family doctor. Diabetic foot developed after an accident on holiday, when he stepped on a sea urchin. Several months of unsuccessful ulcer healing followed diagnosis of diabetes mellitus and treatment started. Osteolysis of 1st metatarsal suggested for osteomyelitis. The surgeon planned the amputation, but after many years of neglected screening, the prostatic specific antigen (PSA) test and biopsies confirmed prostate cancer. The patient is now undergoing radiotherapy and hormonal therapy.

Conclusion: Our experience confirms that, despite the fact that the legal framework creates all the conditions for the screening of diabetes mellitus, not all patients will use it. Then we'll be surprised when we diagnose diabetes after the diabetic foot develops. The older the patient is, the more likely it is that at the same time we will discover other serious diseases at an advanced stage. The quality of life of such an individual is then very low. In this light, the implementation of preventive examinations appears to be extremely important.

VTE – AGE DOES MATTER

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Venous thromboembolism (VTE) occurs across generations. It affects the young as well as the old. The incidence of VTE is 0.6/100,000 per year in children up to 14 years and 39.3/100,000 per year in the age of 25–39.

Methods: 219 patients with VTE were followed in last 6 years by the Outpatient Department of Angiology. Phlebothrombosis was diagnosed by colour duplex ultrasound and pulmonary embolism was diagnosed by CT pulmoangiography.

Observed risk factors: family history of VTE, inherited thrombophilia, malignancy, trauma, surgery prior to VTE, using of hormonal contraceptives, pregnancy, hormonal replacement therapy or hormonal anticancer therapy, chemotherapy, radiotherapy, travelling, immobilisation, inflammatory disease.

Results: 100 (45.7%) of them were men and 119 women (54.3%), from 21 to 90 years. 20.55% of followed patients were 21–45 years old. 40.18% of patients were 66–90 years old. 13.3% of young adults and 21.6% of seniors underwent pulmonary embolism, difference is not statistically significant (Fisher's exact test with $p=0.476$). We identified recurrence of VTE in 28.9% of young adults and 52.3% of seniors, difference is significant ($p=0.018$). 22.2% of young adults and 11.4% of seniors reported VTE in relatives, difference is not significant ($p=0.113$). Only 4.4% of young adults had malignant disease but in seniors it was 34.1%, difference significant ($p<0.000$). 24.4% of young adults and 17.0% of seniors underwent VTE in the context with trauma, difference is not significant ($p=0.589$). 8.9% of young adults and 11.4% of seniors underwent perioperative VTE, difference is not significant ($p=0.575$). 31.1% of young adults and 4.5% of seniors underwent VTE regarding to use of hormones, difference is significant ($p<0.000$).

Conclusions: Excessively optimistic view on young adults considered usually healthy and unthreatened may lead to underestimation of risk of VTE.

BILATERAL INTERNAL CAROTID ARTERIES OCCLUSION, EXTERNAL CAROTID ARTERIES STENOSIS AND VERTEBRAL ARTERIES KINKING – MAY IT BE ASYMPTOMATIC?

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The clinical spectrum of internal carotid artery occlusion ranges from being a completely asymptomatic occlusion to a devastating stroke or death. The prevalence of asymptomatic internal carotid artery occlusion is unknown, particularly for bilateral occlusion. The distal branches of the external carotid artery anastomose with distal branches of the internal carotid artery providing important sources of collateral circulation to the brain. Stenosis of the external carotid artery with ipsilateral/bilateral internal occlusion may result in ischemic sequelae. Coiling or kinking of the vertebral artery is a rare morphological entity that is infrequently reported because it remains asymptomatic and has no clinical relevance. Currently there is little evidence to support management strategies for this disease entity and no official recommendations for asymptomatic bilateral carotid artery occlusion. We present a case of a 62 years old female with asymptomatic bilateral internal carotid arteries occlusion, bilateral external carotid artery stenosis and bilateral kinking of the vertebral artery at the V2 segment, who has been successfully managed conservatively for over five years. An individualized approach to management of patients with bilateral internal carotid artery occlusion, especially in combination with external carotid artery stenosis and elongation malformations of the vertebral artery is the key to a successful strategy.

CYSTIC ADVENTITIAL DISEASE IN FORMER ATHLETE

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In this paper, we present a 39-year-old former athlete complaining with pain in his legs during long walk resembling to intermittent claudication. Colour duplex scan described a popliteal artery with 10 mm in diameter with mural thrombus that caused stenosis 75% of lumen. Digital subtraction angiography demonstrated a stenosis of right popliteal artery. The suspicion for Cystic adventitial disease was set. The patient was operated on by posterior direct approach. After incision, a yellowish viscous material was observed in adventitia. Partial resection of the affected popliteal artery and replacement by an

autogenous great saphenous vein graft was performed. Patient was dismissed on the seventh postoperative day, in good condition and without any complication.

Cystic adventitial disease of the popliteal artery should be considered in the differential diagnosis of intermittent claudication, especially in former sportsmen patients. Partial resection of the affected popliteal artery and replacement by an autogenous great saphenous vein graft produces excellent results.

DOES OBSTRUCTIVE SLEEP APNOEA SYNDROME PLAY A KEY ROLE IN THE PROGNOSIS OF THE DIABETIC FOOT?

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Obstructive sleep apnoea syndrome (OSAS) is often associated with cardiovascular diseases and due to a chronic intermittent hypoxia also with insulin resistance. The OSAS is frequently present in patients with diabetes mellitus, but the real data of its incidence and clinical impact on patients with DF are still missing.

The **aim** of our study was to assess in patients with DF and subjectively describe sleep abnormalities the occurrence of OSAS and its association with macrovascular complications and prognosis of DF.

Methods: Into our study, we included into our study 38 patients with DF who were treated in our outpatient foot clinic (January 2016 – March 2016), completed screening questionnaires (Berlin and STOP-Bang questionnaires for OSAS detection and Epworth sleeping scale – ESS for excessive daytime sleepiness), sleep disability questionnaires, underwent anthropometric examinations and ApneaLink screening (detected Apnoea Hypopnoea Index – AHI – patients with OSAS have AHI ≥ 5 , severe OSAS AHI ≥ 30). Patients were divided according to AHI into 2 groups – group A (OSAS positive) and group B (OSAS negative). During the follow-up period (6–9 months and 12–15 months) macrovascular complications (cardiovascular disease – in 23.4%, stroke – in 14.9% and PAD – in 55.3% of patients), microcirculation status (assessed by transcutaneous oxygen tension – TcPO₂) and DF healing (including ulcer size, amputations, etc.) were evaluated. **Results:** OSAS was detected in 79% of studied patients (30/38 – group A), of whom 30% had the severe form of OSAS (9/30). There was found a borderline significance of higher incidence of PAD (50% vs. 25%; $p=0.18$) and lower values of TcPO₂ (38.7 ± 12.9 vs. 50.8 ± 10.8 mmHg; $p=0.14$) with higher frequency of patients with TcPO₂ below 40 mmHg (50% vs.

12.5%; $p=0.096$) in group A compared to group B. Patients from group A had significantly larger defects ($p=0.03$) as at the begging of this study, as after 6–9 months ($p=0.002$ and $p=0.001$) and 12–15 months ($p=0.001$ and $p=0.0009$). The presence of OSAS had no impact on the DF prognosis including DF worsening (23% after 6–9 months and 43% after 12–15 months in group A vs. 25% and 25% in group B; NS) in study groups. The subanalysis showed that patients with severe OSAS were significantly older ($p=0.03$), had more sleep abnormalities ($p=0.01$), larger DF ulcers at the end of the study ($p=0.08$ and $p=0.08$) and higher occurrence of new DF ulcers during the follow-up period ($p=0.09$). The AHI significantly correlated with validated screening questionnaires results ($p=0.014$).

Conclusion: The incidence of OSAS is probably higher in patients with DF compared to general diabetic population. Patients with OSAS had higher incidence of PAD and lower TcPO₂ values that could negatively influence as the ulcer sizes as DF healing. The screening tests significantly correlated with AHI. Therefore, OSAS screening should be performed especially in patients with DF, PAD and lower TcPO₂.

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POST-EXERCISE TCPO₂ IN THE DETECTION OF LATENT PERIPHERAL ARTERIAL DISEASE IN PATIENTS WITH DIABETIC FOOT

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One of the most serious late diabetic complication is the diabetic foot (DF). An integral part of DF therapy is as the detection and solution of infectious complications and adequate off-loading as a screening for the peripheral arterial disease (PAD) and resolvment of the vascular abnormalities. We usually use several non-invasive measurements for the detection of PAD including ABI, where we often meet with the presence of mediocalcinosis. TBI mostly cannot be detected due to technical reasons, so we mainly focus on the transcutaneous oxygen measurement (TcPO₂) evaluating the status of microcirculation. This examination is recommended in patients suffering from DF since the TcPO₂ values are corresponding with the probability of DF ulcer healing. However, based on our experiences, not all TcPO₂ values fully corre-

spond to the macrocirculation status, moreover, TcPO₂ values could be influenced by many factors. Therefore, new options refining the detection of PAD, predominantly of latent form, are searched for.

We initiated a multicentre trial with TcPO₂ measurement supplemented by a stress physical activity test (lower limb elevation and rhythmic exercise). The TcPO₂ values before, during and after stress test and their Δ (the baseline TcPO₂ number – the lowest TcPO₂ number detected during stress test) were evaluated during this study. These results are further correlated with the arterial flows found in the magistral arteries supplying the investigated angiosome. So far, we included 14 patients with diabetes mellitus and/or DF (mean age 64.8±14.9 years, diabetes duration 18.3±11.1 years, HbA_{1c} 60.6±22.4 mmol/mol, creatinine levels 87.3±36.2 μ mol/L) into our study. These patients were divided into two groups according to the arterial supply – group with triphasic flows in the relevant angiosome (group T; n=8) and group with monophasic or undetected flows (group M; n=6). No significant difference was detected in their basal characteristics. There was found during the stress test a significant decrease of absolute TcPO₂ values (20.5±14.3 vs. 35.5±5.3, $p=0.05$) in contrast to basal values (39.8±5.9 vs. 43.4±6 mmHg; NS) as a significant difference of Δ TcPO₂ (19.3±10.2 vs. 7.9±3.9; $p=0.04$) in the group M compared to the group T.

In conclusion, stress physical activity tests supplementing TcPO₂ measurements could potentiate the detection of latent forms of PAD in patients with diabetes and/or diabetic foot where the presence of PAD is not often clinically fully expressed.

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ENDOVASCULAR TREATMENT OF ACUTE LIMB ISCHEMIA WITH NEED OF URGENT NEUTRALIZATION OF ANTICOAGULATION EFFECT OF DABIGATRAN

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Case report: Acute limb ischemia (ALI) is an acute vascular event which threatens not only the limb but also the life of the patient. It requires fast and effective treatment, however, comorbidities and concomitant medication often confine the treatment possibilities.

This case report describes the 69-year-old man with arterial hypertension, type 2 diabetes mellitus, with chronic kidney disease with reduced glomerular filtration, with chronic periphery artery disease, with advanced coronary artery disease, with chronic heart failure (EF 20%), with permanent atrial fibrillation using oral anticoagulation therapy (currently dabigatran 150 mg BID), who was previously over-reactive to warfarin treatment but later with thrombus in left atrium

while on apixaban. The patient was admitted to our department with clinical picture of ALI of left calf Rutherford IIa, with ultrasound finding of embolic occlusion of popliteal artery and crural arteries. The patient was considered too risky for open surgery due to the co-morbidities and clinical state on admission (biventricular congestive heart failure, hypotension, oliguria) and we preferred endovascular treatment (EVT) as a first line strategy. We presumed a hypocoagulation state on admission due to the use of dabigatran 150 mg BID and decreased glomerular filtration (GFR 0.46 ml/min) which was confirmed by tests: INR 1,71, aPTT 55,1 sec, TT >100 sec, dabigatran concentration 264.5 ng/ml. There was a high likelihood of local intra-arterial thrombolytic therapy during EVT, and in case of failure of EVT, the open surgery would have been inevitable and so the hypocoagulation state was undesired. We decided to apply 5 mg of idarucizumab i.v. and subsequently EVT was done (thrombaspiration from popliteal artery and anterior tibial artery, continual local intra-arterial thrombolytic therapy for 8 hours) with very good effect and without excessive blood losses. After initial LMWH therapy we set the patient on warfarin (1 mg daily), because an availability of INR monitoring and keeping the patient in therapeutic range of INR can provide more effective and provable anticoagulation. Rather than "resistance" to NOAK we hypothesize irregular use of NOAK leading to an insufficient anticoagulation effect in this patient. Complex therapy using the advantages in endovascular therapy and in pharmacology leads to salvage of the limb together with improvement of the cardiac and renal function in our high-risk patient.

RARE CASE OF MASSIVE PULMONARY EMBOLISM IN A YOUNG WOMAN – CASE REPORT

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Introduction: Venous aneurysms are vascular malformations, which occur only rarely. Particularly rare are primary venous aneurysms that cannot be linked to former injury, inflammation or arteriovenous fistula. These are most commonly located on jugular veins, central veins of a chest, visceral veins and profunda veins of the limbs. In secondary aneurysms, the cause of formation can be determined. Venous aneurysms are usually asymptomatic or manifest themselves with non-specific local symptoms depending on their size and location. Their diagnostics is often incidental. For the patient, however, they pose a potential risk. The most serious complications include acute massive bleeding from ruptured weakened wall, acute heart failure due to arteriovenous fistula with a large left-to-right short circuit, or massive pulmonary embolism with acute cor pulmonale.

Case report: We present a very rare case of a massive pulmonary embolism in a young healthy woman with a circulation arrest. After laic and subsequent extended cardiopulmonary resuscitation, blood circulation was restored. Upon arrival to the hospital, ultrasound of heart was performed with a picture of acute cor pulmonale. Followed by angioCT scan, where massive pulmonary embolism was confirmed. The patient was successfully treated including acute systemic thrombolysis. In upcoming examinations, aneurysmatic dilatation on the medial side of the external iliac vein was detected, already without any thrombus present. All other causes, including congenital thrombophilic conditions, were excluded. The patient was treated with low molecular heparin and subsequently converted to warfarin. With a 3-month delay we provided the surgical resection of the aneurysm using vascular stapler.

The cause of dilatation was probably traction after previous surgery in a childhood – operation of right-sided inguinal hernia and due to the growth drawing of the scar for the venous wall that consequents to venous dilatation.

Summary: Venous aneurysms are rare vascular malformations, whose symptoms are mostly belated and depend on their size and storage – from compression of surrounding structures, massive bleeding after their rupture, venous thrombosis to pulmonary embolism. The same as symptoms, treatment also depends on localization and co-morbidities. Even in the era of advanced endovascular techniques, vascular surgeon has an irreplaceable role in the treatment of venous aneurysms.

EXERCISE OXIMETRY IN THE DIAGNOSIS OF A CLINICALLY CHALLENGING BILATERAL SOCKET INTOLERANCE AND FOLLOW-UP OF AN APPARENTLY INEFFICIENT REVASCULARISATION

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Background: Socket intolerance is a cause of walking impairment in amputees. Exercise transcutaneous oxygen pressure (Ex-TcPO₂) is proposed to monitor exercise-induced ischemia.

Case 1: A 68 years old female with a history of cardiac and vascular bypass. After femoro-distal bypass occlusion she had amputation of the right leg below the knee. Years later, she complains from socket intolerance and walking fatigability. Ex-TcPO₂ is performed that confirms the arterial origin of pain and the patient is referred for eventual aorto iliac surgery.

Case 2: A 72 years old man with bilateral traumatic tibial amputation since the age of 17, was referred for left thigh pain and socket intolerance. Ex-TcPO₂ showed an ischemia on the left thigh and on buttocks. After vascular surgery, the patient complains from walking limitation with left buttock pain.

A new Ex-TcPO₂ showed a normalization of the thighs ischemia but a worsening on the left buttock, due to the circumflex artery occlusion during surgery.

Conclusion: These cases illustrate questions that physician may face in patients with amputation; Ex-TcPO₂ confirms vascular origin of the pain but also the apparent functional failure in the second patient.

Reference

Fouasson-Chailloux, A., Henni, S., Abraham, P. Exercise Oxymetry in the Diagnosis of a Clinically Challenging Bilateral Socket Intolerance and Follow-up of An Apparently Inefficient Revascularisation. *Int J Phys Med Rehabil*, 5, 2, 2017.

MY MOST IMPRESSIVE CASE OF 2017: RENAL ARTERY STENOSIS AND COMORBIDITIES

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Introduction: Renal artery stenosis are a quite frequent finding in severe generalized atherosclerosis. Approximately 18% of patients with relevant coronary artery disease also have some grade of a renal artery stenosis. In this case the 73-year-old female patient had a PTCA 2003. In 2016, she presented with a progressive renal insufficiency with a low clearance of 23 ml/min and extreme generalized oedema. The diagnostic workup revealed a subtotal renal artery stenosis on the right and a high grade on the left. The right kidney was 7 cm, the left 10 cm in length. After stenting of the left renal artery, the clearance went up to 58 ml/min and the patient lost 8–10 kg of oedema. Already at that time we described a concomitant mesenteric artery disease with an occluded celiac trunc and a high-grade stenosis of the superior mesenteric. Because of no complaints and stable body weight we only recommended regular clinical controls.

After a year the patient came for a routine control. She reported different diagnostic procedures (gastroscopy, enteroscopy) because of loss of appetite and an unexplained weight loss of 30 kg in the last year. She could only eat very little and complained of an uncomfortable epigastric pressure.

The angio revealed the subtotal stenosis of the superior mesenteric artery, which was successfully treated. After the procedure, the epigastric pressure vanished and the patient regained body weight.

Conclusion: Atherosclerotic renal artery stenosis is a sign of severe generalized disease and frequently combined with other vessel problems. Unexplained weight loss and epigastric pressure are sign of mesenteric malperfusion and should not be missed.

SCLEROTHERAPY TO TREAT SYMPTOMATIC FINGER VENOUS MALFORMATIONS: REPORT OF A CASE

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Introduction: Venous malformations can affect the upper limbs and extremities causing therefore daily activity and working ability impairment.

Methods: We present the case of a 37 years old man, working as a building painter, with a symptomatic venous malformation of the fifth finger of the right hand, referred to us after a local thrombotic episode and inability to return to work. After MRI and echocolour Doppler imaging, confirming the absence of arterio-venous shunt, we performed percutaneous sclerotherapy with 1% foam polidocanol in two sessions at 3-month interval.

Results and conclusion: We observed immediate and complete resolution of symptoms after the first session and complete disappearance of the lesion 3 months after the second injection. No relapse was observed at 1-year follow-up. Polidocanol foam sclerotherapy is a safe and effective approach for venous malformations of the extremities. Injections may be repeated if necessary and do not require any anaesthesia.

THERAPEUTIC ROLE OF ADIPOSE-DERIVED STEM CELLS IN DIABETIC FOOT ULCER

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With the increasing global prevalence of diabetes mellitus, a significant rise in the number of patients suffering from non-healing wounds is expected. The current treatments for non-healing wounds include debridement of necrotic tissue, revascularization surgery, mechanical offloading, foot care education, mechanical compression, and limb elevation. However, these treatments are often insufficient to ensure satisfactory wound healing. One therapeutic strategy that has been identified, as particularly promising, utilizes adipose-derived stem cells (ADSCs). These cells have the capacity to differentiate into multiple cell lineages and are considered an alternative source to bone marrow-derived mesenchymal stem cells. They can be easily extracted from the adipose tissue and are capable of in-vitro expansion. Through our review, we aimed to provide an overview of the experimental basis, the scientific background, and advances in the delivery of ADSCs for treating non-healing diabetic wounds. The reviewed studies showed that ADSCs can

enhance diabetic wound healing through increasing epithelialization and granulation tissue formation, anti-inflammatory and anti-apoptotic effects, and release of angiogenic cytokines.

AORTIC STIFFNESS, IN CASE OF BICUSPID AORTIC VALVE, DIFFERS AMONG AORTIC SEGMENTS

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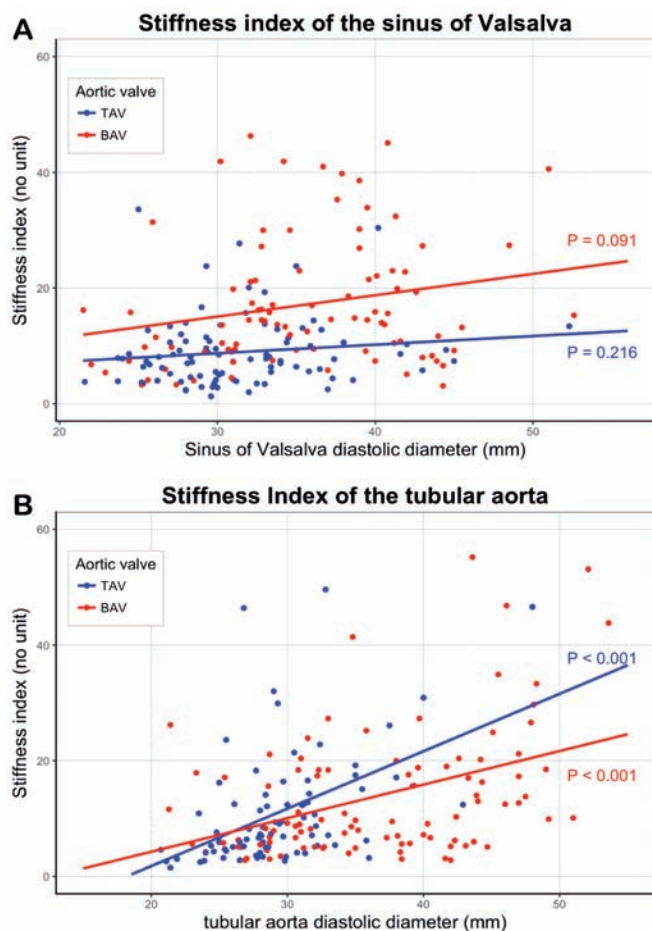
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Figure: Stiffness index (Y-axis, no unit) as a function of aortic diameter (X-axis, mm) at the Valsalva sinus (A) and tubular ascending aorta (B) in BAV patients (red) and relatives (blue). P-values are obtained by comparing the stiffness indexes between BAV patients and relatives with multiple linear correlations adjusted with age.



Objective: Evaluation of the aortic wall segmental characteristics of bicuspid aortic valve (BAV) associated aortopathy, and its association with valvular morphotypes and functions.

Methods: 219 BAV patients and 148 first-degree relatives (without BAV) were retrospectively included in the French Reference Centre for BAV. Ultrasound assessment of aortic and carotid stiffness was based on the variation of the segmental arterial diameters during the cardiac cycle and as a function of blood pressure.

Results: Ascending aorta of BAV patients was more dilated ($p < 0.001$ at each levels) and stiffer at each segment of the ascending aorta ($p < 0.001$) compared to relatives. However, after adjustment on aortic diameter and age, only the sinus of Valsalva remained stiffer in BAV compared to relatives (Figure): stiffness index (no unit) at 37.0 ± 6.9 vs. 31.8 ± 5.3 , $p = 0.025$. Aortic diameters were not influenced by the valve morphotype, except for the arch, more dilated in case of 1-NR subtype: 36.1 vs. 27.6 mm, $p < 0.001$. Aortic insufficiency was associated with an increase in aortic diameters at the sinus of Valsalva and the tubular aortic levels. At the sinus of Valsalva level: 39.6 (aortic insufficiency) vs. 33.3 mm (aortic stenosis), $p = 0.001$.

Conclusion: Increased aortic stiffness in BAV patients, compared to controls, is correlated with aortic dilatation except for the sinus of Valsalva, which presents a specific higher stiffness. These new data emphasize the need to pay more attention to the sinus of Valsalva, when evaluating the vascular risk of a BAV patient.

NON-INVASIVE ARTERIAL STIFFENING EVALUATION BY AORTIC PULSE WAVE VELOCITY WITH ULTRAFAST ULTRASOUND IMAGING IN VASCULAR EHLERS-DANLOS MOUSE MODELS

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Objective: Vascular Ehlers-Danlos syndrome (vEDS) is associated with arterial ruptures, due to a mutant gene encoding collagen type III (Col-III). To better understand the role of Col-III, we aimed at evaluating the aortic stiffness and dynamic stiffening in vEDS mouse models, with either a quantitative (col3KO-mice) or a qualitative Col-III defect (col3KI-mice).

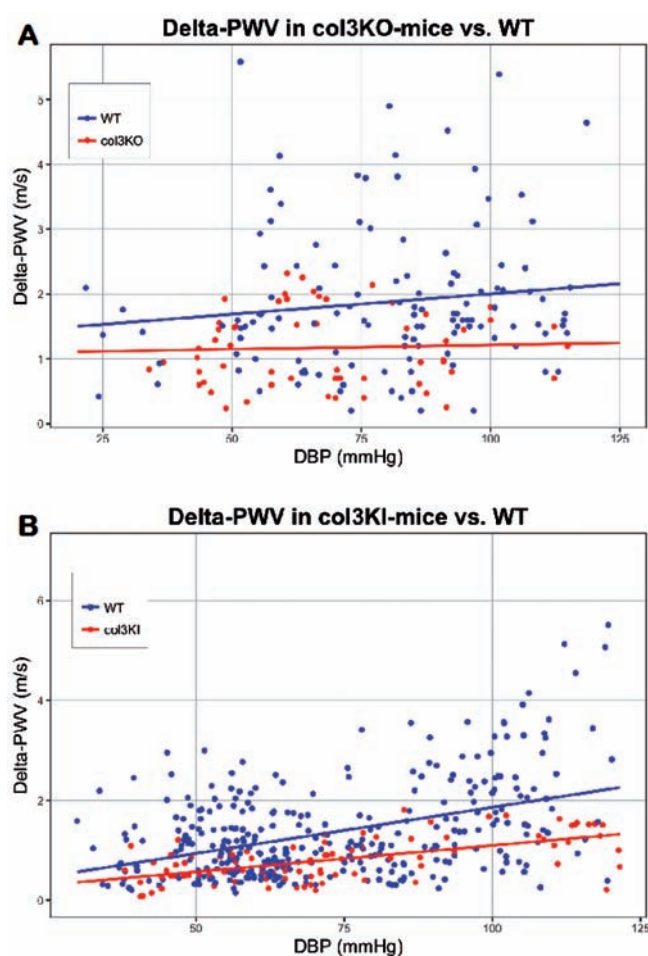
Material and methods: Abdominal aortic wall pulse wave velocities (PWV) in col3KO- and col3KI-mice were compared to their respective wild type (WT) littermates using a 15 MHz-ultrafast-ultrasonic transducer. A carotid catheter continuously monitored pressure changes due to phenylephrine injections. PWV1, generated at diastolic blood pressure (DBP), and

PWV2, at systolic blood pressure (SBP) were recorded. Difference between PWV2 and PWV1 (Delta-PWV) normalized by the pulse pressure (PP), corresponding to the aortic stiffening over the cardiac cycle, were compared between mutant and WT mice, as well as the regression slope of PWV as a function of pressure

Results: Delta-PWV/PP was lower in col3KO- ($p=0.033$) and col3KI-mice ($p<0.001$) vs. WT-mice regardless of the pressure level (Figure). Slope of PWV1 with DBP increase showed a lower arterial stiffness in mutant mice vs. controls in both models. This difference was amplified when evaluating stiffness at systolic blood pressure levels with PWV2.

Conclusion: In both vEDS mouse models, aortic stiffening was reduced, mainly driven by a lower stiffness at systolic blood pressure. Defective Col-III may be responsible for this, as it is recruited when pressure rises. These pre-clinical data could explain vascular fragility observed in vEDS patients.

Figure: Delta-PWV in the col3KO (A) and col3KI (B) mouse models. Results of delta-PWV (PWV2–PWV1; Y-axis) are presented in.



NEW PERSPECTIVES IN CLASSIFICATION, DIAGNOSIS AND MANAGEMENT OF ANGIOEDEMA

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Introduction: Angioedema can be described as an acute pronounced swelling of the deep dermis/mucosa and subcutaneous/submucosal tissues resulting from vasodilatation and blood vessel permeability change. It is an urgent condition requiring fast and precise evaluation and diagnosis followed by immediate treatment. Angioedema can be congenital associated with C1-INH deficiency (HAE-1), C1-INH dysfunction (HAE-2) or normal blood levels of C1-INH (HAE-3). From a clinical perspective, we can distinguish between bradykinin-induced angioedema, which is resistant to epinephrine, corticosteroid and antihistamine administration, and between mast cell mediators-induced angioedema, which is responsive to these stimuli. An acute attack of the latter should be treated according to the international guidelines for anaphylaxis treatment. The on-demand therapy of hereditary angioedema requires substitution of C1-INH. In long-term therapy and preprocedural prevention C1-INH derivatives, B₂ bradykinin receptor antagonists – icatibant and kallikrein inhibitors – ecalantid are used.

Methods: This work is a review article summarising the most recent classification, diagnostic approach and management guidelines. The article considers international guidelines such as the World Allergy Organization (WOA) guidelines¹, International Consensus Algorithm for the Diagnosis, Therapy, and Management of Hereditary Angioedema², and national guidelines of Management of Angioedema suggested by the Angiology Section of Slovak Medical Chamber^{3,4}.

Results: Multiple schemes and pathways were created and adapted from the international guidelines to make them easier to apply in practice. The article also summarises the key points concerning the management of both hereditary and acquired angioedema with a specific section dedicated to the treatment of vulnerable patients, pregnant and breastfeeding women and paediatrics patients.

Conclusion: Angioedema is a medical emergency to which medical staff – regardless of specialty or experience – can be exposed to at any time. Knowledge of the right diagnostic and management pathway is crucial and should be known by, or otherwise immediately available to all doctors and medical staff.

References

1. Craig, T., Aygören-Pürsün, E., Bork, K. et al. WAO guideline for the management of hereditary angioedema. *World Allergy Organ J* 5, 12: 182–199, 2012. 2)
2. Bowen, T., Cicardi, M., Farkas, H. et al. 2010 International consensus algorithm for the diagnosis, therapy and management of hereditary angioedema. *Allergy Asthma Clin Immunol* 6, 1: 24, 2010.

3. Gavorník, P., Gašpar, L., Dukát, A. Nová klasifikácia, diagnóza a manažment angioedému. Odporúčania Angiologickej sekcie Slovenskej lekárskej komory (2013). *Anestéziol Intenzívna Med* 2, 2: 71–76, 2013.
4. Gubo, G., Hučková, N., Slezáková, L., Gašpar, L. Nové perspektívy v klasifikácii, diagnostike a manažmente angioedému. *Interná medicína* 14, 7–8: 303–308, 2014.

NEW PHYSIOLOGICAL VESSEL'S QUALITY – BIOMECHANICAL STUDY

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The study of biomechanical characters of vessels and their modelling cause the new information about behaviour of this anatomical structure.

Recently discovered vessel quality, angiosynizesis and self-excitation wall vessel vibration have an influence on behaviour and understand part of cardiovascular system. Recently discovered biomechanical vessel duality has an influence on physiology and pathophysiology of vessel system in different anatomical systems of body, e.g. central nervous system area.

Physiological aspects: in haemodynamic regulation – Starling resistor, in haemodynamic – combination bridging veins, any venous brain system and venous brain sinuses – primarily cavernous sinus ("physiological jewel box") – as pulsing pump, the effect on liquorodynamic brain system – increased production (plexus chorioideus), resorption (basal system – arachnothelial tissue on skull base, convexity system as standby system), the effect of "movement" of brain on bridging veins, exchange cross-section, influence on brain microcirculation by way oncotic and osmotic pressure during local metabolism, the effect for aim increase function selected brain part – by way physical influences on muscular vein type – the contraction and exchange microcirculation into drainage areas – influence brain part with superior function in the same time (under exam – fMRI, MSI, SISCOM, PET, SPECT).

The self-excitation oscillation: cleaning wall, the effect for blood flow, the inflation of physical effect between layers – biomechanical border double layers, resolution of problem imperfect absolute smoothness inner surface vessel wall, mixing fluids, at fluid with particles reduction particle clustering, the protection before Karman vortex street.

The effect of Karman vortices, vortex streets, on boundary two layers of fluid with different speed come about so-called Kelvin-Helmholtz instability, which demonstrates by form Karman vortices, whose density increases by fractally, the fluid until go to turbulence mode.

Pathophysiological problems: during trauma very junction between bridging veins and sinuses is gentle and fragile area – venorhexis, development of hydrocephalus – influence on production and resorption of cerebrospinal fluid – hyporesorptional (influence of arachothel with combination of venous system) or hypersecretional type – the production from plexus chorioideus, problem with local brain ischemia – arterial and venous type (inhibition of tissue), the problem during surgery procedures

(e.g. temporobasal areas) in train of venous connection – the influence of level brain retraction on flow rate, external compression venous wall, "pseudotumor cerebri" – small brain ventricles, papilloedema, on CT brain oedema, any organic pathology, our premise: impairment of brain outflow – none venous thrombosis or sinuses thrombosis – none venous brain attack, more verisimilitude effect of angiosynizesis.

Self-excitation oscillation. The problem non-pulsing flow at artificial pump in blood circulation, which do not form pulses, participation on development angiosynizesis, the cavitation effect into adventitia and into blood flow, the effect on collagen – piezoelectric, magnetisation etc. – electromagnetic continuum.

The conclusions: very small exchange of length (approx. 1%) about bridging brain veins can go to angiosynizesis, vibration of vessel wall during physiological state, facility beginning of angiosynizesis by propagation pulsing pressure wave, structural stability of bridging veins can be restored by adequate rise in pressure in the given moment. The function of flow in thin wall venous system of brain is combination of angiosynizesis and "pulsing venous pump" of cavernous sinus, which follow into venous system pulsing flow.

Angiosynizesis – the vessel's collapses, the spontaneous shut-off valve of vessel cross-section. The condition: pulsing flow into system minimalized to zero (preferentially in venous system), types: temporary and permanently. The time to an inception of effect is given by biomechanical vessel wall characters a flow fluid characters – rate pulsing, angiosynizesis has effect on haemodynamic and liquorodynamic system of brain and influence on brain microcirculation, angiosynizesis has effect on any pathology of brain (e.g. subdural haematoma and traction of veins – interhemispheric hematoma in the first place, the cause of idiopathic benign intracranial hypertension) and biomechanical quality of bridging veins together with biomechanical quality of connection between bridging veins and venous brain sinuses are area of injury.

Self-excitation oscillation – the effect of commencement of double layer border. The formation at pulsing flow too, a phenomenon on layer border, is able to form on border solid elastic, viscoelastic unit and fluid (continuum), on border layer of fluid etc.

INTRA-TEST AND TEST-RETEST RELIABILITY OF EXERCISE OXIMETRY IN ARTERIAL CLAUDICATION

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Background: Transcutaneous oxygen pressure (TcPO₂) reliability is blunted by an unpredictable transcutaneous gradient through the skin. We hypothesised that the Decrease from Rest of Oxygen pressure (DROP: subtraction of limb-changes from

chest-changes from the respective starting values) would show a good to excellent reliability during Exercise-TcPO₂ investigations.

Methods: In three different experiments we tested: The intra-test variability at the peripheral level (Experiment A: 32 patients, 16 at each location), at the chest level (Experiment B: 45 patients) and the test-retest reproducibility within 3 months (Experiment C: 67 patients). We calculated the intra-class coefficient of correlation (ICC) with 95% confidence interval [Lower/upper limit]. ICC between 0.60 and 0.749 indicate a good agreement. ICC above 0.750 indicates an excellent agreement.

Results: ICC values for DROP-min were 0.848 [0.723/0.935] at the buttock and 0.920 [0.846/0.967] at the calf levels, in experiment A; ICC were 0.873 [0.799/0.923] at the buttock and 0.898 [0.790/0.953] at the calf levels, in experiment B; 0.806 [0.716/0.871] at then buttock level (n=67) and 0.807 [0.722/0.868] at the calf in experiment C.

Conclusions: Intra-test and test-retest reliability is excellent using the DROP calculation for exercise-TcPO₂ investigations.

Reference

Henni, S., Semporé, Y. W., Le Meliner, T. et al. Intra-test and test-retest reliability of exercise oximetry in arterial claudication. *Micorvas Res* 117: 44–49, 2018. (<https://doi.org/10.1016/j.mvr.2018.01.003>)

INTERVENTIONS ON THE SUPERFICIAL VENOUS SYSTEM OF LOWER EXTREMITIES DUE TO A CHRONIC VENOUS DISORDER

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Introduction: Interventional treatment of a chronic venous disorder (CVD) is accomplished especially on the superficial venous system. The target of these operations is to remodel the blood flow and to be minimally invasive.

Aim: To show all up-to-date interventional modalities on the superficial venous system of lower extremities for the treatment of CVD.

Material and method: The crossectomy, stripping and phlebectomy are recommended as a gold standard for an interventional treatment of incompetent superficial veins in many countries. However, modern approaches are minimal invasive and therefore the endovascular treatment has increased in the last two decades so much. These procedures are very often realized in a local anaesthesia, which is beneficial for the most of patients. And this leads to a relocation of these interventions from operating theatres to procedure rooms.

Results: Endovascular procedures are divided into four categories. The first one is chemical ablation – the sclerotherapy: the foam sclerotherapy for stem veins and their tributaries and the liquid sclerotherapy that is indicated for the treatment of spider veins. The second group contains thermal ablations like radiofrequency – RFA and RFITT methods, endovascular laser therapy, where fibres with radial distribution of laser beams are

the most effective and the last thermal intervention is a hot steam. The ciano-acrylate glue belongs to the group three. Combined techniques like mechanic-chemical ablation (MOCA – Clarivein) or Laser assisted foam sclerotherapy (LAFOS presented by Frulini) constitute the group four.

Conclusions: In general, endovascular techniques, especially thermal ablations, are associated with a lot of advantages and benefits as it has been published. But not only endovascular techniques are minimal invasive. It is possible to find minimal invasive methods in the open surgery, too. These surgical approaches are ASVAL and CHIVA methods. Both techniques are well known, but not so frequently used. In general, all minimal invasive methods come out from the haemodynamic theory – the reflux elimination leads to shrinking down of incompetent veins which become asymptomatic due to a reduced flow.

EPITHELIOID SARCOMA AS A CAUSE OF A NOT HEALING ISCHEMIC ULCER

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The authors describe a case report of a 66-year-old patient with chronic limb ischemia who died of generalization of an epithelioid sarcoma. He was a smoker with arterial hypertension and hypercholesterolemia. In 2002 the patient underwent an aorto-bifemoral bypass for critical limb ischemia and superficial ulcer on the right calf. For the next 14 years, the ulcer has not healed and spread out (Figure).



In July 2016 angiography was performed for worsening of pain in the right calf, proving occlusion of the right superficial femoral artery. In October 2016, insertion of a femoropopliteal bypass and the abrasion of chronic granulation in the right calf were performed. Surprisingly, an epithelioid sarcoma was discovered by histological and immunohistochemical studies. In October 2016 patient's right limb was amputated in thigh. Chemotherapy was administered repeatedly, however, the sarcoma cells were generalized in right inguinal nodes and in the right lung. The patient died in December 2017.

The authors draw attention to the risk of developing sarcoma in long-lasting ischemic ulcers.

COMPARISON OF THE ANKLE BRACHIAL INDEX WITH CLINICAL SYMPTOMS OF LOWER EXTREMITY ARTERIAL DISEASE IN DIABETICS – TENTATIVE RESULTS

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Ankle brachial index is a simple non-invasive technique that is primarily used for screening or diagnosis of lower extremity arterial disease (LEAD). The classic manifestation of this disease is intermittent claudication, which, however, is accompanied by atypical symptoms or completely asymptomatic in most patients at the early stage. LEAD occurs to a greater extent, with a worse prognosis, proceeds faster and develops earlier in diabetics. Additionally, in diabetics may be decreased the sensitivity of ABI due to diabetic neuropathy and presence of medial artery calcification. In the Czech Republic, this method is included in the recommendation for dispensarization of type 2 diabetics.

The main objective of this ongoing study is to compare ABI methods with proven clinical symptoms of LEAD in diabetics, especially anamnestic intermittent claudication.

So far, ABI has been measured on 50 limbs in 25 diabetics (type 2). Patients with proven LEAD diagnosis by duplex sonography (DUS) were selected to this group. ABI was measured using the two most commonly used methods (oscillometric and Doppler). For Doppler ABI, different methods were used to calculate the final value, which differed at the site of measurement of systolic pressure on the ankle (*dorsalis pedis* or *tibialis posterior artery*) and at the value of the systolic pressure of the lower limb given to the numerator of the formula for calculating ABI (higher value from two ankle measurements – HAP method, lower value – LAP method). The data thus obtained was compared with clinical signs and intermittent claudication.

From tentative results, we generally see low agreement ABI with clinical status and subjective symptoms. From the evaluated ABI methods, a significant dependence between the occurrence of subjectively stated intermittent claudication and ABI measurement results was found in oscillometric methods. Other methods of ABI do not show significant dependence.

THE MEANING OF BASIC NON-INVASIVE METHODOLOGIES FOR THE DIAGNOSIS OF LOWER EXTREMITY ARTERIAL DISEASE IN DIABETICS – ANKLE BRACHIAL INDEX, DUPLEX ULTRASOUND

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Lower extremity arterial disease (LEAD) is characterized by the presence of ischemia in stenotic or obliterating peripheral artery disease. LEAD occurs to a greater extent, with a worse prognosis, proceeds faster and develops earlier in diabetics. In the initial period of LEAD, the risk of developing cardiovascular disease (myocardial infarction, stroke) is significantly increased.

The basic non-invasive investigative method is the measurement of ankle brachial index (ABI). It is used for both screening and diagnosis purposes. In the Czech Republic, this method is included in the recommendation for the dispensarization of type 2 diabetics. However, in diabetics may be decreased the sensitivity due to diabetic neuropathy or medial artery calcification.

In our ongoing study comparing the ABI with Duplex Sonography DUS (as an investigational standard) in diabetics, we see a low agreement between these two methods. So far, ABI was measured at 50 lower extremities in 25 type 2 diabetics using the two most commonly used methods (oscillometric and Doppler) and an DUS of the arteries of these limbs was performed. The statistically significant difference between the different ABI methods is observed. The highest agreement with DUS (not even 50 % and can be interpreted as weak) is observed in the Doppler ABI. Specifically, it is a method of calculating, which gives to the numerator a lower value of systolic pressure from two measuring points on the ankle (LAP method). Conversely, low agreement is monitored by the oscillometric method. The highest sensitivity is observed in the LAP method and the highest specificity in the oscillometric method. We also generally observed low agreement of ABI with clinical status and subjective symptoms, especially anamnestic claudication.

In this respect, the use of the ABI in diabetics may seem problematic. Neither the so-called "toe-brachial index", which is recommended in this case, may not reflect actual status, in comparison with DUS.

OUTCOMES OF CLARIVEIN ABLATION IN ONE DAY SURGERY CLINIC

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Introduction: The authors of the retrospective study present four years outcomes with mechanochemical endovenous ablation (ClariVein). The ClariVein is a new minimally invasive method which combines mechanical damage of endothelial cells and chemical injury with liquid sclerosant. The advantages of this method are reducing pain during and after treatment, as well as reducing heat-related injury.

Material and methods: We present retrospective study in the period from January 2013 to January 2017. The inclusion criteria were reflux in great, small or accessory saphenous veins and patients who had vein diameters of 3 mm to 10 mm. In small part of patients, we need to use sedation. Tributary veins were treated by concomitant or subsequent sclerotherapy. Initial technical success, complications, visual analogue scale and closure rate were assessed. Patients underwent duplex sonography 3rd day, 3 months and 1 year after procedure.

Results: 124 patients underwent 138 ClariVein ablation in One Day Surgery Clinic from 2013 to 2017. We performed 124 procedures in great saphenous vein, 9 procedures in small saphenous vein, 5 procedures in accessory saphenous veins. The occlusion rate was after 3 days 100%, after 3 months 96% and after 1 year 92%. The visual analogue scale was between 1–2 (0–10). No paraesthesia was occurred in our patients. We noted no deep vein thrombosis and no pulmonary embolism.

Conclusion: The introduction of ClariVein system brings a tumescentless approach in venous surgery. The damage of venous wall during the procedure is less invasive than in heating methods. The results of ClariVein ablation are very similar to thermal methods, about 90–95% of success rate after one year of follow-up. We confirm that ClariVein system is the successful and safety procedure.



WHAT WE KNOW AND DO NOT KNOW ABOUT PERFORATING VEIN OF ADDUCTOR CANAL

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Introduction: The perforating veins of the adductor canal belong to the medial group of the thigh perforators and are of great importance in recurrent varices. Their anatomy is veiled with lack of information of their number and location.

The aim: The aim of the study is to show discrepancies in literary sources and results of real anatomical dissection.

Material and method: There are missing studies providing detailed and reliable data. In the original Dodd's paper, it is possible to find inexact description of anatomical structures in the surrounding of the perforators. There are studies mixing the names Dodd and Hunter or are using different terms for the anatomical structures.

Results: Generally, the adductor canal perforating veins ("perforator of Hunter") correspond to the "inferior perforator of Dodd". The medial perforating veins of the thigh usually connect the anterior accessory great saphenous vein (rarely the proper great saphenous vein) and the femoral vein, but they often bypass the superficial venous trunks and drain separate areas of the subcutaneous tissue. Frequently, they are branched and indirect and pass through the Sartorius, adductor magnus or vasti muscles.

Conclusions: The better knowledge of this anatomical entity may ameliorate our treatment approach of varices recurrence.

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RECURRENT VARICOSE VEINS TREATED WITH FOAM SCLEROTHERAPY

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The etiology of recurrent varicose veins of lower extremities is multifactorial: neovascularisation, incompetent perforators, reflux from pelvic veins etc. However, the neovascularisation is considered to be one of the leading causes of recurrence. In recent years many techniques were described to treat recurrence: re-do surgery, multiple phlebectomies without re-opening the groin or the poplitea fossa, endovenous thermal or non-thermal ablation, foam sclerotherapy and different combined techniques.

Simple ultrasound guided foam sclerotherapy (UGFS) is nowadays most widely used technique, however, it can be combined

with other techniques as well: first of all, with radiofrequency or laser.

UGFS itself is excellent technique to treat recurrent varicose veins: ambulatory, cheap and easily repeatable. It should be the first-line treatment mainly for groin or poplitea fossa neovascularisation except when duplex scanning reveals an intact incompetent saphenous stump at the saphenofemoral or saphenopopliteal junction with a massive reflux filling the peripheral varicose network which means the technical error of the previous surgical procedure.

A CASE OF AN ASYMPTOMATIC LEFT GASTROEPILOIC ARTERY ANEURYSM

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Aneurysms of the gastroepiploic artery is extremely rare occurring at a frequency of 3–4% of all visceral arteries; only 22 cases have been reported in the English literature. We present the case of 65-year-old woman with an asymptomatic visceral artery aneurysm which was an incidental ultrasonography finding. Magnetic resonance imaging showed an arterial aneurysm close to the peripheral splenic artery with intense tortuosity of the celiac and splenic artery. Abdominal computed tomography angiography confirmed the existence of an arterial aneurysm with a diameter of 2,3 cm near the splenic hilus. The patient underwent an elective open surgery through a chevron incision where the complicated celiac artery anatomy and the aneurysm of the left gastroepiploic artery were revealed. The aneurysm was resected with intact the splenic artery and the patient left the hospital on the 4th post-operative day without any complication. Historically, most of aneurysms of the gastroepiploic aneurysms have been observed in men in the 6th decade of their life, and after rupture; in modern times, early incidental diagnosis is frequent due to the spread of imaging studies. Due to the advanced current imaging armamentarium, diagnostic approach and preoperative planning is of paramount importance in order to avoid complications.



KAZUISTIKY
V ANGIOLOGII

MAY-THURNER SYNDROME – NOT A RISK FACTOR FOR POST-THROMBOTIC SYNDROME?

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Introduction: Post-thrombotic syndrome – a common long-term complication of deep vein thrombosis (DVT) – is caused by incomplete recanalization of occluded veins and/or valve insufficiency with consequent venous hypertension. It could also be caused by anatomical changes like iliac vein compression or so-called May-Thurner syndrome (MTS), a syndrome usually found in left leg in young women.

We analysed occurrence of PTS in a group of young females with a history of proximal left leg deep venous thrombosis (DVT), treated with anticoagulation alone. Our assumption was that untreated MTS in this group of patients would cause more frequent PTS.

Methods: Sixty-eight consecutive female patients with a history of proximal (femoropopliteal, femoral and iliofemoral) left-sided DVT in the past (six months to 10 years back) were evaluated. Based on Villalta score we divided them into two groups – with and without PTS (Villalta score ≥ 5 or < 5 , respectively). After clinical assessment, venous ultrasound for residual vein thrombus and valvular incompetence was made, and magnetic resonance angiography for the evaluation of MTS.

Results: Out of 68 patients, 25 women developed PTS (37.3%), which was mild in most cases (84%). Patients with PTS were older (36.3 years vs. 33.6 years; $p=0.047$), recurrent DVT was more common (28% vs. 2.3%; $p=0.001$). Other DVT risk factors (BMI, smoking, thrombophilia) were similar in both groups. Popliteal valvular incompetence was related to PTS ($p=0.01$; OR 3.97; 95% CI 1.364 to 10.63). Neither MTS (OR 1.21, 95% CI 0.44 to 3.06, $p=0.8$) nor incomplete thrombus removal in popliteal and femoral vein (OR 2.8, 95% CI 0.9913 to 7.615, $p=0.07$) were linked to PTS.

Conclusion: Venous hypertension in PTS is multifactorial. In our group of patients valvular incompetence was significantly related to PTS, while residual thrombosis showed only trend. We did not confirm MTS as a risk factor for PTS.

COMPLICATIONS OF PERCUTANEOUS INTERVENTIONS IN OUR PRACTICE

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Introduction: Increasing number of patients with vascular disease leads to more frequent diagnostic and therapeutic interventions. Despite the improvement of the instrumentation

and skills of interventional radiologists and angiologists, it is not possible to avoid peri- and post-interventional complications. The most common are complications in relation to puncture site such as pseudoaneurysm, hematoma or iatrogenic arterio-venous fistula. In addition, iatrogenic embolization and active bleeding may occur as well as early closure of the intervened vessels.

Methods and results: During the years 2016 and 2017 we performed 2,780 interventions at our department on peripheral and extracranial vessels as well as on aorta and veins. EVARs were implanted in 46 cases. In majority of interventions (2,305) transfemoral access was chosen. Transbathial artery access was chosen in 235 cases and venous system was chosen in 39 cases. Overall complication rate was 7,58%. Small complications occurred in 5% and 2,58% patients required surgical treatment. The most common complications were pseudoaneurysms, hematomas and bleedings.

Conclusion: Angiographies and subsequent percutaneous interventions are associated with certain risk of complications, therefore we need to monitor patients, diagnose complications and threat them, even interdisciplinary.

WALKING PERFORMANCES AND MUSCLE OXYGEN DESATURATION ARE INCREASED AFTER SUPERVISED EXERCISE TRAINING IN TAKAYASU ARTERITIS: A CASE REPORT

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Background: Takayasu arteritis (TAK) is a rare chronic inflammatory vasculitis that predominantly affects aorta and its main branches and that may increase cardiovascular risk. Clinical manifestations are diminished/absent peripheral pulses, asymmetric blood pressure in either upper or lower limbs, peripheral ischemia and arterial claudication. Daily life activities are compromised and physical function reduced. Supervised exercise training (SET) is a well-recognized and effective therapeutic tool improving walking performances in patients with chronic atherosclerotic disease; however, the effects of SET, and the underlying mechanisms, remain poorly documented in TAK patients.

Aim: We investigated the effects of a 12-week SET program on walking performances and muscle oxygen saturation [StO_2 (%)] during exercise in a 28-year-old male patient with TAK and symptoms of arterial lower limb claudication.

Methods: SET consisted in 3 weekly 50-min sessions: twice Nordic walking, and once lower limbs strengthening. At beginning and end of SET, pain-free walking distance (PFWD), maximal walking distance (MWD), and calf StO_2 (assessed by near-infrared spectroscopy) were assessed during standardized treadmill test. The 6-minute walking distance (6MWD) was also assessed pre- and post-SET.

Results: Following SET, PFWD (90 m pre- vs. 110 m post-SET), MWD (150 m pre- vs. 560 m post-SET), and 6MWD (352 m pre- vs. 585 m post-SET) increased. Following SET, a greater delta muscle oxygen desaturation (i.e., StO_2 at each time point during exercise minus the baseline StO_2) was observed during the first (-9.2% pre- vs. -18.8% post-SET), and the second (-7.9% pre- vs. -21.1% post-SET) minute of exercise, and also at PFWD (-7.9% pre- vs. -20.9% post-SET) and MWD (-5.7% pre- vs. -13.7% post-SET).

Conclusion: The greater muscle oxygen desaturation (i.e., increased oxygen extraction) during exercise observed after SET may help to explain, at least in part, the increased walking performances and exercise tolerance. These results suggest that exercise should be recommended in TAK patients.

LOW-DOSE LONG-DURATION CATHETER-DIRECTED THROMBOLYSIS IN PROXIMAL DEEP VEIN THROMBOSIS

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Introduction: Patients with acute deep vein thrombosis (DVT) of proximal veins have the worst outcome in terms of post-thrombotic syndrome if treated only with anticoagulant therapy.

Methods: In our non-randomised observational cohort study, all patients had ultrasonically verified occlusive proximal arm or leg DVT (subclavian vein or ileo-femoral vein). Before the start of thrombolysis, we performed CT scans to detect concomitant pulmonary embolism (33%) and to exclude malignancy or any other contraindication to systemic thrombolysis. The thrombolysis catheter was placed under ultrasound guidance through a patent superficial vein (mostly great saphenous, basilic or cephalic vein) into thrombosed region.

Results: After 2012, we treated 12 patients with occlusive proximal DVT with our thrombolysis protocol (75% female, median age 76 years (range 19–89), 83% ileo-femoral DVT, 17% subclavian vein). All patients received catheter-derived slow thrombolysis (alteplase 0.5–1 mg/h) with constant infusion of normal saline to ensure flow and an infusion of unfractionated heparin. Mean thrombolysis time was 136 ± 85 hours with mean dose of 90 ± 61 mg of thrombolytic. Unfractionated heparin in a slow infusion (125–500 IE/h) was continued for 6–19 days after thrombolysis. We monitored the effect of thrombolysis with daily ultrasounds. Angiography was done 2–10 days after the start of thrombolysis to assess the patency of central veins (stenting was required in 58%). No major bleeding, allergic reaction or significant decrease of haemoglobin was observed. Patients were discharged with low-molecular-weight-heparin and oral anticoagulants were started after 1 month if ultrasound check-up showed patent deep venous system. After the mean check-up time of 134 ± 179 days

none of the patients is experiencing post-thrombotic syndrome, proximal veins are patent, without reflux and no recurrence.

Conclusions: Low-dose long-duration catheter-directed thrombolysis is a feasible, safe and successful approach of treating proximal leg (LED 3 or higher) or arm DVT. It can also be complimentary with angioplasty.

DIRECT ORAL ANTICOAGULANTS: A NOVEL THERAPY FOR MAY-THURNER SYNDROME-RELATED DEEP VEIN THROMBOSIS?

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Introduction: May-Thurner Syndrome (MTS) has been reported to up to 40% in patients presenting with left-sided ilio-femoral deep vein thrombosis (DVT). Thrombectomy, stenting, or bypass surgery have been standard therapy. Some patients may not be suitable for interventional approach due to high perioperative risk or from patient's own preference.

We report a clinical outcome of a patient with MTS-related DVT treated with direct oral anticoagulant (DOAC), rivaroxaban.

Methods: An 81-year-old Chinese male was admitted for deep vein thrombosis of the left popliteal vein to the left common femoral vein (CFV).

Computed tomography (CT) venography showed narrowing at the proximal left common iliac vein (CIV), with the right common iliac artery and prominent marginal osteophyte causing compression. The left CIV, left internal and external iliac veins (EIV), left femoral and popliteal veins showed downstream dilatation. Findings were consistent with MTS. No evidence of malignancy was seen in whole body CT.

Enoxaparin was initiated, overlapped with warfarin. Vascular Surgery was sought for possible interventional approach; however, patient opted for medical therapy. Warfarin was switched to rivaroxaban.

Results: Repeat venous Doppler scan after four days showed partial recanalization of thrombosis in the superficial femoral and popliteal veins. Repeat venous Doppler scan after one year showed full recanalization of left CFV, with remaining thrombosis of the left CIV and EIV. Regular follow-up at Vascular Medicine Clinic showed no evidence of post-thrombotic syndrome or chronic venous insufficiency.

Conclusions: DOAC therapy may be considered as an alternative to surgical intervention or Vitamin K antagonist (warfarin) therapy. The success rate of DOAC therapy in MTS-related DVT has not been studied extensively. This can be a good jumpstart for further studies with longer follow-up duration and larger study population.

COMPARISON OF THE ANKLE BRACHIAL INDEX WITH ULTRASONOGRAPHIC EXAMINATION OF THE LOWER LIMB ARTERIES IN DIABETICS WITH A PROVEN LOWER EXTREMITY ARTERIAL DISEASE – TENTATIVE RESULTS

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Ankle brachial index is a non-invasive technique that is especially used to determine lower extremity arterial disease (LEAD). However, in diabetics may be decreased the sensitivity due to diabetic neuropathy and presence of medial artery calcification. In the Czech Republic, this method is included in the recommendation for dispensarization of type 2 diabetics.

The main objective of this ongoing study is to evaluate the validity of the ABI methods in diabetic patients with established LEAD as compared to duplex sonography (DUS) as a gold standard of investigation.

ABI was measured at 50 lower extremities in 25 type 2 diabetics using the two most commonly used methods (oscillometric and Doppler) and an DUS of the arteries of these limbs was performed. For Doppler ABI, different methods were used to calculate the final value, which differed at the site of measurement of systolic pressure on the ankle (*dorsalis pedis* or *tibialis posterior artery*) and at the value of the systolic pressure of the lower limb given to the numerator of the formula for calculating ABI (higher value from two ankle measurements – HAP method, lower value – LAP method). The data was compared to each other, to the oscillometric method and then to the DUS method.

The statistically significant difference between the oscillometric and Doppler method of ABI was found in the evaluated group. When comparing the different methods of ABI with the DUS method, it was found that the highest agreement was achieved with the LAP method. This agreement was, however, not even 50% and according to the kappa index can be interpreted as borderline, rather weak. The highest sensitivity was found in the LAP method and the highest specificity in the oscillometric method. In this respect, the use of the ABI method in diabetics may seem problematic.

OPTOELECTRONIC SCANNING AS A TOOL FOR LOWER EXTREMITY ANTHROPOMETRIC MEASUREMENTS – COMPARISON WITH MANUAL MEASUREMENTS

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Background: Modern optoelectronic methods are used in various sectors to precisely measure surface areas of objects. Building on previous experiences, an optoelectronic scanner BS04 has been constructed to be used for contactless measurements of the body surface area.

Objective: The main objectives of this paper were to verify the feasibility and suitability of the BS04 system for use in healthcare and to determine differences in the accuracy of measuring anthropometric points in the lower extremity with the system when compared with manual measurements.

Methods: Building on a pilot study, a total of 72 series of repeated automated and 144 series of repeated manual measurements were performed in 24 volunteers at 16 measurement points located on the lower extremities. The paired t-test for difference values was used. Statistical significance was assessed at 5% level.

Results: The comparison showed statistically significant differences in all cases. The mean difference between manual and automated measurements ranged from -3.20 to -0.47 cm (min -7.87 cm, max 3.73 cm). On average, the values obtained by automated measurements were higher than those obtained by manual measurements. Certain limitations were found that, for the time being, prevent full use of the BS04 system in the entire population, particularly immobile individuals. Further development and adjustments could make this approach to human body measurements an invaluable instrument for the use in healthcare.

Conclusions: The BS04 scanner is mainly used for making orthopedic, compression and other medical aids. Additionally, the outcomes of automated measurements allow seeing time curves for individual measurements, providing more accurate data on disease progression or regression. In this respect, it holds great potential for use in patients with lymphatic disease requiring lifetime maintenance therapy. The system may also be used in patients undergoing oncological surgery, plastic surgery or some other surgical procedures.

BLOOD PRESSURE RESPONSE TO RENAL SYMPATHETIC DENERVATION DEPENDS ON NUMBER OF ABLATION POINTS

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Aims: To evaluate efficacy of different generation of radiofrequency renal sympathetic denervation (RDN) systems in patients with resistant arterial hypertension (AH) in mid-term follow-up period.

Methods: In the group of 43 patients (55±10 years, M:F 26:17) with uncontrolled AH on 3 or more antihypertensives including diuretics (average office blood pressure /BP/ 189/111 mmHg, average number of antihypertensive drugs 7±1), we realized RDN intervention with use of following systems: Simplicity (Medtronic) – group A (n=17), EnligHTN (St. Jude) – group B (n=16), and Spyral (Medtronic) – group C (n=10). During 6-month follow-up we analysed changes in 24 hours ambulatory BP monitoring (ABPM), and relation of BP response to the number of RDN ablation points. Patients with decrease in ABPM systolic BP (sBP) >10 mmHg after 6 months were defined as responders to RDN.

Results: There was significant decrease in ABPM sBP (167±21 to 156±26 mmHg, p=0.007), as well as in ABPM diastolic BP (94±18 to 90±20 mmHg, p=0.007) after 6 months. However, only 20 patients (47%) were identified as responders to RDN. Drop in sBP in group C (-28±16 mmHg) was higher compare to group A (-4±23 mmHg, p=0.006), and to group B (-4±27 mmHg, p=0.01), with target decrease in sBP in 9/10 patients (90%) in group C. Importantly, responders to RDN were characterized by higher number of ablation points (19±7 vs 14±4, p=0.009), and decrease in 24 hours sBP correlated with number of ablation points (p=0.02, r=-0.36).

Conclusion: Effective decrease in BP could be achieved by higher number of ablations during radiofrequency RDN. An increase in number of responders to RDN could be expected with introduction of newer generation of ablation catheters.

ASSESSMENT OF TIBIOPEDAL RETROGRADE VASCULAR ACCESS AS AN INNOVATIVE APPROACH IN ENDOVASCULAR TREATMENT OF PATIENTS WITH CRITICAL LIMB ISCHEMIA

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Introduction: In some patients with critical lower limb ischemia antegrade endovascular recanalization (in accordance to the blood flow) occluded arteries below the inguinal liga-

ment cannot be performed. In that case retrograde access (contrary to the blood flow) to foot and crus arteries may be used to endovascular therapy for chronic total occlusion. Aim of our study was to rate effectiveness of retrograde access method and frequency of complications during these procedures.

Methods: During the study, 119 patients treated in a relatively large angiology centre who underwent percutaneous transluminal angioplasty (PTA) and required retrograde access were observed. Using the data collected in Angiology Procedures' Register, procedures technique, effectiveness of revascularization and complications were reviewed. Furthermore, clinical condition and haemodynamic parameters before PTA, 1 day, 30 days, 3 months and 6 months after the procedure were assessed.

Results: In 100 out of 133 cases (75%) retrograde access enabled artery recanalization which was impossible using the antegrade method. In 23 cases (17%) complications occurred (2 blood vessel contractions, 5 occlusions, 2 perforations, 2 arteriovenous fistulae) which were successfully managed intra-procedurally (in 1 case covered stent was inserted, in 10 cases additional PTA was performed and in 7 cases pressure dressing was used).

In 6-month observation 11 (9,2%) patients required reintervention and in 5 patients (4,2%) lower limb was amputated, however retrograde access did not contribute to these complications. Clinical condition of lower limb after 6 months in 88 cases improved (74%), did not change 25 (21%) and worsened 6 (5%).

Conclusion: Tibiopodal retrograde access substantially increases effectiveness of artery recanalization in lower limb arteries located below the inguinal ligament. Complications of retrograde access are relatively rare and can be successfully managed intra-procedurally, using endovascular techniques. Retrograde access revascularizations should be introduced into daily clinical practice.

CD8+ T LYMPHOCYTE SUBSETS AS EARLY REACTANTS IN POST-ANGIOPLASTY VASCULAR INJURY IN PAD PATIENTS

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Introduction: Early recruitment of T lymphocytes at the vascular injury site is known as initiating phenomenon in atherosclerotic plaque development. Immunosenescent CD28nullCD8+ T cells are attributed to the plaque destabilization in animal models and in vitro experimentation. T lymphocytes behaviour in Peripheral Arterial Disease (PAD) is mostly unknown.

Methods: Blood was collected before and immediately after PTA (via angioplasty catheter, directly from the plaque vicinity) in 45 patients with PAD Rutherford class 3 and 4. Other potential immune activation causes were excluded. Sham procedures with no angioplasty performed served as observational controls. T cell populations were isolated and characterized by FACS cytometry.

Results: PTA was associated with an acute reduction of TCR CD8+ T cells. Further characterisation revealed reduction in pro-atherosclerotic CD28nullCD57+ cells, effector (CD45RA+CCR7-) and effector memory (CD45RA-CCR7-) cells. No differences in CD4+ cells were noted. Also, cells bearing activation and tissue homing and adhesion markers were also reduced.

Conclusions: Effector and immunosenescent CD8+ T cells bearing chemokine receptor CCR5 may preferentially adhere to the injured vessel wall after balloon deflation. This phenomenon most probably reflects an early phase of plaque initiation and progression process. Immunosenescent, activated effector CD8+ cells have a role in the initial vascular injury dependent immune response following PTA in PAD patients.

DOPPLER WAVEFORMS ASSESSMENT FOR PAD

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Peripheral artery disease of the lower limbs (PAD) is a common disease. Evaluation of PAD is primarily based on non-invasive examinations with analysis of the arterial Doppler signal being a key element. However, the description of arterial Doppler waveforms morphologies varies considerably across medical schools and from country to country. In order to overcome this issue, the French College of Teachers for Vascular Medicine (Collège des Enseignants de Médecine Vasculaire; CEMV) has summarised the published data on Doppler waveforms analysis and proposes the simplified Saint-Bonnet classification system to describe Doppler waveforms morphologies. This classification, which is based on previous classifications, could improve the descriptions of both physiological and pathological waveforms, recorded in lower limb arteries.

THE ROLE OF OPEN SURGICAL CONVERSION IN THE TREATMENT OF LATE COMPLICATIONS AFTER TEVAR

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Background: Thoracic endovascular aortic repair (TEVAR) is the method of choice in the treatment of majority of patients with the aneurysm of descending thoracic aorta. Some of late complications require open surgical conversion (OSC) which is often complex and challenging procedure.

Methods: Between 2008–2017, 114 TEVARs were performed at our Clinic. Seven patients (6.1%) required OSC due to late complications. Indications for TEVAR were postdissectant aneurysm of thoracoabdominal aorta (2 pts); degenerative aneurysm of thoracic aorta (ATA) (2 pts); posttraumatic ATA (2 pts) and saccular ATA (1 pt). The mean interval between TEVAR and OSC was 38.7 months. Indications for OSC were: distal progression of aneurysmatic disease (2); type III endoleak (1); stent graft migration with type Ib endoleak associated with rupture (1); type Ia endoleak with aneurysm enlargement (1); secondary aorto-esophageal fistula (AEF) (1) and secondary AEF associated with aortobronchial fistula (ABF) (1). In the majority of patients complex open surgical repair was performed, requiring extirpation of endograft and implantation of conventional vascular prosthesis. In patients with AEF and ABF additional procedures were required.

Results: Intrahospital mortality was 43% (3 pts). Reasons for lethal outcome were uncontrolled intraoperative haemorrhage (1), acute dyspnoea and haemoptysis in patient with ABF and profound myocardial decompensation (1). During mean follow up of survived patients (18 months) there were no signs of additional events.

Conclusion: In most cases OSR after TEVAR requires extensive and complex procedure associated with high perioperative mortality. It should be performed in highly profiled vascular centres with significant experience in open vascular surgery.

BRINGING THE BASIC MICROCIRCULATION RESEARCH TO THE CLINICAL WORLD

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Regardless of the significant progress made by the basic research on microcirculation over the last two decades, the clinical world still remains far from them. An example of this gap may be considered the application of wavelet analysis to the Laser Doppler Fluxmetry signals for studying the cuta-

neous flowmotion waves. Despite the wavelet analysis of the laser Doppler fluxmetry was introduced in 1998 and allowed the investigation of each microvascular haemodynamic components (endothelial, sympathetic and myogenic) till now it has remained almost neglected in clinical application.

The systematic review of the literature made on PubMed and Scopus databases from January 1990 to December 2017 has found 98 studies on humans reporting the application of the Wavelet analysis to the Laser Doppler Fluxmetry. On average, the number of studies published per year was 4.8 (95% CI 3.4–6.2).

Fifty-three studies, 54.0% (95% CI 44.2–63.6) pooled rate, have been performed on 892 healthy subjects; only 45 studies, 45.9% (95% CI 36.3–55.7) pooled rate, on 1,679 patients, have been performed in clinical application with no significant difference ($p=0.81$). The overall trend of studies production has shown a significant increase from 1998 to 2017 ($p=0.0006$). Only in the last 5 years the studies about clinical application on patients have shown a significant increase ($p=0.0003$).

This review highlights that the wavelet analysis remains underused and neglected even though it represents a promising methodology for the study of microcirculatory haemodynamic and in particular for the endothelial function at microcirculatory level.

ABDOMINAL AORTIC ANEURYSM: A TWELVE-YEAR TREND OVERVIEW IN A TERTIARY CARE CENTRE

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Background: The rupture of the abdominal aortic aneurysm is burdened by high mortality and therefore early diagnosis and planning treatment is crucial. Endovascular grafting (EVAR) and open surgical grafting are both performed to prevent rupture of abdominal aortic aneurysm. The difference is that the EVAR is less invasive than open surgery and recovery time may be faster. Investigation of epidemiological tendency represents a fundamental feedback about how we cured in the past to better improve what we would care in the future.

Objectives: This retrospective analysis will focus on twelve-year trends in hospitalization for abdominal aortic aneurysm, treatment, complications, comorbidity and in-hospital mortality in a tertiary centre in southern Italy.

Methods: We retrospectively collected all hospitalization for abdominal aortic aneurysm in the period 2005–2016,

analysing endovascular and open surgery, in-hospital-mortality, surgery complications, age and comorbidities.

Results: We examined 1,095 hospitalization for abdominal aortic aneurysm in a twelve-year period. We observed a progressive increase of hospitalization prevalence (from 62 to 84 patient/year, $p<0.01$). There was a significant increasing in EVAR (from 19.4% to 90.5%; $p<0.01$) (Figure 1) with significant reduction of some surgical complications as anemia, acute respiratory failure, cardiac arrhythmias, shock and in-hospital mortality (Table and Figure 2). The mean age at admission is higher in patients undergoing EVAR (73.23 ± 8.05 ys 70.45 ± 8.38

Figure 1

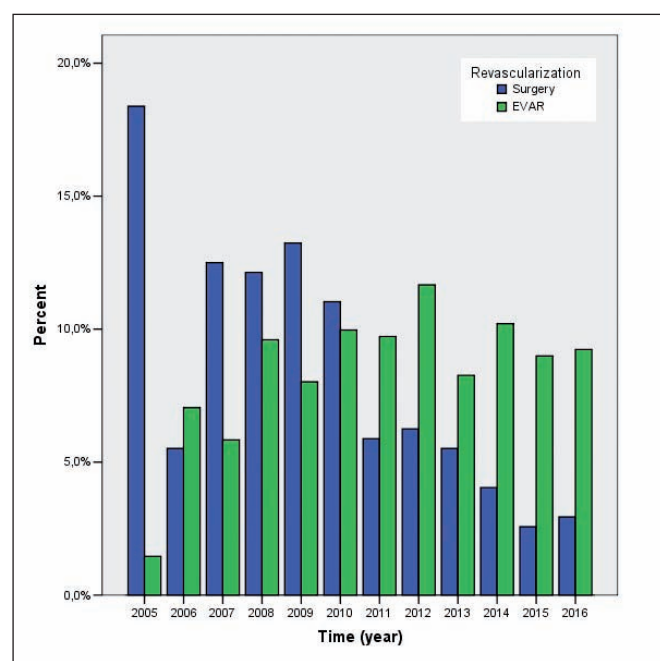
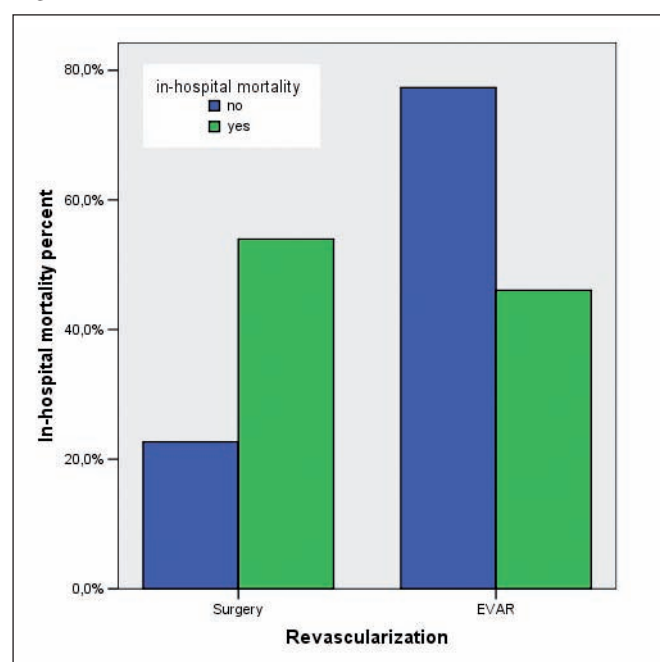


Figure 2



ys, $p<0.001$). No statistically significant differences were observed in the two treatment groups among the comorbidities evaluated except for arterial hypertension.

Conclusions: Our retrospective analysis shows an increased burden in abdominal aortic aneurysm hospitalization. The endovascular treatment reduces many surgical complications and in-hospital mortality, from which it can be deduced that a timely diagnosis is fundamental for a better planning and treatment success.

Table

	Total	Open surgery	EVAR	p
N. hospitalization	1,095	272	823	<0.001
Age\pmSD	72.54 \pm 8.21	70.45 \pm 8.38	73.23 \pm 8.05	<0.001
Chronic comorbidity				
Ischemic heart disease (%)	7.9	7.0	8.3	ns
Diabetes (%)	3.9	1.5	4.7	ns
Hypertension (%)	19.9	10.3	23.1	0.05
Renal disease (%)	2.7	1.8	3.0	ns
Chronic bronchitis (%)	8.9	7.7	9.2	ns
Dyslipidemia (%)	3.9	1.5	4.7	ns
Other aneurysms (%)	1.9	2.9	1.7	ns
Vascular arteriosclerosis (%)	2.9	3.3	2.8	ns
Cancer (%)	2.3	0.7	2.8	ns
Acute complications				
Anemia (%)	10.9	19.9	7.9	<0.001
Renal failure (%)	0.4	0.7	0.2	ns
Respiratory failure (%)	8.5	21.3	4.3	<0.001
Cardiac arrhythmias (%)	3.6	1.1	4.4	0.05
Embolism and thrombosis (%)	4.0	5.1	3.6	ns
Fractures (%)	0.3	0.4	0.2	ns
Gastrointestinal complications (%)	1.5	2.6	1.5	ns
Haemorrhage (%)	0.9	1.8	0.6	ns
Infections (%)	0.5	1.1	0.2	ns
Shock (%)	2.2	4.8	1.3	0.05
Urinary complications (%)	0.5	0	0.6	ns
Other complications (%)	1.7	2.6	1.5	ns
Mortality (%)	6.9	15.1	4.3	<0.001

SEVERE FORM OF VENOUS LEG ULCER AFTER SURGICAL TREATMENT OF SECONDARY VARICOSE VEINS IN PATIENT WITH POSTTHROMBOTIC SYNDROME

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Introduction: The appearance of secondary varicose veins after deep vein thrombosis (DVT) is a common problem. In general, surgical treatment of varicose veins in such patients is

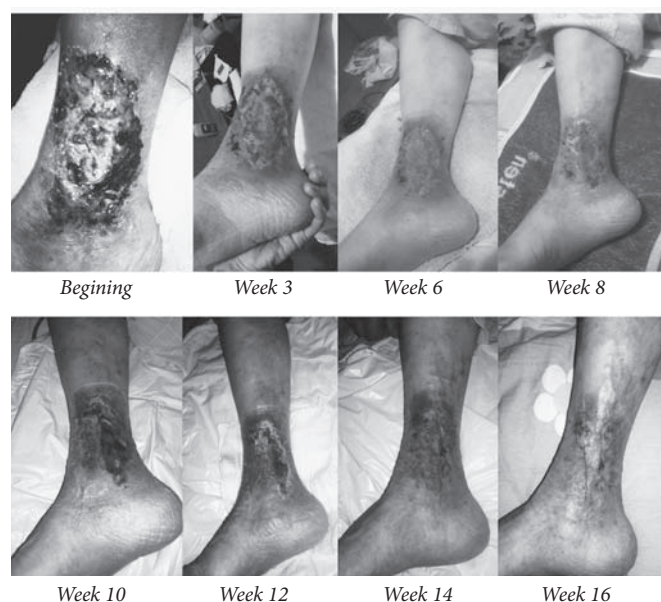
contraindicated. If surgical treatment is performed anyway, there is a disruption of the venous drainage of the entire limb. It usually significantly accelerates the development of complications of chronic venous insufficiency.

Case report: We are presenting a 56-year-old female patient. At the age of 40, she had a DVT of femoro-popliteal segment of the right leg. Secondary varicose veins developed 2.5 years after DVT. At the age of 44, stripping of right great saphenous vein was performed, and 3 years later, residual varicose veins were surgically removed. Over last 5 years, she occasionally had ulcerations on the right lower leg. Current ulceration developed 2 months before she was examined for the first time by dermatologist-angiologist. Prior to our examination she was hospitalized at the regional centre, received a number of antibiotics. Elastic bandage was not applied.

At the time of the first examination, there was large ulceration on the medial side of the distal third of the right lower leg, covered with a haemorrhagic-necrotic scab. The surrounding skin was eczematized, but without signs of infection. Ulcer was extremely painful, and patient's general condition disturbed. We applied combination therapy with systemic diosmin, silver-containing dressings and compression class 3 elastic stocking. Within 4 months complete epithelization of ulceration was achieved (Figure 1).

Conclusion: Treatment of patients in whom a complete great saphenous vein stripping after femoropopliteal DVT was performed, represents a major therapeutic challenge. Application of high degree compressive therapy, accompanied by adequate local ulceration therapy, good control of infection and administration of diosmin preparations in systemic therapy are needed for optimal results.

Figure 1: Course of venous leg ulcer treatment



EFFICACY AND PATENCY OF REVASCULARIZATION IN PATIENTS WITH THROMBOANGIITIS OBLITERANS

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Background: Thromboangiitis obliterans (TAO) is associated with a high amputation rate because of tobacco continuation and the few pharmacological and revascularization options of controversial efficacy. Endovascular or bypass revascularization patency and efficacy are poorly described in the literature. We aimed at describing the results of the French National Reference Centre TAO cohort.

Methods: A revascularization procedure has been attempted in 19 of the 198 patients followed-up. Patency was assessed on angioCT-scan or Duplex ultrasounds. Efficacy was assessed according to clinicians in charge of the patient, and if an amputation had been performed or not despite a primary successful procedure.

Results: 16 were male, all tobacco users, 21% cannabis users. Median follow-up was 19.9 months [11.0–36.9]. 84.2% of the patients received Iloprost before revascularization, and 63.2% had dihydropyridine, 73.3% statin and 100% at least aspirin. Endovascular procedure was exclusive for 14 patients, bypass surgery for 1 patient and 4 patients had combined procedures, leading to 7 bypasses (15.9%) and 37 endovascular surgeries (84.1%). Primary patency of endovascular procedures was 89.4% and their patency duration was 221 ± 173 days. For bypass surgery, the patency duration was higher 827 ± 408 days ($p=0.273$). On long term aorto-iliac revascularizations were better $1,830$ days followed by upper limb 751 ± 402 days, femoro-popliteal 347 ± 196 days and finally infra-popliteal with 178 ± 134 days.

Stability or improvement was observed after 52.3% of the revascularizations. Minor and major amputations accounted for 21.2% and 11.3% of the failures.

Conclusions: As expected, proximal artery revascularizations of lower limbs were associated with higher and longer patency rate than femoro-popliteal procedures or infra-popliteal revascularizations. Upper limb revascularizations had a better outcome than for lower limbs. Although the efficacy is difficult to assess because often proposed as a limb salvage procedure, it is noteworthy it brought benefit to > 50% of the patients.

MANIFESTATION OF LATENT LYMPHEDEMA AFTER VEIN SURGERY

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Case report of 64-year-old woman, tailors, non-smoker with varicose veins. Typical symptoms of CVI started in 30 years, mostly in right leg. 1998–2014 tree-times surgery in local anaesthesia, 2014 crossectomy in the right groin, after which occurred swelling in the calf and forefoot with the picture of typical lymphedema. Lymphoscintigraphy proved decreasing lymph drainage not only in the right leg, but partly in left leg. We conclude the case as latent lymphedema in both legs, manifested in right side after varicose vein surgery.

COUMARIN NECROSIS OF UPPER LIMB FINGERS

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A 63-year-old woman with a history of recurrent phlebotrombosis of lower limbs on a regular anticoagulant therapy with warfarin for many years was admitted to hospital for repeated left lower limb erysipelas. She was treated with antibiotics and the inflammation regressed after this therapy. Sudden redness and pain of the left hand and fingers of the right hand occurred on the 7th day. Within few hours, petechiae disseminated and ecchymosis developed. During another two days, a severe left-hand ischemia with black-violet oedematous lesions, with haemorrhagic bullae and an erythematous rim evolved. The right hand was affected only in distal parts of the fingers. CT angiography excluded both thrombosis and embolization. An oesophageal echocardiography didn't reveal any significant pathology as well. Both vasculitis and secondary Raynaud's phenomenon were excluded based on a clinical finding, laboratory tests, PET CT and capillaroscopy. The association with erysipelas didn't seem to be likely after 7 days of



an effective antibiotic therapy. Finally, according to the disease manifestation, lesions morphology, low C and S protein levels, and a history of INR fluctuations, a coumarin necrosis appeared to be the cause. Further progression stopped after a discontinuation of warfarin, a conversion to low molecular heparin, plasma and vitamin K substitution. A size of the lesions reduced, and a necrotic tissue demarcated within the fingers of both upper limbs.

A coumarin necrosis occurs in 0.01–0.1% of patients treated with warfarin. The pathophysiology of the disease is the disbalance of a procoagulant and anticoagulant factors in the initiation of the therapy, but there are case reports of a coumarin necrosis even after 15 years of full anticoagulation. Typically, it is localized on the breasts, buttocks and thighs. However, there are only rare cases of the acral limb involvement.

MULTIDISCIPLINARY THERAPEUTIC APPROACH AS A MODULATOR OF THE COURSE OF PERIPHERAL ARTERIAL DISEASE OF THE LOWER LIMBS AND SENSORIMOTOR POLYNEUROPATHY AMONG THE PATIENTS SUFFERING FROM DIABETES MELLITUS

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Judging by the epidemiological predictions, vascular diseases which include peripheral arterial disease of the lower limbs-PAD, will be responsible for 19 millions of death among the world population in 2020. Statistics say that 74 billion euros, by year, will be spent for the therapy of patients with vascular diseases in European community.

Observed from an epidemiological point of view, over the last decade, in developed countries, there is a tendency of significant increase in the prevalence of diabetes mellitus (DM), reaching 4–6%, which means that today, over 250 million people in the world suffer from DM. Considering that 40–60% of all patients suffering from DM have diabetic polyneuropathy (DPN), we can conclude that today, about 150 million people in the world suffer from DPN.

Accordingly, this study had two objectives:

1. To examine the impact of the application of physical procedures and physical activity on the course of PAD and DPN among the patients suffering from DM.
2. To examine the significance of the correlation between the course of PAD and DPN among the patients suffering from DM.

The conducted study was descriptively-correlating. The sample included 45 patients with diagnosis of PAD and DM (with DPN). Patients were randomly divided into two groups that differed in applied treatment protocol. Patients of the first

group were treated with: medicaments therapy, physical activity and physical procedures, while among patients of the second group neither physical procedures or activities were applied. EMNG examination was also performed before and after implementation of mentioned therapeutical protocols.

The results of this study indicate the existence of a high statistically significant impact of the application of physical therapy (physical procedures and physical activity) on the regression of the course of PAD and DPN among the patients suffering from DM, as well as the existence of a statistically significant correlation of the course of these two pathological entities among the patients suffering from DM.

The general conclusion of this study could be that physical therapy, which necessarily should involve both: physical activity and physical procedures, should be the integral part of the therapeutic algorithm, which is used in the treatment of patients suffering from both, PAD and DPN.

THE ROLE OF NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN (NGAL) AS NOVEL BIOMARKER FOR ATHEROSCLEROTIC RISK STRATIFICATION IN PATIENTS WITH HIGH CAROTID ARTERY PLAQUE BURDEN

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Background: Neutrophil gelatinase-associated lipocalin (NGAL) is a glycoprotein elevated in kidney disease and inflammatory processes. Recently, clinical trials revealed NGAL as novel biomarker for cardiovascular disorders like myocardial infarction or heart failure. Since, atherosclerosis is associated with inflammation we hypothesised an association between NGAL levels and plaque volume. To test our hypothesis, we used sonographic 3D plaque volumetry which is a promising new approach to quantify exactly atherosclerotic plaque burden in peripheral arteries.

Methods: In this prospective, single centre study, we included 361 asymptomatic patients with at least one cardiovascular risk factor or an established cardiovascular disease. The level of NGAL was determined in peripheral plasma blood samples using a commercially available ELISA. Atherosclerotic plaque burden (3D plaque volume) of carotid arteries was analysed using an automated software on a Philips iU22 system equipped with a VL 13-5 probe.

Results: Patients with no or low carotid plaque burden ($n=297$) and those with high carotid plaque burden ($n=64$) were separated in two groups. NGAL was significantly higher in patients with high carotid plaque burden versus patients with no or low carotid plaque burden (69 [mean \pm SD $43-95$] versus 91 [mean \pm SD $60-122$] ng/ml, $p<0.0001$). Interestingly, high sensitivity CRP did not differ significantly ($0,33$ [mean \pm SD $-0,13-0,79$] versus $0,39$ [mean \pm SD $-0,08-0,86$]

ng/ml, $p=0,084$). The value of the NGAL amplitude for the prediction of high carotid plaque burden (AUC: 0.729 , 95%CI $0.67-0.79$; $p<0.0001$) was significantly higher compared to that for hs-CRP (AUC: 0.568 , 95%CI $0.49-0.64$; $p=0.089$).

Conclusion: In our patients, the level of NGAL appears to be a better predictor for high atherosclerotic plaque burden compared to the level of high-sensitivity CRP, which is the most widely used biomarker for atherosclerosis at the moment.

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PROPHYLAXIS OF VENOUS THROMBOEMBOLISM IN PREGNANCY AND POSTPARTUM

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The risk of venous thromboembolism in pregnant women is increased up to tenfold in comparison to non-pregnant ones of the same age and it is even higher in the first 6 weeks postpartum. Absolute numbers of VTE are still low – up to 2 per 1,000 deliveries. However, VTE is nevertheless important cause of maternal morbidity and mortality. Some women are at higher risk than the others. Risk stratification is therefore needed. The most common risk factors are previous VTE – unprovoked and related to hormonal treatment, acquired thrombophilia and VTE in close relatives. The concomitant diseases and procedures like caesarean section are also important. For prophylaxis low molecular weight heparins are used, because the risk for adverse events with other drugs outweighs the benefit. The proposed duration of treatment depends on the risk. In some prophylaxis is needed during the whole pregnancy and in the others only postpartum. There is no general consensus about the dosage – guidelines discuss low or intermediate dosage. The risk of bleeding goes up with higher doses, which are probably more effective in prophylaxis. We report about the efficacy and adverse events in our group of pregnant women treated with prophylactic low dose low molecular weight heparins.

Table: Women treated with low dose low molecular heparin during pregnancy and/or postpartum

Duration of prophylaxis	Number	New VTE	Major bleeding	Minor bleeding
The whole pregnancy and postpartum	261	3 (0.9%)	6 (1.8%)	13 (4%)
Postpartum only	65	0 (0%)	1 (0.3%)	1 (0.3%)
All	326	3 (0.9%)	7 (2.1%)	14 (4.3%)

In our group, the recurrent VTE rate was low, and bleeding rate could be accepted as it was not higher as it is in nontreated pregnant women. Therefore, our conclusion could be that low dosage low molecular weight could be used and there is no need for intermediate dosages.

INFLUENCE OF INSULIN RESISTANCE AND HYPERINSULINISM ON HEART RATE VARIABILITY, MYOCARDIAL STRAIN AND ARTERIAL STIFFNESS

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Background and aim: Metabolic Syndrome (MetS) is a cluster of Risk Factors (RFs) that recognize as main cause the insulin resistance and the hyperinsulinism.

The aim of our study was: 1) to search a possible correlation between insulin resistance and heart rate variability; 2) to evaluate if patients with insulin resistance, but without diabetes, present a reduction of cardiac global longitudinal strain, a parameter useful to identify the risk of developing cardiomyopathy; 3) to study a possible relationship between insulin resistance and arterial stiffness.

Methods: We studied 127 asymptomatic patients (61 ± 11.4 years) with cardiovascular RFs. All patients underwent: coronary angiography; 24 hours ECG Holter monitoring useful to detect heart rate variability (SDANN, SDNN index and RMSDDN); echocardiogram, with the evaluation of Global Longitudinal Strain (GLS); Doppler ultrasound of carotid arteries, with the evaluation of pulse wave velocity (PWV) and laboratory tests. Exclusion criteria were: coronary arteries disease detected by angiography, diabetes (fasting glucose greater than 126 mg/dl or treatment with insulin or oral hypoglycemic agents), and creatinine above 1.5 mg/dl, atrial fibrillation or malignant arrhythmias, left ventricular hypertrophy, valvular heart disease, ejection fraction below 50%. The presence of insulin resistance was assessed by using the Homeostasis Model Assessment of Insulin Resistance (HOMA-IR).

Results: Patients were divided into two groups based on the value of HOMA-IR of 2,5. In patient with higher levels of HOMA-IR ($>2,5$) we observed: heart rate variability (SDANN and SDNN index) significantly reduced ($91,6 \pm 22,5$ vs. $116,1 \pm 25,32$, $p=0.001$ and $70,9 \pm 12,52$ vs. $85 \pm 21,13$, $p=0,004$); global longitudinal strain (GLS) significantly reduced ($-17,75 \pm 2,35\%$ vs. $-20 \pm 1,95\%$, $p=0.001$) and an increased vascular stiffness, evaluated as pulse wave velocity (PWV) ($8,54 \pm 2,25$ m/s vs. $6,89 \pm 1,29$ m/s; $p=0.001$).

Conclusions: Insulin resistance is associated with subclinical myocardial alterations, measured as reduction of heart rate variability, reduction of global longitudinal strain, and vascular disease, evaluated as increased arterial stiffness. Our results underline the importance of studying ventricular-arterial coupling, in the perspective of preventive and therapeutic interventions, which should be synergic on both fronts.

TREATING GREAT AND SMALL SAPHENOUS VEIN INSUFFICIENCY WITH HISTOACRYL IN PATIENTS WITH VENOUS ULCERATION AND INCREASED RISK OF SURGERY

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Introduction: Treating great and small saphenous vein trunk insufficiency with cyanoacrylate glue is the least taxing treatment method of all available techniques. In response to the long-term unavailability of commercial kits with modified n-butyl-2-cyanoacrylate (Histoacryl) in the Czech Republic, we developed a proprietary technique.

Patients and methods: Over two years, we treated 56 limbs in 49 patients suffering from great saphenous vein or small saphenous vein insufficiency. In the study, we included in particular patients with severe venous insufficiency and patients with complicating comorbidities. We used the Seldinger technique with ultrasound control to insert a catheter into the treated venous trunk. After flushing the catheter with 5% glucose and checking the position of the catheter tip, we gradually applied the Histoacryl with Lipiodol under ultrasound probe compression.

Results: The immediate success rate of the treatment was 98%. In follow-up intervals of 6 weeks, 6 months, 1 year and 2 years, the anatomical success rates of embolization (recanalization of no more than 10 cm from the junction) were 98%, 96%, 94%, and 94% respectively. At identical intervals the venous insufficiency was scored according to the Aberdeen Varicose Vein Questionnaire and the American Venous Clinical Severity Score. In both cases improvement was demonstrated over the two-year follow-up, with a 0.05% significance level. Specific clinical signs of venous insufficiency were also evaluated, such as pain, oedema, clearance of varicose veins and healing of venous ulceration. One severe complication – a pulmonary embolism – was reported, without consequences.

Conclusion: We demonstrated that treating insufficient saphena by embolizing them with Histoacryl and Lipiodol is a successful technique which can also be applied to patients with severe forms of venous insufficiency and with numerous comorbidities; to such patients, this treatment method poses a minimum burden, while significantly relieving the symptoms of chronic venous insufficiency.

RADICAL NEPHRECTOMY COMBINED WITH INFERIOR VENA CAVA THROMBECTOMY FOR MALIGNANT THROMBUS CAUSED BY RENAL CARCINOMA: 4 PATIENTS SERIE

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Background: Advanced renal cell carcinoma (RCC) in some cases causes renal vein malignant thrombus, with potential of growth into inferior vena cava (IVC) or even right atrium. RCC is accompanied by an intravascular malignant thrombus in up to 10% of cases. Caval thrombectomy combined with radical nephrectomy currently represents the only complex treatment for this diagnosis.

Introduction: Four patients underwent IVC thrombectomy with partial IVC resection and radical nephrectomy for RCC between 2014 and 2017 at our department. All relevant data were collected and analysed.

Method and results: Four patients underwent IVC thrombectomy with partial IVC resection combined with radical nephrectomy. An average age of the patients was 59 years (range 47–74 years). Mean hospital stay was 10 days (range 6–16 days). Two patients (50%) had a right-sided tumour. According to the Novick classification of IVC tumour thrombus, there were 2 infra-hepatic (level I or II), 0 intra-hepatic (level III), and 2 supra-diaphragmatic (level IV) tumour thrombi. The use of extra-corporal circulation in a tumour removal through the left atrium was performed in one patient (25%). In one patient (25%) the pericardium was opened and in order to place cross-clamp above a tumour just below the left atrium. The intraoperative transoesophageal Doppler was used to make sure the clamp is placed above the thrombus. Dilatation of the VCI was needed in one patient (25%). IVC resection and reconstruction for adhering tumour was performed in one patient (25%). There were no postoperative mortalities up-to-date with an average follow-up of 19.7 month (range 2–48 month). Up-to-date no patient had demonstrated recurrent IVC tumour thrombus requiring secondary IVC thrombectomy and/or any other treatment. A comparison of estimated blood loss and transfusion rate was not significantly different in all four cases.

Conclusion: Despite the technical complexity of the procedure, caval thrombectomy combined with radical nephrectomy currently represents the only radical treatment of RCC accompanied by a malignant thrombus in the IVC.

ENDOVASCULAR VS SURGICAL TREATMENT OF SUBCLAVIAN STEAL SYNDROME

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Objective: Endovascular procedures dominate the treatment of subclavian steal syndrome. Our purpose in this study was to reflect upon the indications for surgical treatment.

Material and method: A total of 286 patients with symptomatic subclavian steal were treated in our department between 1988 and 2017. 212 were treated with endovascular methods and 74 underwent surgery. The evaluation of results was based on Doppler-ultrasound, angio-CT, blood pressure measurements and questionnaires for patients' assessment of symptoms.

Results: Immediate good results were obtained in 197 (92,9%) of the patients treated by percutaneous angioplasty. 134 remained in long-term follow-up. 23 (17,2%) of them had recurrent stenosis of less than 50%. 14 (10,4%) patients had a recurrence of the subclavian steal, symptomatic in 12 of them. 10 of these symptomatic recurrences required secondary intervention (endovascular or surgical). In the surgery group, immediate good results were noted in 69 (93,2%). 41 (85,4%) out of the 48 remaining in follow-up were asymptomatic.

Conclusions: The minimal invasiveness and high efficacy of angioplasty makes endovascular procedures the treatment of choice in the initial approach to patients with subclavian steal syndrome. Open surgery should be performed not only in primary segmental occlusion of the subclavian artery but in case of severe in-stent restenosis or occlusion after endovascular procedures. Surgery procedures enjoyed very good and long-lasting effects, with only few complications.

THE RESULTS PERTAINING TO THE PATIENTS SUFFERING FROM SAPHENOUS VEIN INSUFFICIENCY AND TREATED USING N-BUTYL CYANOACRYLATE EMBOLIZATION

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Aim: To present our results obtained from the patients with advanced saphenous vein insufficiency and treated with N-Butyl Cyanoacrylate embolization (CAE).

Methods and materials: In the present study, we included 205 patients admitted to our clinic with advanced saphenous vein insufficiency and treated with N-Butyl Cyanoacrylate

embolization between January 2016 and June 2017. All the patients were evaluated based on their clinical severity, aetiology, anatomy, and pathophysiology (CEAP) prior to the surgery. The patients were rechecked and, their clinics and quality of life were assessed at 1st, 3rd, and 6th months after the surgery. Moreover, results of their colour Doppler ultrasounds (CDUS) obtained right after and 6 months after the operation were compared. The presence of the total occlusion in the vein treated was considered as a successful intervention.

Findings: While total occlusions of the veins were detected in the examinations of the CDUS obtained right after the surgery in all the patients (100%), the examinations of the CDUS taken at 6th months after the surgery indicated that one of the patients developed partial recanalization and minimal reflux (0.5%). However, 28 patients possessed various extend of complications (13%). Some of the patients suffered from the minor complications such as sensitivity (12%), ecchymosis (10%), severe pain (4%) and skin induration (4%). Nevertheless, no patients had major complications such as deep vein thrombosis, pulmonary embolism, and skin burn. Ultimately, while 90–96% of the patients expressed improvement in their sense of pain, burning, fatigue, and itching symptoms, 2 patients (1%) expressed deterioration in such symptoms at 6th month after the surgery.

Conclusion: Our present results suggest that CAE can be used safely in the treatment of advanced saphenous vein insufficiency since it provides high occlusion rates with success, rare complications and offers better comfort to the patients.

DEEP VEIN RECANALIZATION AND HAEMODIALYSIS CATHETER PLACEMENT IN A PATIENT WITH COMPLETE OBSTRUCTION OF CENTRAL VENOUS VESSELS

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Introduction: Complete obstruction of central venous vessels is a feared but common complication in haemodialysis patients who previously underwent repeated procedures of central venous catheter placement.

Method: We present a case of a 73-year-old patient with end-stage renal disease and without peripheral access option due to bilateral subclavian, brachiocephalic, iliac vein occlusion and due to multiple failures of arteriovenous fistulas.

Result: To achieve central venous access we decided to perform iliac vein recanalization and long segment stenting of the right external and common iliac veins, furthermore long-term haemodialysis catheter was placed through previously recanalized iliac segment.

Conclusion: Recanalization of chronic occlusion in the deep venous system in order to implant haemodialysis catheter can be considered as a viable option in extreme cases. Appropriate imaging and use of dedicated endovascular material is crucial to avoid complications and to facilitate long term patency of the central catheter.

ATORVASTATIN ENHANCES ISCHEMIC HINDLIMB FUNCTION IN A LOWER EXTREMITY ARTERIAL DISEASE MOUSE MODEL

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Introduction: Although it is well established that statin medication is effective in reducing cardiovascular risk in patients with lower extremity arterial disease (LEAD), its benefit in limb outcome remains poorly understood. In the present study, we used a LEAD mouse model to investigate cholesterol-independent effect of statin treatment on ischemic hindlimb function.

Methods: Hypercholesterolemic ApoE^{-/-} mice with hindlimb ischemia were treated orally with (ATOR) or without (CON) atorvastatin (20 mg/kg/day) for 1 or 4 weeks. Walking capacity was assessed on a running wheel for 24 h. Arteriogenic response was evaluated using laser Doppler perfusion imaging as well as alpha-smooth muscle actin immunostaining. Real-time RT-PCR analysis was performed both in ischemic gastrocnemius and spleen tissues.

Results: Following 4 weeks of treatment, walking capacity was improved in ATOR-treated mice compared to CON (5.0±2.1 km vs. 2.0±1.5 km; $p<0.05$). Moreover, ATOR-treated mice showed increased hindlimb perfusion recovery (ischemic/non-ischemic paw ratio: 0.39±0.11 vs. 0.55±0.17; $p<0.05$) and higher arteriolar density ($p=0.067$). ATOR increased ischemic gastrocnemius mRNA expression of Arg1 (anti-inflammatory and tissue repair M2-macrophage marker) ($p=0.065$), but not of iNOS (pro-inflammatory M1-macrophage marker). Additionally, pro-inflammatory cytokines TNF- α , IL-1 β , and IL-12p35 mRNA expression were decreased, whereas anti-inflammatory cytokine IL-4 mRNA expression was increased in response to ATOR ($p<0.05$). No significant difference in IFN- γ , IL-4, IL-17, and IL-10 (signature cytokines for Th1, Th2, Th17, and Treg) mRNA expression in spleen tissue was observed between the 2 groups. Histopathologic analysis of ischemic gastrocnemius showed higher number of regenerating muscle fibers with centrally located nuclei in ATOR-treated mice after 2 weeks of treatment (50.9±7.8% vs. 18.6±14.9% in CON; $p<0.05$).

Conclusion: Atorvastatin treatment improves ischemic limb function in a LEAD mouse model by ameliorating the inflammatory status in ischemic limb. Our data provide rational for the use of statin in LEAD patients for improving functional status.

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DIABETIC NEUROISCHEMIC FOOT AND RHEOPHERETIC TREATMENT – PILOT STUDY

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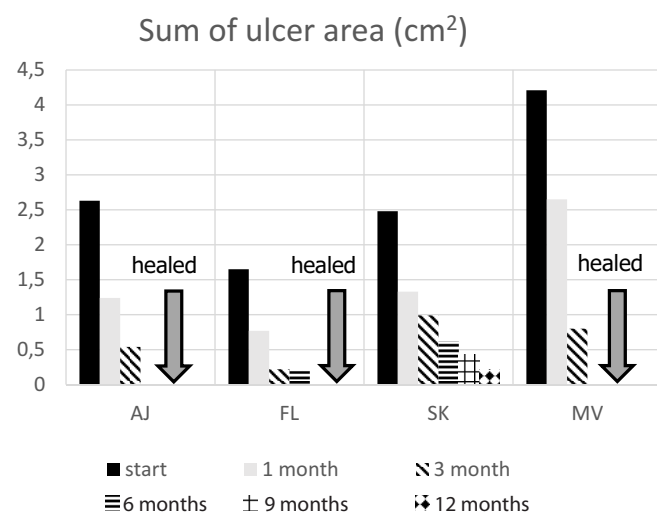
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Introduction: Diabetic foot syndrome is a debilitating condition that increases risk of leg amputation. In case of non-optional ischemia, we tend to find another method how to help to improve tissue viability and heal the ulceration. We tried to test whether the rheopheretic procedures could help to heal diabetic neuroischemic ulcerations. Rheopheresis means double plasma filtration, the high-molecular-weight particles as fibrinogen, LDL cholesterol, alpha 2 macroglobulin and IgM are removed. Improving the blood viscosity is followed by improvement of the endothelial function and better microcirculation. Unfortunately, we have only low evidence about efficacy of this treatment in diabetic neuroischemic ulcerations.

Methods: Four type 2 diabetic patients (2 men and 2 women) with diabetic neuroischemic ulcerations underwent series of rheopheretic treatment (3–4 applications until fibrinogen level dropped below 1.5 g/l). We examined peripheral circulation parameters (toe-brachial index, TcPO₂ level), plasmatic levels of high molecular particles and size of the ulcerations before and after treatment, after 1, 2, 3, 6, 9 and 12 months.

Results: We observed significantly decreased plasmatic levels of high molecular particles in all patients after rheopheretic treatment. We also observed improvement in parameters of peripheral circulation during first 3 months but most important finding was acceleration of healing of long-lasting non-healing ulcerations. At start 4 patients had 11 non-healing long-lasting ulceration (mean duration of ulceration was 15 months). First patient was completely healed at 6th-month-visit, second in 9th-month-visit and third in 12th-month-visit. Only 1 ulceration in 1 patient persists after 1 year of follow-up.

Conclusion: According to the first observation we hope that rheopheretic treatment could be very helpful in "non-optional" patients with non-healing neuroischemic diabetic ulcerations.



THE ROLE OF VWF, ADAMTS13 AND INFLAMMATORY RESPONSE IN THE OUTCOME OF ACUTE ISCHEMIC STROKE MECHANICAL THROMBECTOMY PROCEDURE

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Background: Stent retrievers or aspiration catheters are most frequently used for intracranial thrombus extraction. Inflammatory cells and von Willebrand factor (vWF) may influence procedure clinical outcome.

Methods: Interventional procedure parameters, haemocoagulation markers, and the inflammatory response relative to the histological structure of the extracted emboli were analysed.

Results: Mechanical thrombectomy (MT) led to TICI 2–3 recanalization outcome in 89% out of 131 patients. IVT was used in 101 (78%) patients and not used in 29 (22%) patients; these groups did not differ in the 3M-mRS clinical outcome ($p=0.459$). One of the major findings is that patients with NIHSS>15 had a significantly higher vWF antigen level (%) ($p=0.003$), and a significantly higher vWF/ADAMTS13 ratio ($p=0.038$) upon admission for stroke therapy. Also, significantly higher levels of D-dimers ($p=0.029$) were observed in patients with 3M-mRS of 3–6. Compared with patients with TICI score outcomes of 0–1, patients with TICI 2–3 had a significantly lower neutrophil count ($p=0.006$) 5±2 days after the procedure. It is worth emphasizing that correlation coefficients were significant for the relationship of plasma vWF with embolus vWF ($r=0.32$) and platelets ($r=0.24$) and fibrin ($r=0.26$) in embolus. In embolus structures, vWF correlated with platelet count ($r=0.53$), CD31-positive cells ($r=0.38$), and fibrin ($r=0.48$).

Conclusions: Mechanical thrombectomy led to very good clinical outcome of mRS 0–2 in 47% cases. Patients with worse

clinical outcome had significantly higher vWF levels. It seems that due to the effect of accumulated neutrophils, vWF, fibrin and platelets, embolic clots are more stable and therefore they might be resistant to fibrinolysis. These factors may lead to IVT failure with further acceleration of brain inflammatory response.

THE DISTRIBUTION OF *MMP3* RS3025058 GENOTYPES IN ABDOMINAL AORTIC ANEURYSM PATIENTS WITH AND WITHOUT DIABETES MELLITUS

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Introduction: The matrix metalloproteinase 3 (stromelysin 1) plays an important role in the pathogenesis of abdominal aortic aneurysm (AAA). Common variant in the promoter of *MMP3* gene appears to be crucial in regulation of *MMP3* gene expression and may be involved in the pathogenesis of AAA. An inverse association between diabetes mellitus (DM) and AAA risk has been reported. Apart from a lower AAA prevalence among patients with vs. without DM, there are data

showing that DM may have a protective role on AAA growth and rupture risk. The aim of present study was to evaluate the distribution of *MMP3* gene polymorphism rs3025058 in abdominal aortic aneurysm patients with and without DM. **Methods:** The study included 117 patients (107 men/10 women) with AAA, 28.5% of patients (n=33) were DM patients. The mean age of patients was 72.5±8.0 years, mean BMI 28.0±4.5 kg/m². *MMP3* rs3025058 genotyping was performed using real-time PCR, with subsequent high-resolution melting analysis. The statistical analysis was performed using SPSS statistics 21.0 software (SPSS Inc., Chicago, IL, USA).

Results: Prevalence of 5A/5A genotype of *MMP3* rs3025058 was lower in patients with DM compared to patients without DM (15.2% vs. 32.1%, p=0.07). After adjusting for age, sex, smoking status and dyslipidaemia, the prevalence of 5A/5A genotype was significantly lower in patients with DM compared to patients without DM with odds ratio OR 0.31 (95%CI 0.10–0.98, p=0.047).

Conclusion: The results showed significantly lower frequency of *MMP3* rs3025058 5A/5A genotype in patients with abdominal aortic aneurysm when compared patients with DM to patients without DM. Because 5A/5A genotype of *MMP3* rs3025058 leads to higher promoter activity compared with 5A/6A and 6A/6A genotypes, lower occurrence of *MMP3* rs3025058 5A/5A genotype in diabetic patients may be related to slower progression of abdominal aneurysm in diabetic patients. However, the total number of patients was small and further studies are needed.

The study was supported by research grants VEGA 1/0027/16 from the Ministry of Education, Science, Research and Sport, Slovak Republic.

Table: Distribution of *MMP3* rs3025058 genotypes in patients with AAA. Odds ratios for the two study groups in univariate analyses and multivariate analyses adjusted for age, smoking-habit, sex and dyslipidaemia.

<i>MMP3</i> rs3025058 genotypes	AAA patients with DM (n=33)	AAA patients without DM (n=84)	p	OR (95%CI)	adjusted OR (95%CI)
6A/6A	11 (33.3%)	21 (25.0%)	0.363	1.50 (0.63–3.60)	1.29 (0.55–3.05), p=0.560
5A/6A	17 (51.5%)	36 (42.9%)	0.397	1.42 (0.63–3.18)	1.63 (0.75–3.55), p=0.218
5A/5A	5 (15.2%)	27 (32.1%)	0.064	0.38 (0.13–1.08)	0.31 (0.10–0.98), p=0.046



KAZUISTIKY V ANGIOLOGII

LEUKOCYTE-PLATELET RICH FIBRIN (L-PRF) IN THE TREATMENT OF SKIN LESIONS

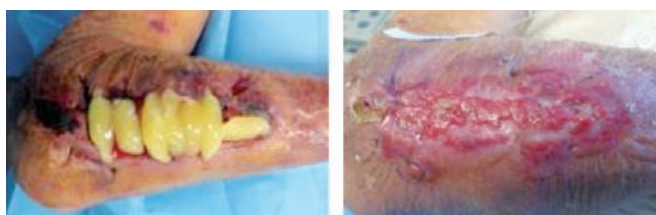
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Background: In the last decade L-PRF has developed in the dental field, able to regenerate bone and gingival tissue. The platelets and the leucocytes enclosed in this clot release growth factors in greater quantity and duration than the traditional platelet concentrates. We intend to show the possible benefits deriving from the use of L-PRF also in the treatment of skin lesions.

Methods: 18 patients, 6 males and 12 females, mean age 78.8 y (range 32–99), with 23 skin ulcers (10 traumatic, 6 diabetic, 2 phlebostatic, 1 mixed, 2 pressure, 1 peristomal, 1 rheumatoid), with a skin wound's total area of 405.1 cm² (range 1–98), some already treated unsuccessfully with advanced dressings, were weekly subjected to application of L-PRF. Red blood cells were separated from the coagulated plasma sampling with 10 ml (Intra-Lock) tubes immediately centrifuged for 12 minutes at 2,700 rpm (Intraspin Medical Device Intra-Lock System Europa SPA).

Results: 22 lesions (96%) presented highly vascularized and regenerated new tissue, 19 lesions (83%) healed completely. Pain relief at the first application occurred in all 18 patients (100%). All traumatic wounds healed with fast epidermal growing. In one case of a diabetic foot with an exposed bone, healing was obtained avoiding amputation. The average healing time on 19 lesions was 8.89 weeks (range 1–21). 1 diabetic patient with comorbidity and skin allergy, despite initial improvement, worsened representing the only adverse event; 2 patients died because of acute renal failure and poor general conditions; another one lost to follow up for transfer to another institution.



Conclusions: L-PRF, an autologous inexpensive and easy to prepare device in skin lesions, has shown in our limited experience excellent tolerability, antalgic efficacy, reduction of healing times in traumatic and inveterate non-responders lesions, in diabetic foot could avoid amputation.

AMBULATORY ARTERIAL STIFFNESS INDEX IN PATIENTS WITH HYPERTENSION AND RHEUMATOID ARTHRITIS

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Objective: The ambulatory arterial stiffness index (AASI) is a new index of arterial stiffness that correlates accurately with most frequently used methods for measuring arterial stiffness. AASI is good predictor of cardiovascular and stroke mortality, end-organ damage, such as renal damage, microalbuminuria, left ventricular hypertrophy and carotid abnormalities. The patients with rheumatoid arthritis (RA) have increased cardiovascular morbidity and mortality that is primarily a result of premature atherosclerosis of coronary and cerebral arteries. Hypertension along with metabolic, inflammatory, and immunological changes may play an important role in the pathogenesis of premature atherosclerosis in RA patients. The individuals with AASI over 0.53 in age under 50 years and those with AASI over 0.72 in age 50 years and more, are in very high risk to developing cardiovascular event.

Design and method: Blood pressure (BP) measurement using 24-hour ambulatory BP monitoring (ABPM, SpaceLabs 90207) according to the ESH criteria. 60 patients with treated or newly diagnosed untreated hypertension and stable RA. 15 males and 45 females mean age 58±11.3 years. AASI defined as 1-regression slope of diastolic on systolic BP computed from 24-hour recording for each patient.

Results: Mean clinical systolic BP 139.0±14.7 mmHg, diastolic BP 85.7±6.5 mmHg and heart rate 74.9±7.3 pulse/min. Mean 24-hour systolic BP 127.7±12.6 mmHg, diastolic BP 77.6±7.4 mmHg and heart rate 73.9±8.7 pulse/min. AASI in all patients: 0.39±0.06, AASI in patient under 50 years old: 0.35±0.04, AASI in patients 50 years old and over: 0.40±0.06.

Conclusion: In these patients with RA and hypertension the values of AASI were not significantly affected.

The work is part of the grant research: Specific research, Category A project, MUNI / A / 0949/2016. Differential diagnosis and prognosis of internal diseases.

VENOUS THROMBOEMBOLISM AND IMMUNOTHROMBOSIS: IDENTIFICATION OF NEW BIOMARKERS OF PATHOLOGY

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Background: Venous thromboembolism (VTE) is the third leading cause of death in Italian population. Immunothrombosis represents a new pathogenetic model of VTE. Recent studies propose some interleukins and microRNAs as molecules able to modulate endothelial inflammation and platelet hyperactivity.

Materials and methods: 23 patients (18–65 years) were recruited with a new diagnosis of non-oncological VTE and free from chronic inflammatory diseases. Patients were matched 1:1 for age and sex with 23 healthy blood donors. Serum microRNAs (miR 126, 155, 17.92, 195), inflammatory cytokines (IL-6, TNF-alpha, IL-8) and lymphocyte subsets were evaluated in patients at the onset of pathology (T0) and in controls. In patients, clinical and instrumental follow-up was performed: ultrasound thrombotic vein residual, miRNA and interleukins evaluation at 3-month (T1), angio-TAC or pulmonary ventilarly-perfusion scintigraphy at 4–6 months.

Results: Patients compared to healthy showed significant increased values of miRNA 126 ($p=0.01$), IL-8 ($p=0.045$), monocytes ($p=0.007$), activated T lymphocytes ($p=0.011$), Treg lymphocytes ($p=0.018$). IL-6 and miRNA 126 are significantly increased in pathological subjects at T0 compared to T1 (IL-6: $p=0.003$ and miRNA 126: $p=0.014$). In our study, high miRNA126 values at the onset (T0) would correlate with a significant overall thrombotic residual at 3–6-month follow-up (Spearman's Rho coefficient 0.646, $p=0.004$).

Conclusion: Our data supports the idea that systemic inflammation is evident in the acute phase of VTE with increase in monocytes, activated T lymphocytes and IL-8. MiRNA 126 is highly active in mediating endothelial activation. These results suggest that miRNA 126 could modify at the onset the thrombus morphometry, conditioning response to therapy. MiR 126 would therefore represent a possible predictive biomarker of poor early recanalization. New efforts would better clarify the morphometric components of the thrombus and molecules modulating the various structural components.

DEVELOPMENT OF VARICOSE VEINS IN LOWER LIMBS OPERATED FOR VARICES

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Recurrence of varices after treatment is generally known as a common and continuing process occurring despite of current progress in diagnostic and therapeutic methods. Frequency of recurrent varicose veins is reported in a wide range, from 6,6–80%. Inadequate surgical treatment is traditionally considered as the most important cause.

The aim of study was to measure quantitatively size of varicose veins before and after surgery and to follow development of recurrences.

Material: Randomly formed sample from consecutively going patients indicated for surgery of varices was followed. Total of 176 limbs was measured before and at 6, 18, 30 and 42 months after surgery. A simple technique based on direct measurement of contours created by varicose vein was used.

Results: Number of recurrences of varicose veins was increasing continuously with time since surgery and in relation to the pre-operative size. The greater the extent of varices preoperatively the higher the frequency and size of recurrent varicose veins.

Conclusion: Responsibility of surgeons for recurrent varicose veins is overestimated. Size of varicose veins is reflecting degree of venous wall structural changes causing its weakness. Measurement of varicose vein size may be used for estimation of risk and probability of the recurrence after surgery.

ARTERIAL THROMBOSIS ... INTERESTING CASES

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Background/Aim: Arterial thrombosis can affect almost any organ system. Hence, the presentation of it is vast and varied. Without a systemic comprehensive approach, the time to diagnosis or identification of the primary aetiology can get delayed months to years, leading to irreversible damage.

Methods/Results/Conclusion: Patients diagnosed with arterial thrombosis at our facility between January 1, 2000 to January 1, 2018 were identified via ICD codes. Data including patient demographics, presenting symptoms, work up done and final diagnosis was extracted from the electronic medical record.

From the data and expert consensus, we hope to present a comprehensive initial and subsequent work up of arterial thrombosis, via case presentations.

Case #1: Atherosclerosis plaque

Case #2: Cardio-thromboembolism

Case #3: Myeloproliferative Disorder (JAK mutation positive)

Case #3: PNH

Case #4: Antiphospholipid Syndrome

PULMONARY EMBOLISM DUE TO LEAD POISONING

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Introduction: Lead poisoning is a major public health problem. Recently, there have been reports of opioid adulteration with lead in Iran. Lead is a toxic metal that affects many organ systems in humans. The following case series is the first of its kind in that pulmonary thromboembolism (PTE) due to lead toxicity has been described.

Methods: We report ten patients with lead poisoning in Iran, all of whom presented with leg pain and dyspnoea. A history of opium ingestion or inhalation was present in each of these patients. None of the patients reported known occupational exposure to toxin and any risk factor for PTE. Clinical finding including the swelling and erythema in lower legs, elevated of jugular venous pressure and decrease O₂ saturation. Colour Doppler sonography in all patients showed deep vein thrombosis. Chest CT was in favour of massive PTE. Lead level was higher than normal.

Results: All patients underwent medical treatment and discharge with good condition. Lead is available in the environment widely and affects major organ systems in the body including hematopoietic, respiratory, renal, nervous and cardiovascular systems, mainly through increased oxidative stress, ionic mechanism and apoptosis. Exposure may result from ingestion or inhalation of lead compounds. Diagnosis of lead poisoning depends on a high index of suspicion and a thorough patient history. Lead is sometimes deliberately added to opium by the smugglers or salesman to increase its weight during trading.

Conclusion: Lead toxicity should always be considered in cases of PTE with an unknown aetiology, especially in a setting where opium abuse is common.

TREATMENT OF LYMPHOEDEMA BY TESTICULAR PATCH IN CANINE HIND LIMB

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Introduction: Lymphoedema, the abnormal collection of lymph in the interstitial space is classified into primary and secondary types. A number of procedures have been proposed to bypass or reconstruct the lymphatic system. Clinical data and experience remain inadequate to demonstrate the efficacy

of these techniques. We present an easy experimental model for lymphatic conduit formation for the treatment of lymphoedema.

Methods: Ten healthy dogs were used. Under general anaesthesia via bilateral inguinal incisions, dissection of inguinal area and total excision of all lymph nodes were done. An elliptical incision on the tunica albuginea of testis near the hilum was made and a flap was transferred to the site of excised lymph node and fixed. After 6 months, the site of anastomosis was removed and investigated histologically.

Results: Sections obtained from the testicular flap showed a rich lymphatic vascular development in 80% of samples. There were many lymphatic vessels of different sizes scattered in a stroma of minimal fibrosis, with arterial and venular capillaries. A homogenous lymph fluid could be observed in some of these vessels.

Conclusion: Testis have a rich lymphatic drainage. We feel that the testicular patch technique can be an effective method for creation of lymphatic conduit and possibly in the management of lymphoedema.

PERI-OPERATIVE OUTCOMES OF CAROTID ENDARTERECTOMY UNDER LOCAL ANAESTHESIA: A SINGLE CENTRE PROSPECTIVE STUDY

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Background: Carotid artery stenosis accounts for approximately 10% of all ischemic strokes, causing significant morbidity and mortality. We investigated peri-operative outcomes of carotid endarterectomy (CEA) done under local anaesthesia at our unit.

Methods: Consecutive patients from a single vascular unit with symptomatic carotid stenosis undergoing CEA under local anaesthesia between January 2016 and October 2017 identified from a prospective maintained vascular database were included in the study.

Results: Seventy-nine patients who had CEA between Jan 2016 and October 2017, were included in the study. Amaurosis fugax was the index event in 10% of patients (n=8), TIA in 46% (n=36), minor stroke in 39% (n=31), other symptoms in 4.0% (n=3) and asymptomatic in 1.0% (n=1). There were 65% (n=51) male and 35% (n=28) female patients with a mean age of 74 years. Pre-operative risk factors were age more than 80 years old (26.5%), arterial hypertension (51.8%), hypercholesterolemia (83.5%), current smoking (20%), ex smoking (55%), stenosis $\geq 90\%$ (31.6%). Majority of the patients were referred by stroke physicians (91%). Operative procedure suture with prosthesis patch 96.3%, direct suture 2.5% and eversion 1.2%. Readmission within 30 days of procedure was 3 (3.7%) patients. Repeat minor stroke was seen in 4 (5%) patients. There was no mortality in our study.

Conclusion: Our evidence suggests that carotid endarterectomy under local anaesthesia can be an effective alternative for carotid stenosis.

ENDOVENOUS TREATMENT OF VARICOSE VEINS IN AN ANGIOLOGICAL OUTPATIENT CLINIC

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We know more options for endovenous treatment of varicose veins, include sonographically navigated foam sclerotherapy, catheter controlled thermal or mechanical-chemical ablation, and as the latest method of tissue glue – VenaSeal. A common denominator of ablation methods is the complete destruction of the endothelium of the vein, leading to its fibrosis and occlusion. VenaSeal is a catheter-controlled application of tissue glue followed by venous occlusion induced by external compression using the USG probe. Necessary conditions for endovenous treatment are perfectly mastered ultrasound diagnosis of the venous insufficiency with mapping, ultrasound-navigated vascular cannulation, and work with the catheter under USG control. The aim of this lecture is to offer an overview of the current options for mini-invasive treatment of varicose veins. In conclusion, we summarize the results of the two-year experience with mechanical-chemical ablation of the ClariVein catheter.

TREATMENT OF NICOTINE DEPENDENCY IN PATIENTS WITH PERIPHERAL ARTERY DISEASE: LOSING TIME OR LIFE-SAVING MEDICAL INTERVENTION?

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Aim: Smoking is the most important risk of the Peripheral artery disease in many European states, and the main preventable cause of mortality in Europe today. Brief intervention (BI) has been proven effective, and should be an integral part of the treatment of peripheral artery disease (PAD) in the daily practice. Providing adequate medication rises more than four times the quit rate.

Method: The method of BI represents a short and officially recommended tool for intervening smoking patients. However, for various reasons the intervention for smoking cessation is rather rare in Czech settings. BI will be presented as well as the

most common obstacles of this technique. The efficacy of the treatment of tobacco dependency raises with smoking cessation medication provided. The newest available medication as well as the newest smoking cessation aids without Evidence based medicine data will be reviewed. The financial incentives for smoking cessation in 2018 in European states will be presented.

Results: The BI has been shown effective, especially if followed by prescribed medication to quit smoking. The available medication and its financial support in different European countries is shown.

Conclusion: Every smoker should be advised to quit. The use of the smoking cessation medication and the quit rate increases with the BI, medical prescription as well as with the financial incentives. This involves all three major stakeholders: the patient, the treating physician and the insurance company.

SCREENING FOR PAD IN TYPE 2 DIABETES MELLITUS

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In type 2 diabetes mellitus (T₂DM), peripheral artery disease (PAD) can involve the whole vascular network. It associates macroangiopathy, which is mainly located in cervicoencephalic, lower limb and coronary arteries; and microangiopathy, which may be responsible for retinopathy, nephropathy, neuropathy and foot ulcers. T₂DM is also strongly linked to medial calcification.

Lower extremity artery disease (LEAD) affects 10 to 40% of patients with T₂DM. Compared with non-diabetic patients, LEAD occurs earlier and is also a more severe and more distal disease in T₂DM. It is also frequently associated with polyneuropathy.

Screening for PAD begins with clinical examination. Due to medial calcification, ankle-brachial index (ABI) may be unreliable or impossible. In this case the measurement has to be made using the toe-brachial index (TBI) with photoplethysmography, or LASER-Doppler. The assessment of LEAD needs to be completed by using imaging modalities. The first-line modality is, of course, Duplex ultrasounds.

For many reasons, LEAD diagnosis is usually late, and sometimes it is made at the stage of critical ischemia! This is why 60% of amputations occur in diabetic patients, and 20% of diabetic patients with intermittent claudication will eventually need amputation!

Screening for PAD and neuropathy is mandatory in these patients. Awareness of the disease should not only lead to prescribing these patients with the «best medical treatment» but also to prevent foot wounds and ulcers. Education of patients and their relatives, but also of nurses and physicians, especially general practitioners, is crucial. It can save legs from amputation!

BLUE LIGHT EXPOSURE ACUTELY DECREASES BLOOD PRESSURE AND PULSE WAVE VELOCITY AND INCREASES ENDOTHELIAL FUNCTION

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Aims: Previous studies have shown that UVA light can lead to release of nitric oxide (NO) from the skin and decrease blood pressure. More recent experimental work suggests that visible blue light may also be capable of releasing NO from the skin. Here, we investigated whether whole body exposure to visible blue light can decrease blood pressure and increase endothelial function in healthy subjects.

Methods and results: In a randomized cross-over study, 14 healthy male subjects were exposed on 2 days to monochromatic blue light or blue light with a filter foil over 30 min. We measured blood pressure (primary endpoint), heart rate, endothelial function as flow-mediated dilation, forearm blood flow, forearm peripheral resistance, pulse wave velocity, and NO species, nitrite, and nitroso compounds (RX-NO) (secondary endpoints) during and up to 2 hours after exposure.

Systolic blood pressure decreased by 6 mmHg and heart rate increased during blue light exposure and remained decreased for at least 2 hours as compared to control. In parallel, blue light significantly increased forearm blood flow, brachial artery diameter, flow-mediated dilation, and circulating RX-NO while it decreased forearm peripheral resistance and pulse wave velocity. No significant changes were observed in plasma nitrite and nitrate.

Conclusion: Whole body irradiation with visible blue light improves cardiovascular function. Blue light may be a promising non-pharmaceutical therapeutic approach for cardiovascular prevention in the future.

CARDIOVASCULAR RISK PROFILE AND CERVICAL ARTERIAL ULTRASOUND EVALUATION IN PATIENTS WITH PERIPHERAL ARTERY DISEASE: A COMPARATIVE ANALYSIS BETWEEN PATIENTS WITH AND WITHOUT CRITICAL LEG ISCHEMIA

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Introduction: The presence of peripheral arterial disease (PAD) is a sign of simultaneous multisite arterial lesions (cervical, coronary arteries), which increases dramatically patients' mortality.

The **aim** of this study was to evaluate the cardiovascular risk factors profile and cervical arterial ultrasound spectrum findings in patients with PAD with critical leg ischemia (CLI) comparative with patients without CLI.

Methods: Our study enrolled 197 PAD patients: 142 patients with CLI and 55 patients without CLI. After signing an informed consent, all patients were clinically evaluated, laboratory tested (glucose, cholesterol, triglyceride serum levels) and vascular duplex ultrasound evaluated the peripheral and cervical arterial lesions topography and stenosis haemodynamic significance. The study methodology was approved by the Ethical Committee. Statistical data processing was performed with SPSS.

Results: The prevalence of diabetes (63,5% versus 17,7%, $p < 0,001$) hypertriglyceridemia (56,8% versus 26,3%, $p < 0,001$), arterial hypertension (71,2% versus 53,4%, $p < 0,01$) and smoking (70,3% versus 65,6%, $p < 0,1$) was higher in patients with CLI, while the prevalence of hypercholesterolemia (62,4% versus 47,7%, $p < 0,01$) and aging was higher in patients without CLI. The PAD patients with CLI presented important modifications of carotid and vertebral arterial ultrasound profile with significant higher intima-media thickness (IMT) ($1 \pm 0,27$ mm versus $0,78 \pm 0,2$, $p < 0,001$) and a higher prevalence of arterial cervical stenosis $> 50\%$ (36% versus 29%, $p < 0,1$), especially 50–70% stenosis (23% versus 14%, $p < 0,01$). The carotid and vertebral arteries thrombosis and stenosis $> 70\%$ prevalence was slightly higher in PAD patients without CLI (15% versus 13%, ns).

Conclusions: The vascular evaluation in the context of the high-prevalence and severity of major cardiovascular risk factors in patients with PAD reveals, beside significant peripheral arterial lesions, important pathological findings in cervical arterial ultrasound spectrum with carotid and vertebral arterial lesions, more severe in patients with CLI and stipulates the indication for a complete and sustained treatment strategy.

SKIN NECROSIS – AN UNPLEASANT REALITY OF SCLEROTHERAPY (CZECH SODIUM TETRADECYL SULFATE – STS – STUDY)

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Introduction: Skin necrosis can occur as a side effect of sclerotherapy after using practically any sclerosing agent (liquid of foam), on any vein diameter or localization and using whichever technique. In majority, the cause of its origin remains unknown. Several mechanisms are assumed.

Methods: 10,057 sclerotherapy treatments performed in CDA in Prague between November 2015 and June 2016 we performed and evaluated by our team of 4 experienced phlebologists with sclerotherapy practice of more than 15 years.

Results: In comparison to Australian Polidocanol Clinical Trial (skin necrosis in 0.34%), we found 0.21% when using STS. A detailed analysis of locations and concentrations of STS are presented.

Conclusion: Skin necrosis after sclerotherapy appears in a comparable rate in both most frequently used sclerotherapy agents (POL and STS). Informed consent of the patient regarding possible complications and adverse sequelae of sclerotherapy should be a standard as much as correct and immediate treatment is.

AN UNUSUAL PRESENTATION OF DVT CAUSING ACUTE LIMB ISCHAEMIA

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Introduction: Phlegmasia Cerulea Dolens (PCD) is the diagnosis of acute lower limb ischaemia secondary to massive iliofemoral deep vein thrombosis. DVT is an uncommon cause of compartment syndrome and even more rarely seen affecting the foot.

Case description: We encountered a case of lower leg ischaemia in the setting of multiple systemic thromboses with occlusive DVT in below knee veins (with some patent superficial veins), pulmonary emboli and portal vein thrombosis. There was no iliofemoral vein or IVC thrombus. This 59-year-old lady had a history of breast cancer 10 years prior and recent chest wall abscess with *S. aureus* requiring incision and drainage. There was no prior trauma. She presented with acute onset foot pain with cyanosis well demarcated to the ankle, compartment syndrome and a full complement of pulses. She responded to anticoagulation as well as fasciotomies of the foot.

Discussion: This patient produced a diagnostic dilemma as she has an unusual case of multiple thromboses and compartment syndrome associated with ischaemic limb, possibly from recent sepsis, without haematological evidence of disseminated intravascular coagulation or heparin induced thrombocytopenia. She had normal vasculitic and thrombophilia screen. Her malignancy history is 10 years prior with no evidence of recurrence on full body CT scan. She did not have the massive iliofemoral DVT expected in cases of PCD nor arterial disease on CT-angiography. Whilst the differential of compartment syndrome is known to include DVT it is unusual for below knee DVT to cause such considerable ischaemia requiring surgical intervention.



BACTERAEMIA PRECIPITATING RUPTURE OF KNOWN AAA

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Introduction: Abdominal aortic mycotic aneurysms are uncommon and most are located in the suprarenal portion of the aorta. We present the case of known Aortoiliac aneurysm, rupturing two weeks after elective Amplatzer (St. Jude Medical) occlusion of left internal iliac artery, prior to planned endovascular repair with Gore Excluder Iliac branch device.

Case description: The patient is 61-year-old male with active prostate cancer, living in a remote town, 2,856 km from the nearest vascular surgeon. One week after internal iliac artery embolization procedure, and prior to planned second stage endovascular repair of aortoiliac aneurysm, he presented to a peripheral hospital with *Serratia marsecens* bacteraemia. His CT scan at this stage was unremarkable and he had no other signs or symptoms to suggest mycotic aortic aneurysm. CXR and urine were unremarkable. After hospital admission and treatment with intravenous antibiotics the patient settled clinically and was later discharged on a course of oral antibiotics. He then represented with acute rupture of his aortic aneurysm and was transferred to tertiary hospital and underwent emergency open surgical repair. He underwent emergent in situ repair with aorto-iliac bypass and removal of Amplatzer device. Aortic tissue and Amplatzer were both positive for

S. marsecens, implicating the implanted device for mycotic transformation of his aneurysm. His post-operative recovery was uncomplicated, antibiotics were continued lifelong.

Discussion: Aneurysmal rupture is not well predicted for mycotic aneurysms and culture positive aneurysms are disproportionately responsible for ruptured aneurysms. The literature describes superinfection of known aortic aneurysms, mostly secondary to infective endocarditis, intravenous drug use or aortoenteric fistulae. However, *Serratia spp.* is not regularly reported as causing mycotic abdominal aneurysm (unlike other *Enterobacteriaceae*) neither is foreign body implantation leading to mycotic aneurysm transformation. In situ reconstruction is still the procedure of choice for the majority of mycotic aneurysms (level B evidence).

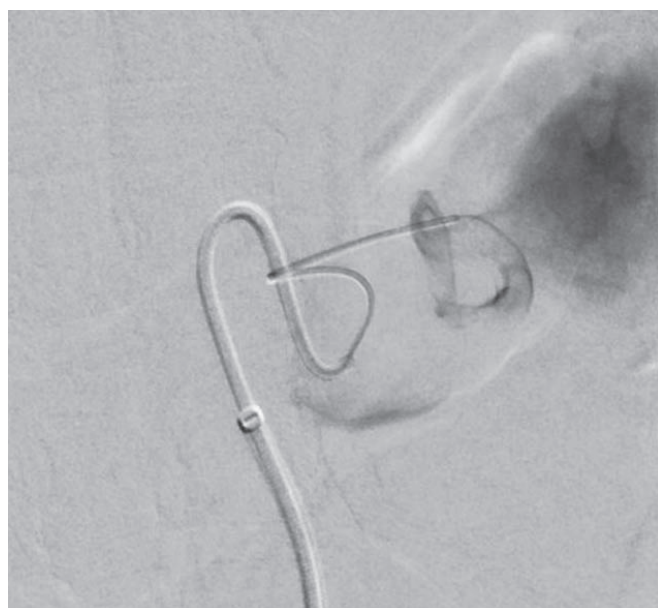
THE CHALLENGE OF THE ENDOVASCULAR APPROACH TO LARGE SPLENIC ARTERY ANEURYSM WITH TORTUOSITY

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Introduction: Asymptomatic splenic artery aneurysms are usually considered for treatment if enlarging or greater than 2 cm in size. Elective aneurysm repair is also usually also indicated in other high-risk patient groups such as those with portal hypertension, pregnant women, and women of child bearing age.

Case description: We present a case in which a 51-year-old uniparous female presented with a symptomatic 50 mm splenic artery aneurysm. She presents one year of vague abdominal discomfort, with no significant medical history, trauma or family history. Investigations included abdominal computed tomography, which identified 50 mm splenic artery aneurysm, significant tortuosity of splenic artery, chronic dissection of



coeliac artery with aneurysm and bilateral small renal artery aneurysms. We initially chose the retrograde endovascular approach to embolization. This was technically challenging because of splenic artery tortuosity and celiac artery dissection. We changed to the antegrade approach from left axillary artery cut down and were able to achieve cannulation that reached the aneurysm, allowing successful embolization of the lesion. There were no other complications; her coeliac and renal arteries remain under observation.

Discussion: Treatment options include open and endovascular embolization or stenting. The endovascular approach to aneurysm repair is most preferred, if technically feasible, in the elective setting. Embolization carries the risk of auto-splenectomy if left gastric collaterals are insufficient. The morbidity associated with open repair is still significant, so we feel it is suitable to change approach and repeat endovascular attempt to achieve embolization if necessary. One disadvantage of this approach may be the lack of tissue to diagnose the arteriopathy and therefore guide specific management. As more endovascular cases are reported, it will become apparent whether radiological findings are sufficient.

PERSONALIZED CARDIOVASCULAR DISEASE PREVENTION – THE IMPROVING APPROACH

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The commonly used scoring systems may underestimate the real cardiovascular disease (CVD) risk. Subclinical atherosclerosis (AS) may be confirmed by biochemical markers of endothelial dysfunction, vascular inflammation and haemostasis, as well as by genetic markers, but mainly by functional and morphological methods and may serve for personalized stratification of CVD risk.

The aim of our study was to assess the association between classical CVD risk factors (RF) and some markers of subclinical AS and to analyse the possibility to improve the CVD risk stratification.

Subjects and methods: 198 subjects were selected to our study, 78 males, 120 females, old 35–50 yrs., without apparent signs of AS. We evaluated medical history, clinical documentation, physical examination, analysed some biochemical parameters, calculated 10-yr fatal CVD risk by Scorecard. Functional and structural changes of the arterial wall were evaluated by measurement of pulse/wave velocity (PWV), augmentation index (AIx), flow mediated vasodilatation (FMD), IMT and ABI.

Results: The calculated mean fatal CVD risk was 0.57 (0–5); the mean number of classical CVD risk factors 2.55 (0–6). In linear regression the significant correlation was found between central obesity and mean carotid IMT ($p=0.01$) as well as family history ($p=0.033$); highly significant correlation was established between level of lipoprotein(a), fibrinogen (Fbg),

central obesity (for all $p < 0.005$) as well as arterial hypertension (AH), glomerular filtration (GF) (both $p < 0.05$) and femoral IMT; Smoking was in correlation with ABI ($p < 0.005$); AH, dyslipidaemia (DLP) and male sex correlated with PWV; AH and male sex also with Aix. Carotid AS plaque was predicted by age, femoral AS lesion by male sex. HsCRP may be predicted in AH, higher serum level of Fbg, GF rate and central obesity; FMD and microalbuminuria was not significantly correlated with CVD risk factors in our subjects.

Conclusion: Randomised clinical trials are necessary to justify the most suitable vascular screening tool and to establish the appropriate management of patients with subclinical signs of AS.

"FEMOROFEMORAL BYPASSES" THE NEW INDICATIONS FOR THE EXTRA-ANATOMICAL BYPASSES GRAFTS

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Aim: Femorofemoral bypasses usually were performed in critical limb ischemia to patients with high risk of classical reconstructive operations. Those operations could be provided under spinal or even local anaesthesia. The value of such procedures becomes less valuable in the era of endovascular less invasive procedures. But in the same time, the new indications arise for femorofemoral bypasses grafts.

Method: 31 femorofemoral bypasses were used in cases of limb salvage procedures when the other methods failed. In 23 patients with acute thrombosis of one leg of previously inserted bifurcated stentgraft. In 4 patients with one leg ischemia due to acute symptomatic aorta dissection despite thoracic stentgraft insertion. In 4 patients in second stage of endovascular operation of ruptured abdominal aortic aneurysm with uniliac stentgraft system and occluder on the contralateral side. All operations were performed under spinal or local anaesthesia.

Results: In all cases we observed good early result without signs of major bleeding complications or infection. In early follow-up one patient was reoperated because of the fem-fem graft thrombosis and had leg amputated. In long time observations two patients had bypass thrombosis and were reoperated with good outcome but after they were discharged from hospital second antiplatelet drug was administered. Another gentleman in one year time was admitted again with fem-fem occlusion, reoperation failed and axilo-be-femoral bypass was inserted. In 27 patients, long term follow-up time is uneventful.

Conclusions:

1. Extra-anatomical bypasses are still good alternative in the treatment of critical limb ischemia.
2. Permits to avoid huge open reconstructive operations.
3. Might be performed even under local anaesthesia.

THE AORTOCAVAL FISTULA – A RARE COMPLICATION OF ABDOMINAL AORTIC ANEURYSM – A CASE REPORT

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Introduction: Aortocaval fistula is a rare complication of abdominal aortic aneurysm (AAA), with the prevalence from 2% to 10% of ruptured AAA. It causes overpressure in the venous system and leads to congestive heart failure. Sudden rupture of the abdominal aortic aneurysm into the IVC is associated with severe back and abdominal pain, dyspnoea, heart failure symptoms, anuria or oliguria connected with haematuria. Despite the severity of the complications described, the presence of aortocaval fistula could be haemodynamically beneficial for patients suffering from AAA. This case report describes an abdominal aortic aneurysm rupture complicated with aortocaval fistula.

Case report: 87-year-old man treated for high blood pressure, last outpatient visit in November 2015 with a finding of asymptomatic 11 cm big abdominal aortic aneurysm (AAA) requiring resection for a high risk of rupture. The patient refused hospitalization and surgery.

Two years later (in December 2017) the patient was urgently admitted with following symptoms: morning nausea, short unconsciousness, lumbal pain, paraesthesia and weakness of the lower limbs. The CT angiographic examination demonstrated a large (13 cm big) abdominal subrenal aneurysm complicated with an aortocaval fistula. Peroperatively, a wide communication between aneurysm and inferior vena cava (IVC) was confirmed. The defect of the protrusion was closed with suture then the resection and the replacement of the aneurysm were made. There were not any post-operative complications. The patient was released home after 12 days.

Conclusion: Despite its rare occurrence, we should be aware of such a complication. CT angiography is the most appropriate examination for its fast and accurate diagnosis. In the case of aortocaval fistula, the patient should be immediately treated in a vascular/endovascular department. In our case successful suture of aortocaval fistula and substitution of the AAA was performed.



PULMONARY EMBOLISM AND FALSE POSITIVE TROPONIN I DUE TO HETEROPHILE ANTIBODIES: A CASE REPORT

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Background: Troponin I level is essential in the diagnosis of acute coronary syndrome, but it may be elevated in other conditions as pulmonary embolism, sepsis, tachycardia, heart failure, myocarditis, myocardial trauma and renal failure.

Endogenous antibodies, as heterophile antibodies and rheumatoid factor, can interfere with the immunoassay measurements, but this condition is not well known.

Case report: A 40-years-old woman was admitted to hospital because of moderate chest pain and dyspnoea in the last month. Isolated Troponin I levels were significantly elevated (270–280 ng/L, normal range 0–40), although there was no suspicion or evidence of acute coronary syndrome, pericarditis or myocarditis. Laboratory tests were not significant except for D-dimer (1,021 ng/mL, normal range 0–500). ECG and echocardiograms were repeatedly normal. Sub-segmental bilateral embolism was detected by pulmonary CT scan. Deep venous thrombosis was not found. Abdominal ultrasound was normal. Further investigations excluded occult cancer, too. Cardiac magnetic resonance imaging and coronary angiography were planned. Endogenous antibodies were investigated to exclude a false positive laboratory result. Rheumatoid factor was negative, but heterophile antibodies were very high. The patient was treated with anticoagulants for three months. No adverse event was noted in the follow-up period. Troponin I levels remained elevated also six months after discharge.

Discussion and conclusions: Heterophile antibodies lead to a false positive result in one of 2,000 patients assessed by modern immunoassay methods. This condition may lead to misdiagnoses and unnecessary invasive interventions.

False elevated troponin should be considered when data do not match with clinical presentation. Before invasive procedures or therapies, if heterophile antibody positivity is suspected, troponin levels should be re-evaluated with another device or method.

ERGOTISM – RECURRENT ACUTE LIMB ISCHEMIA IN A YOUNG WOMAN

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Introduction: Ergotamine (EA) – a well-known alkaloid – is as a poisonous product of a fungus *Claviceps purpurea* parasite on rye and causing epidemic intoxications in Middle Age. Although the acute intoxication after consuming manifested as the St. Antony's fire in modern era is very unlikely and uncommon, the chronic abuse of antimigraine drugs containing EA is still important potential cause of acute limb ischemia especially in younger adults.

Case report: In March 2009, a 34-year-old woman with a history of hypothyreosis and severe chronic migraine was presented with worsening ischemia of both lower extremities, with much worse symptoms in her left leg. She was sent from Rheumatology Department as with the suspicion on primary vasculitis of great vessels – Takayasu type. The onset of claudication pain was dated more than a month ago, worsening to severe rest pain and paraesthesia during last days. Two attacks of severe cramps and chest pain were also described by the patient. On the physical examination, the left leg was pale and pulseless below the knee level including popliteal artery, the left ABI (Ankle Brachial Index) less than 0.4. On ultrasound examination, there were no signs of atherosclerosis or oedema of the arterial wall as often seen in a patient with vasculitis. There were severe long and narrow stenotic changes on left femoral artery with pulses parvus et tardus below this level. All laboratory findings were within normal ranges and ECG did not show any pathologic changes. After the patient disclosed overuse of antimigraine suppositories (mixture of: ergotamine, caffeine, diazepam, phenobarbital) on a daily base, she was immediately given intravenous alprostadil with the subsequent relief of symptoms of ischemia, but with persistent neuropathic pain her left feet. Psychiatric examination revealed pathologically changed personality and referred the patient to regular out patient care. The neurologist recommended pregabalin and thioctic acid for postischemic neuropathy and mixture of different analgesics in suppository without the content of EA.

Despite the severity of symptoms and our strong recommendation, the patient did not follow instructions, did not visited a psychiatrist and did not come for planned angiological control. She continued in the abuse of antimigraine suppositories leading herself to strong addiction (phenobarbital and diazepam). This behaviour led to 2 other attacks of acute ischemia (January 2015 and August 2017), both of them affected both legs. She was treated with intra-arterial vasodilators with relief of rest pain, however, the last time not with complete recovery of the arterial spasm, thus the patient suffers claudication pain. She was examined by a psychiatrist specialised to addictions and was recommended to use

a combination of antidepressant and anxiolytic drugs and the migraine disappeared without analgesic therapy. She was planned for a regular visit in January 2018 in our angiological lab, but she did not come.

Conclusion: Our report is one of those rare cases that appear every year almost all over the world. It is not important because of impact on daily practise, but should be a reminder to all physicians how the history of a patient is still the main clue to correct diagnosis and thus, to the best choice of treatment. The intra-arterial vasodilators are now the treatment of first choice, of course, but we should think about the struggle in the follow up as these patients often require multidisciplinary approach that includes vascular specialist, radiologist, psychiatrist and in our case, also neurologist.

SCREENING PROGRAM OF ABDOMINAL AORTIC ANEURYSM: A CRITICAL VIEW

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In Europe, the prevalence of abdominal aortic aneurysms (AAA) in the elderly population (≥ 65 -year-old) has declined in the last decades to $<4\%$. Aneurysmal degeneration of the aorta is a serious and potentially life-threatening vascular disease. AAAs typically develops subclinically and often only becomes symptomatic when complicated by impending rupture. Most AAAs are discovered incidentally while investigating for an unrelated pathology. Ruptured AAA is the tenth cause of death in Belgium (0.32% of all deaths in 2014). AAA-related deaths. Does population-based ultrasound (US) screening for AAA achieve its objective and is it cost-effective? This literature review tries to answer these challenging questions.

REVASCULARISATION OF THE SUPERFICIAL FEMORAL ARTERY WITH PACLITAXEL-COATED BALLOON FOR CLAUDICATION

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Background: Percutaneous angioplasty of the superficial femoral artery with Paclitaxel-coated balloon, intended to reduce restenosis, has been proven safe and effective in recent randomized controlled trials.

Objective: To assess outcome results of angioplasty of the superficial femoral artery with Paclitaxel-coated balloon in claudicants in real world practice of a single centre.

Material and methods: A continuous prospective cohort-study of 106 claudicants (128 lower limbs) from January 2015 to December 2017. Study end-points include primary patency, freedom from clinically driven target-lesion revascularization and symptom relief.

Results: It concerns 34 women (32%) and 72 men (68 %) with a mean age of 67.8 years, suffering life-style-limiting claudication. Only short to intermediate-length stenosis or occlusions (30.6%), with a mean length of 59.6 mm were selected for percutaneous angioplasty with a Paclitaxel-coated balloon.

Technical success was 100%. At 12 months, primary patency attained 89.5% (2 early occlusions, 2 restenosis). There were four reinterventions, resulting in a clinically driven target lesion revascularization rate of 3.1%. At the end of the follow-up, all but two patients (98%) remained symptom-free. Seven patients died during follow-up (no procedure-related deaths).

Conclusion: Paclitaxel-coated balloon angioplasty of the superficial femoral artery gives in routine clinical practice excellent mid-term results, with a restenosis rate of 10.5% at a mean follow-up of 13 months. This procedure has authors' preference as first-choice technique for correction of short- and intermediate-length symptomatic stenosis of the superficial femoral artery.

THE ROLE OF MAGNETIC RESONANCE IMAGING IN THE DIAGNOSTIC OF CHRONIC VENOUS INSUFFICIENCY

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The venous system consists of a complex network of veins which is often characterized by anatomic variability. Some deviations from the norm – whether rare inborn anomalies or changes due to pathological conditions – can be completely hidden while others result in serious consequences. The first method of choice when diagnosing varicosity of the lower limbs tends to be ultrasound primarily aimed at the examination of the deep venous system of the lower limbs and primarily at locating the reflux of the surface venous system. If there is a possible indication of an anomaly of the venous system, other methods of choice include MRI and CT. MRI is an examination that does not utilize a contrast agent and – of course – ionization.

However, ultrasound has a crucial disadvantage and that is the subjective evaluation of the outcome by a healthcare pro-

fessional. In our sample of 214 patients who were examined in various stages of CVI of the lower limbs in the past two years, we had a total of nine cases when – due to discrepancies of ultrasound – we used MRI of the venous system. In a case of a very young patient we diagnosed Turner syndrome and in three patients we identified an incorrect original diagnosis (e.g. the aplasia of the deep venous system of the calf, MRI confirmed free flow in the venous system.)

Existing guidelines indicate MRI examination in the case of pelvic congestion. We used it in dubious cases with clinical symptoms of CVI of the lower limbs and we recommend it in diagnosis as the benefits to patients are obvious.

Conclusion: It is very important to establish the correct diagnosis of ailments of the venous system when planning a surgical intervention or a minimally invasive intervention.

THE PAD SURVEY IN THE NORTH-EAST OF ITALY: AN OBSERVATION STUDY ON PREDICTIVE VALUE OF ANKLE-BRACHIAL INDEX

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Introduction: The ankle-brachial index (ABI) is a non-invasive tool useful for the diagnosis and surveillance of peripheral arterial disease (PAD). Beyond the diagnosis of PAD, ABI is also a strong marker of generalized atherosclerosis and cardiovascular (CV) risk. An ABI ≤ 0.9 is associated on average with a 2- to 3-fold increased risk of total and CV death. An ABI > 1.3 represents arterial stiffening (medial arterial calcification) and is also associated with a higher risk of CV events and mortality.¹⁻³

This multicentre, prospective, observational cohort study was aimed at assessing the role of ABI in predicting all-cause and cardiovascular mortality.

A secondary analysis on the ABI predictive value for hospitalizations due to acute myocardial infarction, stroke and heart failure was also performed.

Methods: Between 2011 and 2013, in 7 outpatient vascular clinics operating in North-East Italy, 1,251 consecutive patients were enrolled, received a baseline ABI measurement and were regularly followed up for four years.

Baseline clinical characteristics were reported for each enrolled patient, including age, sex, BMI, smoking habit, diabetes, and chronic renal failure.

The ABI was measured in supine position, with cuff places just above the ankle. Systolic blood pressure (SBP) was measured by a Doppler probe (5–10 MHz) on the posterior and anterior tibial arteries on each foot and on the brachial artery of each arm. The ABI of each leg was calculated by dividing the

highest ankle SBP by the highest arm SBP. The ABI ≤ 0.9 and > 1.3 was considered abnormal.

Primary and secondary outcomes were all-cause mortality, fatal and non-fatal CV events, including coronary heart disease (CHD), heart failure, ischemic stroke.

Outcomes data were extracted from the data warehouse of the Regional Epidemiological Service. Among the data sources, ICD10 Codes in mortality records and ICD9-cm Codes in the discharge records were used.

The time to event distribution according to the ABI group was summarized with Kaplan-Meier curves. A Cox regression analysis was used to assess the association between a low ABI and the selected outcomes adjusting for baseline risk factors (advanced age, male sex, smoking habit, diabetes, and chronic renal failure).

Results: Among the 1,251 subjects, 541 (43.2%) had low ABI values. During a follow-up of 4 years, 233 deaths and 227 CV events occurred (47 coronary heart events, 41 strokes, 139 heart failures). A low ABI was found to be associated with all outcomes.

Adjusted hazard ratios [95% CI] remained significant, even after adjustment for diabetes, chronic renal failure, age, sex, and smoking [CHD 3.06 (1.36–6.86); stroke 2.12 (1.02–4.41); all-cause mortality 1.93 (1.37–2.72); CV mortality 1.78 (1.05–3.03)].

Discussion and conclusions: An abnormal ABI is a strong and independent predictor of all-cause death and major cardiovascular events. Besides its use for diagnosing PAD and evaluating its functional severity, ABI is a strong and reliable marker of global cardiovascular risk in the general population.

References

1. Norgren, L., Hiatt, W. R., Dormandy, J. A. et al.; TASC II Working Group. Inter-society consensus for the management of peripheral arterial disease. *Int Angiol* 26, 2: 81–157, 2007.
2. Isla, L. P. Comments on the 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases. *Rev Esp Cardiol (Engl Ed)* 71, 2: 74–78, 2018.
3. Aboyans, V., Ricco, J. B., Bartelink, M. E. L. et al.; ESC Scientific Document Group. 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS): Document covering atherosclerotic disease of extracranial carotid and vertebral, mesenteric, renal, upper and lower extremity arteries. Endorsed by: the European Stroke Organization (ESO) The Task Force for the Diagnosis and Treatment of Peripheral Arterial Diseases of the European Society of Cardiology (ESC) and of the European Society for Vascular Surgery (ESVS). *Eur Heart J Epub* 2017 Aug 26.



CANCER AND VTE: DATA FROM THE RIETE REGISTRY

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The Registro Informatizado de Enfermedad TromboEmbólica (RIETE Registry) is an ongoing, international, prospective registry of consecutive patients with acute venous thromboembolism (VTE) designed to gather and analyse data on treatment patterns and outcomes in patients with acute VTE. In contrast to randomized controlled trials, there is no imposed experimental intervention: the management is determined solely by physicians. Thus, it provides data on patients with VTE in a real-world situation with an unselected patient population. Data from RIETE are hypothesis-generating and provide feedback from real-world clinical situations.

So far, we learned about the natural history of VTE in patients with cancer: risk prediction for occult cancer; risk stratification to predict recurrence, bleeding and death; clinical course according to the specificity of primary cancer.

The benefits of a diagnostic workup for occult cancer in patients with VTE are controversial. The RIETE group provided and validated a risk score for occult cancer in patients with VTE. A nested case-control study in a cohort of patients with VTE included in the registry from 2001 to 2014 was designed. Cases included cancer detected beyond the first 30 days and up to 24 months after VTE. Control subjects were defined as patients with VTE with no cancer in the same period. Of 5,863 eligible patients, 444 (7.6%; 95% CI, 6.8–8.2) were diagnosed with occult cancer. On multivariable analysis, variables selected were male sex, age >70 years, chronic lung disease, anaemia, elevated platelet count, prior VTE, and recent surgery. A risk score assigning points to each variable was built. Internal validity was confirmed using bootstrap analysis. The proportion of patients with cancer who scored ≤2 points was 5.8% (241 of 4,150) and the proportion in those who scored ≥3 points was 12% (203 of 1,713). This is the first risk score that has identified patients with VTE who are at increased risk for occult cancer. This score needs to be externally validated.¹

Even though the Khorana risk score (KRS) has been validated to predict against the development of VTE among patients with cancer, it has a low positive predictive value. It is also unknown whether the score predicts outcomes in patients with cancer with established VTE. In a cohort of patients with active cancer from the RIETE registry the prognostic value of the KRS at inception in predicting the likelihood of VTE recurrences, major bleeding and mortality during the course of anticoagulant therapy was assessed in 7,948 consecutive patients with cancer-associated VTE. Most VTEs occur in

patients with low or moderate risk scores. The KRS did not accurately predict VTE recurrence, major bleeding, or mortality among patients with cancer-associated thrombosis.²

The clinical course of VTE in patients with active cancer may differ according to the specificities of primary tumour site. The clinical VTE-related outcomes during the course of anticoagulation in patients with one of the 4 more frequent cancers (breast, prostate, colorectal, or lung cancer) were compared. Significant differences in the clinical profile of VTE-related outcomes were observed according to the site of cancer. These findings suggest the development of cancer-specific anticoagulant strategies as an area for further research.³

References

1. Jara-Palomares, L., Otero, R., Jimenez, D. et al.; RIETE Investigators. Development of a Risk Prediction Score for Occult Cancer in Patients With VTE. *Chest* 151, 3: 564–571, 2017.
2. Tafur, A. J., Caprini, J. A., Cote, L. et al.; RIETE Investigators. Predictors of active cancer thromboembolic outcomes. RIETE experience of the Khorana score in cancer-associated thrombosis. *Thromb Haemost* 117, 6: 1192–1198, 2017.
3. Mahé, I., Chidiac, J., Bertolotti, L. et al.; RIETE Investigators. The Clinical Course of Venous Thromboembolism May Differ According to Cancer Site. *Am J Med* 130, 3: 337–347, 2017.

ANTITHROMBOTIC THERAPY IN PREGNANT WOMEN WITH MECHANICAL HEART VALVES

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Pregnancy in patients with mechanical valves carries high maternal and fetal morbidity and mortality risk. For the mother, valve thrombosis is the most serious complication. Optimal anticoagulant treatment is therefore of utmost importance, but it has to be balanced against the risk of teratogenicity and fetotoxicity of oral anticoagulants as well as the risk of bleeding.

Guidelines in this field are based on weak scientific evidence due to lack of randomized control studies. Hence, recommendations and practices vary and optimal anticoagulation regimen remains uncertain. Mostly patients follow one of the three strategies: vitamin K antagonists (VKA) throughout pregnancy, therapeutic heparin throughout pregnancy and/or sequential treatment with heparin during the first trimester and VKA in the second and third trimesters. Current evidence shows that VKA throughout pregnancy might be the best option for the mother, while at the same time it carries an increased risk of miscarriage and fetal death. On the other hand, low-molecular-weight heparin (LMWH) based strategy has the highest rate of live births.

In our centre, we adhere to the heparin-throughout-pregnancy strategy for our patients with mechanical heart valves. Since 2004 we have had 20 pregnancies following this regimen. Our patients are switched from VKA to therapeutic doses of LMWH as soon as pregnancy is confirmed. LMWH

is adjusted according to peak anti-Xa levels, measured at least bi-monthly. Ahead of delivery exact peripartum anticoagulation plan is drawn in cooperation with the obstetrician. Postpartum, VKA are re-introduced as soon as possible. The patients are regularly monitored throughout pregnancy and up to four weeks after delivery. Bleeding complications, thrombotic complications and pregnancy outcome are recorded for each patient.

In our opinion, treatment with LMWH in pregnant patients with mechanical valves is a reasonable therapeutic option in a compliant and well-informed patient, provided regular monitoring is feasible.

VENASEAL GLUE AS A NEW DIRECTION FOR VARICOSE VEINS TREATMENT. OUR ANNUAL EXPERIENCE

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Resolving varicose veins effectively, without pain and relatively fast, has been a very challenging task. It started at 2011 and since 2016 we have had modern varicose veins therapy in the Czech Republic.

VenaSeal (Medtronic) is new chemical method to treat varicose veins. This operation under ultrasonographic guidance is based on cyanoacrylate polymerization, endothelial intimal damage, loosening of media and finally closing the great or small saphenous vein (GSV, SSV) without tumescence.

This surgical procedure consists of an ultrasound-guided insertion of a catheter with a cyanoacrylate polymer directly into the vein. The subsequent application of the adhesive is done exactly under sonography control and does not last for an hour. This gluing is well tolerated, with no pain. The patients can get up after the surgery, leave and pursue their work and their normal daily activities. The biggest benefits come from the ability to perform the procedure without pain and without compressive stockings.

Compared to thermal, chemical or surgery, it offers minimal pain, very good tolerance, less complications and very good long-term data on the success of primary treatment.

Our clinical trial shows the first 50 patients with clinical and ultrasound follow-up at 1 to 3 weeks, 1 month, 3 months, 6 months and 12 months after the treatment. We used a clinical severity score questionnaire to stratify clinical symptoms. We examine characteristics, such as incompetence at the sapheno-femoral junction, the diameter of veins, treatment length and presence of perforators.

After the operation, we reported local skin reaction caused by immune response like delayed type of hypersensitivity. No phlebitis, other allergic reaction, deep vein thrombosis or central embolism were observed. No recanalization longer than 5 cm was spotted. According to our findings VenaSeal offers effective alternative to classic surgery or to other modern endovascular treatments.

INFLUENCE OF PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY ON LIFE QUALITY CHANGES IN PATIENTS WITH LOWER LIMBS ISCHEMIA

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Introduction: Percutaneous transluminal angioplasty (PTA) is being commonly performed in patients with peripheral artery disease (PAD). However, the evaluation process of this procedure's results includes imaging and assessment of clinical condition, the evaluation of its impact on the patients' quality of life should not be overlooked. Our aim was to observe changes in patients' quality of life within 12 months after PTA. **Methods:** In this study 715 patients with PAD undergoing their first PTA of their lower extremities were enrolled. Whole group consisted of 352 patients with critical (CLI) and 363 with non-critical (nonCLI) lower limb ischemia. The quality of life has been assessed by two separate validated questionnaires – disease specific VascuQoL-25 and non-specific EuroQoL (EQ-5D-3L), each consisting of five dimensions: Mobility, Self-Care, Usual Activities, Pain, Anxiety; EQ5D also contains Visual Analog Scale (VAS). Both, clinical condition and quality of life, have been examined before PTA procedure as well as 1, 3, 6 and 12 months after it.

Results: 12 months after PTA clinical state significantly improved in CLI group (average Rutherford decreased from 4.88 to 2.27) and nonCLI (Rutherford 2.99 vs 1.44, $p < 0.001$). Also, life quality improvement has been observed. In general questionnaire EQ5D CLI patients' average summary result changed from 2.0 to 1.8 (VAS thermometer: 46.8 vs 57.4) and nonCLIs' from 1.72 to 1.62 (VAS 52.4 vs. 73.8), when in PAD specific questionnaire VascuQoL 25 difference was even more significant (average summary result in CLI 2.5 vs. 4.1 and in nonCLI 3.5 vs 4.7; $p < 0.001$). There were improvements in all five domains of VascQoL and in 4/5 categories in EQ5D.

Conclusions: The study showed that revascularization of lower limbs by PTA procedures improves not only clinical condition but also has positive influence on patients' quality of life. That is very important factor that impacts daily life activities and enables faster recovery process, which is crucial in healing lower limbs ischemia and preventing its complications.

SCREENING FOR PAD IN CORONARY ARTERY DISEASE

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PAD (Peripheral Arterial Disease) often coexists with CAD (Coronary Artery Disease). It is often asymptomatic or masked by CAD symptoms as angina. PAD is usually detected by ABI measurement. Abnormal ABI (<0.9) is present in 13–16 % of patients who have coronary angiography significant lesions.

The coexistence of PAD in CAD patients has been consistently associated with worse outcome although it is unclear whether PAD is a marker or a cause of cardiovascular adverse events.

However, there are many arguments suggesting that measurement of ABI in CAD patients could be a good method for prognostic stratification of patients.

The prevalence of PAD was 12.8% in 711 patients undergoing percutaneous coronary intervention (PCI)¹; PAD patients had a higher prevalence of left main coronary disease and more frequently multivessel lesions. In 1,253 patients undergoing non-emergent coronary angiography and having CAD, the prevalence of PAD was 16%.²

In Acute Coronary Syndrome registries (ACS), outcomes after ACS were worse in patients with PAD.^{3,4}

In a prospective cohort study of 1,018 patients with stable CAD, incident symptomatic PAD events were associated with an increased risk for subsequent CV events.⁵

In a pooled analysis of 19,867 patients undergoing PCI, 8.1% were previously diagnosed with PAD. The presence of PAD was associated with higher rates of post-PCI death and MI and was an independent predictor of short- and long-term mortality.⁶

Concomitant PAD is also associated with a higher risk for periprocedural complications after CABG.^{7,8}

Despite the fact that ABI could be a very practical and easy method for prognostic stratification of CAD patients, the AMERICA Study⁹ has not shown apparent benefit in 521 high risk coronary patients of a systematic detection of asymptomatic multisite artery disease and intensified treatment over a 2-year follow-up period. However, this trial is small and has some limitations and it does not exclude a role for screening for asymptomatic in CAD patients as is recommended by the 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the ESVS.

Anyway, ABI measurement is an easy tool allowing to detect PAD and to sensitize the practitioner at the probably higher CV risk when it is present. Perhaps it would be possible to combine measurements. For example, combining the ABI and SYNTAX scores have been shown to improve the prediction of 1-year adverse ischemic events compared with the SYNTAX Score alone after PCI.¹⁰

Sources

- 1 Kim, E. K., Song, P. S., Yang, J. H. et al. Peripheral artery disease in Korean patients undergoing percutaneous coronary intervention: prevalence and association with coronary artery disease severity. *J Korean Med Sci* 28, 1: 87–92, 2013.
- 2 Imori, Y., Akasaka, T., Ochiai, T. et al. Co-existence of carotid artery disease, renal artery stenosis, and lower extremity peripheral arterial disease in patients with coronary artery disease. *Am J Cardiol* 113, 1: 30–35, 2014.
- 3 Mukherjee, D., Eagle, K. A., Kline-Rogers, E. et al.; GRACE Investigators. Impact of prior peripheral arterial disease and stroke on outcomes of acute coronary syndromes and effect of evidence-based therapies (from the Global Registry of Acute Coronary Events). *Am J Cardiol* 100, 1: 1–6, 2007.
- 4 Subherwal, S., Bhatt, D. L., Li, S. et al. Polyvascular disease and long-term cardiovascular outcomes in older patients with non-ST-segment-elevation myocardial infarction. *Circ Cardiovasc Qual Outcomes* 5, 4: 541–549, 2012.
- 5 Grenon, S. M., Vittinghoff, E., Owens, C. D. et al. Peripheral artery disease and risk of cardiovascular events in patients with coronary artery disease: insights from the Heart and Soul Study. *Vasc Med* 18, 4: 176–184, 2013.
- 6 Saw, J., Bhatt, D. L., Moliterno, D. J. et al. The influence of peripheral arterial disease on outcomes: a pooled analysis of mortality in eight large randomized percutaneous coronary intervention trials. *J Am Coll Cardiol* 48, 8: 1567–1572, 2006.
- 7 Rihal, C. S., Sutton-Tyrrell, K., Guo, P. et al. Increased incidence of periprocedural complications among patients with peripheral vascular disease undergoing myocardial revascularization in the bypass angioplasty revascularization investigation. *Circulation* 100, 2: 171–177, 1999.
- 8 Aboyans, V., Lacroix, P., Postil, A. et al. Subclinical peripheral arterial disease and incompressible ankle arteries are both long-term prognostic factors in patients undergoing coronary artery bypass grafting. *J Am Coll Cardiol* 46, 5: 815–820, 2005.
- 9 Collet, J. P., Cayla, G., Ennezat, P. V. et al.; AMERICA Investigators. Systematic detection of polyvascular disease combined with aggressive secondary prevention in patients presenting with severe coronary artery disease: The randomized AMERICA Study. *Int J Cardiol* 254: 36–42, 2018.
- 10 Ueki, Y., Miura, T., Miyashita, Y. et al. Predictive value of combining the Ankle-Brachial Index and SYNTAX Score for the prediction of outcome after percutaneous coronary intervention (from the SHINANO Registry). *Am J Cardiol* 117, 2: 179–185, 2016.

THE VALUE OF FDG PET/CT IN THE DIAGNOSIS OF STENT GRAFT INFECTIONS

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Aim: To analyse the diagnostic accuracy of FDG PET/CT in the diagnosis of stent graft infections (SGI).

Methods: Two nuclear medicine physicians have independently retrospectively analysed 17 FDG PET/CT examinations in 16 patients (13 males, mean age 66 ± 8 years) referred with clinical suspicion of SGI between 2010–2017. The images were evaluated visually (the uptake pattern: no uptake, diffuse, focal or inhomogeneous; the intensity of uptake: 5-point visual grading scale comparing the level of FDG uptake in the area of SG with accumulation in healthy liver parenchyma and semiquantitatively: maximal standard uptake value in the area of SG (SUV_{max}), target-to-background ratio with blood pool activity (TBR_{BP}) and liver activity (TBR_{hep}) as a reference. The SGI was

defined as the presence of focal hyperactivity in the area of SG and adjacent tissues with the intensity exceeding the activity of the liver parenchyma. The CT images were independently assessed for signs of SGI by one radiologist. Clinical judgment of three angiologists based on thorough review of all available unblinded data in subsequent follow-up was used as a reference.

Results: 9/17 cases were interpreted as SGI by clinical review. FDG PET/CT correctly diagnosed SGI in 8/9 cases and yielded

sensitivity of 89% and specificity of 100%. Mean SUV_{max}, TBR_{BP} and TBR_{hep} (average \pm SD) were 9.8 ± 4.0 , 6.9 ± 2.6 , and 4.6 ± 1.7 resp. in the group of patients with true SGI and 4.0 ± 1.1 , 2.5 ± 0.4 and 1.9 ± 0.2 resp. in true negative cases. Analysis of CT images resulted in sensitivity of 78% and specificity of 100% and was concordant with PET in 14/17 cases.

Conclusion: FDG PET/CT with visual image analysis can be useful tool for the diagnosis of SGI with good diagnostic accuracy.

43rd Czech Angiology Days

POPLITEAL ARTERY ANEURYSM

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Introduction: Popliteal artery aneurysms are the most common peripheral artery aneurysms. Most commonly are asymptomatic. If patients exhibit chronic symptoms, these are usually secondary to mass effect and compression of adjacent structures, such as the tibial nerve or popliteal vein. Acute lower extremity ischemia, can be caused due to aneurysmal intraluminal thrombosis or distal embolization of thrombus. Duplex ultrasonography is the ideal screening and diagnostic imaging modality to detect a popliteal artery aneurysm. Computed tomographic angiography, Magnetic resonance angiography or conventional angiography are necessary to plan the treatment.

Case reports: In our presentation, we report patients with popliteal artery aneurysm. Diagnosis was made using Colour Coded Duplex ultrasound scanning and CT angiography of lower extremities during the time from October 2016 to August 2017. Patients were subsequently treated with open repair which involved ligation of the popliteal artery proximal and distal below the aneurysmal sac and bypassing the excluded segment using autologous vein graft or prosthetic graft.

Conclusions: Popliteal artery aneurysm is a rare diagnosis with poor prognosis. All symptomatic PPAs should be repaired because of increased incidence of thrombosis or limb loss. In asymptomatic patients, to prevent potential complications, the reported indications to repair are size >20 mm, high-grade thrombus and poor run-off vessels. Venous bypass remains the gold standard in repair of popliteal artery aneurysm. Endovas-

cular repair is now a viable alternative to open surgery, especially in high risk patients. Treatment of acutely thrombosed aneurysms is managed by a combination of endovascular and angiosurgical technique. These patients have a relatively poor prognosis with a 15% amputation rate.

THE ROLE OF COMPRESSION IN THE PREVENTION OF POSTTHROMBOTIC SYNDROME

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Postthrombotic syndrome (PTS) is a common and burdensome complication of deep venous thrombosis (DVT). Medical compression was considered effective by level 1 evidence in preventing PTS after proximal DVT until the recent publication of a randomized controlled trial (RTC) conducted by a North American group headed by a recognized epidemiologist and angiologist (SOX trial).

In the paper, there are discussed the results of some new reports and systematic review and meta-analysis of this problem and the recommendation for clinical praxis.

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LEIOMYOSARCOMA OF THE INFERIOR VENA CAVA IN A POTENTIAL LIVE KIDNEY DONOR: A CASE REPORT

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Introduction: Leiomyosarcoma of inferior vena cava (IVC) is a rare neoplasm affecting approximately 1/100,000 people. The prognosis is poor and potential curative intent occurs through challenging operations, such as vena cava resection, occasionally multivisceral when required, and vascular reconstruction. **Case report:** An unusual presentation of the inferior vena cava leiomyosarcoma is reported. Female 51-year-old patient came to Transplant Surgery Department as a potential kidney donor for her son. She did not have abdominal pain, but she felt more

tired on targeted questions. Protocol examinations for a live kidney donor were carried out. Based on initial sonography (Figure 1), tumorous expansion 7 cm in diameter in the IVC was found, implying as sarcoma of the vascular wall. The same finding was confirmed by a CT scan (Figure 2). Surgical removal was decided on a multidisciplinary seminar. Kidney donation was contraindicated.

Radical extirpation of tumour mass with partial resection and direct suture of the IVC was performed. Blood loss was minimal. The hospital stay was uneventful. The follow up is now one month. It was a complete R0 resection and histology confirmed leiomyosarcoma. Adjuvant chemotherapy was not recommended and the patient will be under oncologist's surveillance. To prevent thromboembolism in a patient with significant obtained thrombophilia and surgery in the IVC, the patient will receive prolonged thromboprophylaxis with low molecular weight heparin.

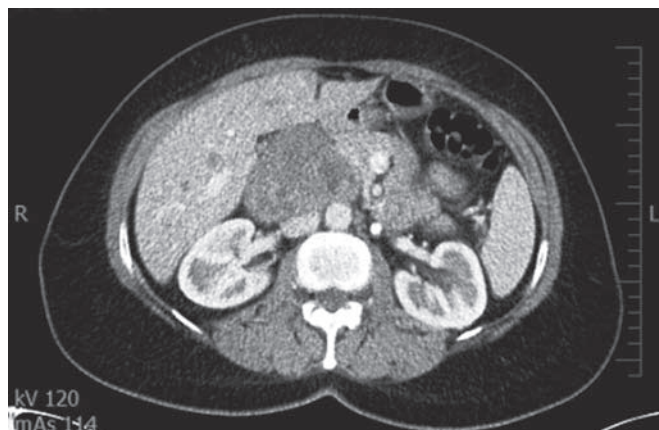
Conclusion: Aggressive operative management is recommended for soft tissue sarcomas using the latest abdominal and vascular surgery techniques. In our case, leiomyosarcoma of the inferior vena cava was accidentally found in a potential kidney donor. Radical extirpation with partial IVC resection was safely performed.

Figure 1: Leiomyosarcoma 7 cm in diameter of the inferior vena cava on sonography



Figure 2: Leiomyosarcoma of the inferior vena cava 7 cm in diameter on CT scan

(Courtesy of Department of Radiology, IKEM, Prague)



HOKUSAI-VTE CANCER STUDY – TREATMENT OF CANCER-ASSOCIATED VENOUS THROMBOEMBOLISM

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The role of treatment with direct oral anticoagulant agents in the treatment of cancer-associated venous thromboembolism is unclear. In this study patients with active cancer and DVT or PE were randomly assigned to receive either edoxaban or dalteparin for 12 months. 1,050 patients were enrolled at 114 centres in 13 countries, including the Czech Republic. The recurrence of venous thromboembolism or major bleeding occurred in 67 of the 522 patients (12.8%) in the edoxaban group and in 71 of the 524 patients (13.5%) in the dalteparin group (hazard ratio, 0.97; 95% confidence interval [CI], 0.70 to 1.36; $p=0.006$). Subgroup analyses showed that patients with gastrointestinal cancer were more likely to have an increase in the risk of bleeding during treatment with edoxaban than with dalteparin. Death occurred in 206 patients (39.5%) in the edoxaban group and in 192 patients (36.6%) in the dalteparin group.

This study shows good efficacy and safety of edoxaban as compared with long-term low-molecular-weight heparin for the treatment of cancer-associated venous thromboembolism.

AORTIC INTRAMURAL HEMATOMA (IMH) AND PENETRATING AORTIC ULCER (PAU)

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Aortic intramural hematoma (IMH) and penetrating aortic ulcer (PAU) are summarized with aortic dissection. The IMH is defined as aortic dissection without identifiable intimal tear and lack of flow in the false lumen of the aorta. Hematoma forms within the aortic wall as a result of either vasa vasorum haemorrhage, a microscopic tear of the intima that is not detectable by imaging modalities or an atherosclerotic plaque with penetrating ulceration rupture. The PAU is defined as an atherosclerotic lesion with ulceration penetrating the intimal elastic lamina. The diagnosis is confirmed by computed tomography (CT) scan, magnetic resonance imaging and/or transoesophageal echocardiography (TEE). The regional thickening of the aortic wall greater than 7 mm with evidence of intramural blood accumulation is considered IMH. Patients with PAU >20 mm in maximum diameter or >10 mm in depth had a high risk of disease progression and thus should be considered candidates for early surgical or endovascular repair. Interestingly, PAU with acute symptoms has a worse prognosis, while asymptomatic patients present a lower incidence of life-threatening complications. The treatment policy of IMH was initial medical treatment with timed surgical intervention in cases with complications, according to clinical assessment and on follow-up imaging studies. The initial therapeutic goal during the acute phase of IMH included the elimination of pain and the reduction of systolic blood pressure to 100–120 mmHg. Close clinical monitoring with CT scan is carried out to minimize the risk of fatal complications. Aortic diameter >5.0 cm and hematoma thickness >12 mm are independent predictors of development of complications and may benefit from urgent endovascular repair.

GENE SCORE AND HYPERTRIGLYCERIDEMIA IN CZECH POPULATION

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Introduction: Hypertriglyceridemia (HTG) is a common lipid disorder. Strong genetic background of very high plasma triglyceride levels (over 10 mmol/L) is probable. Rare mutations may explain some cases, but in majority of cases, the disease seems to be polygenic. Accumulation of risk alleles can nonlinearly increase the risk of HTG.

Methods: We have analysed common polymorphisms within the *APOA5*, *FRMD5*, *GCKR*, *CAPN3*, *TRIB1*, *MLXIPL*, *LPL*, *LIPC*, *TYW1B*, *ANGPTL3*, *COBLL1*, *CILP2*, *NAT2D*, *PLTP*, *FADS1-2-3*, *TIMD4*, *CETP* and *GALNT2* genes in 203 patients with plasma TG over 10 mmol/L and 505 treatment naïve controls with plasma TG repeatedly below 1.8 mmol/L.

Results: We found significant risk (all $p < 0.01$ and ORs over 1.8) of hypertriglyceridemia development associated with risk alleles of the above-mentioned SNPs except for two (*FADS1-2-3*, *GALNT2* gene polymorphisms). We have created individual unweighted gene score based on the number of the risk alleles. Despite the fact, that 16 significant markers have been included, unweighted gene score differed only at $p = 0.05$ between the HTG (12.2 ± 2.2) and controls (11.7 ± 1.9).

Conclusions: Our results suggest that an unweighted multiple gene score does not clearly identify patients with hypertriglyceridemia.

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THE EFFECT OF CONTINUOUS FLOW MECHANICAL CIRCULATORY SUPPORT ON PERIPHERAL ENDOTHELIAL REACTIVITY, ARTERIAL STIFFNESS AND HEART RATE VARIABILITY MEASURED USING ENDO-PAT 2000

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Purpose: According to numerous previous studies, heart failure is associated with changes of endothelial function, heart rate variability (HRV) and arterial stiffness. Endo-PAT 2000 is a FDA approved device for assessment of endothelial function and offers the plausibility to examine reactive hyperaemia index (RHI; a measure of endothelial responsiveness), peripheral augmentation index (AI; a measure of arterial stiffness) and HRV at a time. Aim of this study was to describe possible changes in RHI, AI and HRV in patients receiving continuous flow (CF) left ventricular assist device (LVAD) to assess possible influence of non-physiological flow pattern generated by these LVADs.

Methods: 13 patients implanted with HeartMate II underwent assessment of RHI, AI and HRV with Endo-PAT 2000 device. Subjects were examined 3 and 6 months (± 1 month) after LVAD implantation. Results were compared with control group of healthy volunteers matched with age.

Results: When compared to control group reactive hyperaemia index was significantly decreased in LVAD group ($p = 0.0003$) and augmentation index, measure of arterial stiffness, was significantly higher in LVAD patients at second measurement at 6 months after implant of LVAD ($p = 0.04$). There were no dif-

ferences observed in longitudinal follow up within the groups. HRV did not show any significant differences between the groups.

Conclusion: Despite improvement of central haemodynamic, peripheral endothelial function after LVAD implantation is most probably further compromised according to RHI values in CF LVAD patients. Arterial stiffness was increased in patients with continuous flow HeartMate II pump when compared to healthy control group. Therefore, examination by EndoPAT 2000 showed decline in endothelial function in patients with CF LVAD when compared to the control group, most probably caused by diminished pulsatility.

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CREATING AV SHUNTS: OUR EXPERIENCE (2016–2017)

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Introduction: Our department, exactly Clinic of Vessel Surgery, cooperates with Department of Nephrology to prepare patients for hemodialysis. AV fistula is necessary to put on the transplant program too. It is a surgically made passage between artery and vein. General examination is important to correct plan of AV shunt. It means history of another disease like diabetes, heart disease, coagulopathies, state of artery system (Allen's test) and some another. Not less important are BMI and information, if the patient is right-handed or left-handed.

Methods: Patients are mostly admitted to the hospital for three days. Seven days before operation patients stop to use medicine (antiplatelet drugs, anticoagulants). Then they don't wear tight sleeves or wristwatch. We need to protect veins from trauma during minimally four weeks before operation (no blood sampling, no venous cannula). We almost operate in local anesthesia, for prosthetic shunts we use US navigated nerve block – brachial plexus. Postoperative monitoring of maturing shunts is necessary.

Conclusion: We made 88 AV shunts from 2016 to 2017. Most of them are radiocephalic shunts in foveola manus. Next ones are situated in forearm and then in cubital fossa. 15 shunts are prosthetic.



RADIOGRAPHIC IODINATED CONTRAST MEDIA-INDUCED THYROID DYSFUNCTION

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Context: Thyroid hormone production is dependent on adequate iodine intake. Excess iodine is generally well-tolerated, but thyroid dysfunction can occur in susceptible individuals after excess iodine exposure. Radiological iodinated contrast media (ICM) represents an increasing common source of excess iodine.

Although most cases of contrast-induced thyroid dysfunction are transient, there is a risk for serious complications, such as atrial fibrillation with hyperthyroidism and myxoedema coma with hypothyroidism, especially in elderly patients, neonates and in patient with thyreopathy and impaired renal function.

Objective and conclusions: Currently the needs for any contrast examination increase. This lecture should point to the often-forgotten thyroid examination before any elective contrast examination. When the patient suffers from thyroid disease, we should be reluctant to use ICM. If necessary the proposed preventive measures should be made, patients should be closely monitored for thyroid dysfunction after receiving ICM and should be treated as needed.

THE IMPORTANCE OF DOAC MONITORING IN CLINICAL PRACTICE

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Direct oral anticoagulants (DOAC) do not require routine laboratory monitoring in clinical practice. This should be done only in special cases (emergency patient to operate, bleeding, control of drug use. DOAC dosing is usually unified in the indicated cases and only with exceptions it is possible to use lower dosing. The EMA (European Medicines Agency) requires that each DOAC prescribing physician to be acquainted not only with the Summary of Product Characteristics (SPC), which he indicates, but also with other procedures such as anticoagulant transfer or laboratory control of their anticoagulant effect. We have been using DOAC for several years; the experience with them will gradually increase, especially if the effort is to gradually replace warfarin. This will also apply to laboratory tests, where there are still relatively limited possibilities of interpreting coagulation tests when treated with DOAC. Therefore, ISTH recommends that, in addition to tests

that directly determine the DOAC concentration, a prothrombin test or an F Xa inhibition test (to monitor the effect of direct inhibitors F Xa) and aPTT (to monitor thrombin inhibitor). The main reason for this recommendation is that special quantitative tests may not be available everywhere. Special tests calibrated on the drug-drug concentration in the patient's body. Results-related to the normal values obtained in the given laboratory on one particular analyser.

Method name	Number of results per year (Thrombotic Centre, Prague)			
	2014	2015	2016	2017
TDI Dabigatran	59	88	104	147
DI Rivaroxaban	146	247	342	393
DI Apixaban	27	76	145	192

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AAA, RAAA, CASE STUDIES, SURGICAL TREATMENT

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Currently, abdominal aortic aneurysms (AAA) affect up to 6% of the population over 60 years of age. There are currently two basic treatment options available; classical surgical treatment and endovascular treatment. The results of both procedures are nowadays very prospective with mortality below 3%. Despite advances in endovascular treatment of abdominal aortic aneurysm (AAA), surgical treatment is still justified. It is often an advanced and bizarre form of aneurysm sac, which is more convenient to treat surgically. Another problem is the combination of dilatation (aneurysmatic) forms with stenotizing forms of obliterating arteriosclerosis. Particular attention is paid to rupture of abdominal aortic aneurysm (RAAA), where despite the advances in diagnosis and treatment, high mortality persists. RAAA mortality also affects other factors such as patient age and other associated diseases. Less experienced physician has often troubles with diagnostic. The key factor for patient survival is quick and correct diagnosis, strategy and surgical treatment. Choosing an adequate strategy for surgical treatment of AAA and RAAA and its proper technical implementation is a necessary for good long-term results. The authors demonstrate their own results of the surgical strategy and treatment of AAA, RAAA on their case studies, demonstrate their long-term experience and numerous operations cases.

DUPLEX ULTRASONOGRAPHY DIAGNOSIS OF REFLUX SITES ON THE LEGS WITH PRIMARY AND RECURRENT VARICOSE VEINS

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The aim of the study was to report our experience on the duplex ultrasonography diagnosis of reflux sites on the legs in patients with primary and recurrent varicose veins (VV).

Patients and methods: Retrospective observational study on consecutive patients presented in an angiology outpatient clinic for primary or recurrent chronic venous disease/insufficiency, clinical classes from C₀ to C₆ assessed by means of the CEAP classification. Ultrasound mapping was performed in 725 legs of 725 patients (531 women, 73%, mean age 48.4 years; 194 men, 27%, mean age 45.7 years) with primary VV and in 75 legs of 75 patients with recurrent VV (53 women, 71%, mean age 52.9 years; 22 men, 29%, mean age 54.4 years).

Results: Reflux sites on the legs with primary VV were at saphenofemoral junction (SFJ) in 589 legs (81.2%), saphenopopliteal junction (SPJ) in 117 legs (16.1%), perforating veins (PV) in 34 legs (4.7%) and other in 17 legs (2.3%). Patterns of SFJ reflux (589 legs) were classified as 1) reflux from SFJ to great saphenous vein (GSV) in 501 legs (85%), 2) reflux from SFJ to accessory GSV (AGSV) in 88 legs (15%). Negative ultrasound examination was in 85 legs (11.7%), predominantly in women (73 legs, 85.9%) suffering from early stages of chronic venous disease (class C₀₋₁; 67 legs, 78.8%).

Reflux sites on the legs with recurrent VV were at SFJ in 38 legs (51%), SPJ in 18 legs (24%), PV in 11 legs (14.7%) and other in 4 legs (5.3%). Patterns of SFJ reflux (38 legs) were classified as 1) reflux from SFJ to GSV in 10 legs (26.3%), 2) reflux from SFJ to AGSV in 15 legs (39.5%), 3) reflux from SFJ to neovascularisation in 13 legs (34.2%). Negative ultrasound examination was in 10 legs (13.3%).

Conclusions: The most common reflux site on legs with primary and also recurrent VV was SFJ (81.2% and 51% respectively). The second most frequent reflux site was SPJ (16.1%; 24% respectively). The primary insufficient PV were a much more frequent reflux sites on the legs with recurrent VV than on the legs with primary VV (14.7% vs 4.7%). Most often they were popliteal fossa PV (63.6%) and PV of the femoral canal (27.3%). Negative ultrasound examinations were equally frequent in primary and recurrent VV (11.7% and 13.3% respectively).

NOVEL ANTIPLATELET AGENTS FROM THE CLINICAL PHARMACOLOGIST'S PERSPECTIVE

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In addition to acetylsalicylic acid and clopidogrel, two novel antiplatelet agents finding increasing use in clinical practice are prasugrel and ticagrelor. Both are usually administered in combination with other cardiovascular drugs. In addition to the underlying disease, most patients have other conditions requiring medical therapy. The most frequent associated diseases include arterial hypertension, diabetes, dyslipoproteinemia, and other metabolic and endocrine conditions.

Both of the above modern thienopyridine derivatives, metabolized by the cytochrome P-450 system, have also been shown to have a potential for enzyme induction and platelet inhibition. A factor playing a critical role in the safety of therapy and its future course are drug interactions. Awareness of the risk of developing undesirable effects and clinical conditions requiring modification of therapy is most important for a patient's prognosis. The aim of the presentation is to provide a comprehensive overview of the pharmacological profiles, most relevant interactions, and diagnostic and therapeutic procedures, and to describe the clinical benefits of antiplatelet agents used in current practice.

INTEGRATED TELEMEDICAL SYSTEM FOR EARLY DIAGNOSIS OF ALTERATIONS OF LIMB PERFUSION AND SUPPORT OF THE TREATMENT

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The goal of the current study is to inform about the results of a new integrated program designed for the early detection of patients with cardiovascular risk based on early alterations of plethysmographic curves captured on upper and lower limbs. The program is aimed at providing an opportunity for early stage application of non-invasive or minimally invasive therapies.

The presentation also includes an analysis of the opportunities and limits related to the automated evaluation based on an expert system.

The methods used are based on plethysmography. The results of the program are discussed based on more than 1,500 actual patients treated with the same methodology both in municipal and rural area.

The program itself consists of preventive non-invasive diagnostics, monitoring and support for therapy adherence for

patients in their natural environment. It represents a new model of cooperation among healthcare providers both in municipal and rural areas, companies active in telemedicine and funding providers.

Long term sustainability as one of the goals was reached and is discussed together with basic economic parameters.

RECURRENT THROMBOEMBOLISM AS THE FIRST MANIFESTATION OF PULMONARY CARCINOMA – CASE REPORTS

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It's well known that thromboembolic disease can occur concurrently with a malignancy, often it also can precede tumour even a number of months earlier. For this reason, when venous thrombosis or pulmonary embolism is detected, examinations to exclude concomitant neoplasia are often indicated. There are different opinions on the benefits of routine oncological screening. However, there are situations where a more detailed examination should be done. One of these is the case of recurrent thromboembolic events within a short period of time, despite effective anticoagulant therapy.

The authors present two case reports. The first case is 59-year-old man who had been examined for recurrent superficial and deep vein thrombosis and pulmonary embolism despite effective treatment with warfarin (coumarin anticoagulant). The health condition was then complicated by recurrent myocardial ischemia (STEMI of the diaphragmatic wall) on the basis of thrombotic occlusion of the coronary artery. In pursuance of the next diagnostics the nodal syndrome was detected. A haematological malignancy was considered at the beginning, finally the lung tumour with metastases to the nodes, brain, cerebellum and skeleton was confirmed. The patient's condition quickly progressed and he died. The second patient was 46-year-old woman with recurrent venous thrombosis despite effective anticoagulation. Subsequently a lung tumour with metastases to the nodes and skeleton was proven. Shortly after diagnosis, the woman died of massive pulmonary embolism, although according to laboratory tests she had been adequately treated.

A CASE REPORT OF BUDD-CHIARI SYNDROME ACCOMPANYING POLYCYTHEMIA VERA

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In this abstract we introduce a case of Budd-Chiari syndrome occurring in a young female and characterized by chronic portal vein occlusion together with portal vein thrombosis and portal hypertension. Using genetic methods, Leiden mutation in factor V gene in heterozygous condition was detected. Moreover, coincident polycythemia vera was diagnosed through bone marrow biopsy. Myeloproliferative diseases represent a common underlying cause of splanchnic vein thrombosis (rare as it is), particularly in young females. A persisting hypercoagulation state in this patient was further confirmed by a new onset of deep vein (femoral) thrombosis. It was likely induced by central venous catheter insertion yet developed under ongoing (and effective) treatment with a vitamin K antagonist. Following this episode, the therapy has been converted to low-molecular-weight heparin and currently we consider another switch to a non-vitamin K oral anticoagulant.

PHOTOPLETHYSMOGRAPHY, LASER-DOPPLER PERFUSION IMAGING AND INTRAVITAL CAPILLAROSCOPY: EFFICIENCY AND COST-BENEFIT COMPARISON FOR PERIPHERAL VASCULAR DISEASES

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Aim of study: Our presentation is as a proposal of basic rational equipment and procedures for examining angiological patients suspected of peripheral vascular disease symptoms.

Patients and methods: We made a retrospective comparison of three methods used in our microcirculation lab: Photoplethysmography (PPG), Laser-Doppler Perfusion Imaging (LDPI) and Intravital Capillaroscopy (IC). Our data set included 500 patients with acrosyndroms examined in the last five years. The patients came with common requirements for differential diagnostics. Their problems covered: Reynaud's phenomenon (RP) primary and secondary cases, Peripheral Arterial Occlusive Disease (PAOD), Trombangiitis obliterans, Vibration White Finger (VWF), Diabetes and miscellaneous.

Results: Matrix describing efficiency of these methods in various applications:

	LDPI	PPG	IC
Area of interest mapping	yes	no	difficult
Response measurement (positioning, cooling, rewarming)	yes	yes	difficult
Hyperemia and pharmacological testing	yes	yes/no	difficult
Diabetes complications	yes	no	difficult
Amputation level	yes	no	difficult
Toe Brachial Index (TBI) measurement	yes	yes	difficult
Capillary morphology	no	no	yes

Findings on method sensitivity and specificity of selected diagnoses: LDPI/LDF applied on RF give specificity 95% and sensitivity 80%. PPG for RF manifests 80%, resp. 55%. VWF, when used LDPI/LDF give 90%, resp. 65%, for PPG we obtained 85%, resp. 50%.

Conclusion: During examining of microcirculation there is the optimal way to combine all methods when possible. IC is a golden standard for examination of nutritional flow and diagnostics of scleroderma pattern. Laser-Doppler Flowmetry (LDF) describes thermoregulation adaptation response in deeper structures. LDF modern devices (red and green wavelengths) may in some cases outperform even IC.

However, LDPI and LDF may be the most useful method when resources are limited (time, costs).

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