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ABSTRACTBOOK



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Access and characteristics of supervised exercise training in patients with lower extremity peripheral artery disease: a European overview

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Introduction. The optimal first line management of patients with symptomatic chronic lower extremity peripheral artery disease (PAD) includes secondary prevention of cardiovascular risk factors, pharmacological treatment, and supervised exercise therapy (SET). SET programs have shown to be effective in improving walking performance, physical function, and quality of life. However, despite a large body of evidence, and despite national and international guidelines recommending SET as first line therapy, SET remains largely underused in patients with chronic PAD. This position paper aims to describe how SET is perceived, its accessibility and structure through Europe.

Methods. An anonymous web-based survey was used.

Results. One hundred and thirty one responders from 17 countries were included in the study. For patients with PAD, SET programs exist only in 59% of European countries. SET reimbursement is available in 41% of countries. SET programs showed to be heterogeneous across countries. Thirty-four percent of the SET programs are PAD-dedicated, while 23% are part of a cardiac rehabilitation program. In addition, among existing SET programs, 65% are dedicated to symptomatic patients with PAD only, 9% to both asymptomatic and symptomatic, 8% to post-revascularized patients only, and 1% to asymptomatic patients with PAD only. Finally, 17% reported not knowing which patients are eligible for enrolment in a SET program. Duration, frequency, and modality of SET also varied from country to country.

Conclusion. Overall, these data indicate that a large variability of SET availability and characteristics exists across Europe. Therefore, there is an urgent need to provide detailed guidance to deliver optimal exercise therapeutic care in patients with PAD.

Safety of daycase-based endovascular lower limb revascularisations in patients with peripheral artery disease: Systematic review and meta-analysis

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Introduction: Peripheral artery disease (PAD) is a major challenge worldwide and day case based endovascular revascularizations may help to meet the growing demand. We performed a systematic review and meta-analysis to synthesize complication rates of day case based lower extremity revascularisations in PAD patients.

Methods: Relevant articles were identified on the Ovid platform using the following search terms: peripheral angioplasty, percutaneous transluminal angioplasty, lower limb angioplasty, day case, ambulatory surgery, same day, outpatient, peripheral artery disease, peripheral occlusive artery disease and intermittent limb claudication. Two reviewers independently screened articles and extracted data.

Results: Out of the 135 studies identified, 28 met the eligibility criteria including 32,035 procedures. While the definitions of major complications differed across the studies, the reported major complications included retroperitoneal bleeding requiring or not requiring transfusion, puncture site hematoma requiring transfusion, pseudoaneurysm requiring surgical intervention or thrombin injection, distal embolism, heart failure, cardiac arrest, wire retention, puncture site occlusion requiring surgery and vessel perforation requiring a covered stent. Some studies included conversion to overnight stay as a major complication. However, the pooled overall estimates of major and minor complications were 0.5% (95%CI: 0.3%, 0.7%) and 4.1% (95%CI: 3.4%, 4.8%). Due to the different definitions of complications, there was considerable heterogeneity ($I^2 = 77\%$ and 97%). Four of the studies reported complications rates of both daycases and in-patient procedures. The risk of complications was numerically but not significantly higher in hospitalized patients (OR 1.3 (95%CI: 0.1, 12.8)).

Conclusion: Lower limb angioplasty can be performed safely in PAD patients in a day case setting. The large heterogeneity of reported complications between studies is likely due to different definitions of minor and major complications highlighting the need for unified classification of complications for peripheral endovascular procedures.

Discovery of novel MTOR inhibitors and their effect on senescent cells

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Cellular senescence has recently emerged as a fundamental mechanism in the development of aging-related diseases and although discovered very recently, senotherapeutic drugs that target cellular senescence have been already involved in clinical studies. Cellular senescence plays an important role in cardiovascular diseases (CVD), which remain the leading cause of death, and targeting senescent cells is shown to be beneficial for vascular function (1). Therefore, it is essential to enable the development of novel treatment interventions targeting vascular senescence.

Several pharmacological, dietary and genetic interventions that target aging and age-related diseases are known, but the general principles of these interventions remain unclear. Since aging is an extremely complex and multifactorial process, we aim to analyze the transcriptome of well-known longevity interventions to characterize perturbations in gene expressions. The detection of common longevity signatures allows us to predict new longevity compounds by drug repurposing that is superior to traditional drug discovery in terms of time and budget. As a result of the computational analysis, the top ranking molecules were found to be novel mTOR inhibitors (2). For the experimental validation of predicted compounds, aged human fibroblast cells are tested with mTOR inhibitors that result in the inhibition of cellular senescence. Then, in order to test the effect of mTOR inhibitors on vascular aging, we utilize cells of human progeria syndrome, an accelerated senescence disease with vascular pathology. VSMC, which is the most affected cell in the Progeria syndrome is used to observe the impact of potential interventions on the hallmarks of cellular senescence. As a result, our study reveals common perturbations targeting longevity and their effect on the related pathologies including vascular aging.

1-Inci N, Kamali D, Akyildiz EO, Turanli ET, Bozaykut P. Translation of Cellular Senescence to Novel Therapeutics: Insights from Alternative Tools and Models. *Frontiers in Aging*, 2022 Jun 1;3:828058. doi: 10.3389/fragi.2022.828058.

2-Tyshkovskiy A, Bozaykut P, Borodina AA, Gerashchenko MV, Ables GP, Garratt M, Khaitovich P, Clish CB, Miller RA, Gladyshev VN. Identification and Application of Gene Expression Signatures Associated with Lifespan Extension. *Cell Metabolism*, (2019); 30(3): 573-593.

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Acute ketone monoester ingestion improves systemic vascular function at rest and during incremental cycling exercise in people with Type 2 diabetes mellitus

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Introduction: Type 2 diabetes mellitus (T2DM) is characterised by chronic hyperglycaemia and progressive insulin resistance, ultimately leading to vascular dysfunction and increased prevalence of cardiovascular events [1]. Emerging in-vitro evidence report that exogenous ketone monoester (Kme) may improve diabetes-related vascular dysfunction by contributing to an attenuation of endothelial injury caused by persistent hyperglycaemia in T2DM [2]. However, there is a lack of evidence regarding the acute effect of Kme ingestion on vascular function. Therefore, we aimed to examine the acute effect of Kme on systemic vascular function in people with T2DM.

Methods: In a double blind, randomised, crossover design study, 13 people with T2DM provided written informed consent (age, 66 ± 9 yrs.; body mass, 90.3 ± 15.2; HbA1c, 54 ± 7 mmol/mol) and attended the lab on 2 separate visits during which they ingested either a Kme drink (0.115 g/kg (R)-3-hydroxybutyl (R)-3-hydroxybutyrate) or a placebo drink. Brachial flow mediated dilation (FMD), and microvascular endothelial function was assessed 30 min post ingestion using ultrasound and iontophoresis, respectively. Subsequently, systemic vascular resistance (SVR_i) was determined at rest and during incremental cycling exercise via thoracic impedance cardiography. Circulating β-hydroxybutyrate [βHb] was measured throughout the protocol.

Results: Circulating [βHb] was higher throughout the experimental protocol (mean diff. 1.38 mM; 95%CI 0.85 to 2.1, P=0.001) compared to placebo. After ingestion no differences were observed in the FMD response (P=0.389) and microvascular response (acetylcholine induced, P=0.745; insulin induced (P=0.675) between Kme condition and placebo. In contrast, after ingestion of Kme, SVR_i was lower at rest [mean diff. -705.657 dyn.s/cm⁵.m² (95%CI, -1336 to -74.5, P=0.031)] and during incremental cycling exercise [mean diff. -916.237 dyn.s/cm⁵.m² (95%CI, -1526 to -253.4, P=0.014)] compared to placebo.

Conclusion: Ingestion of Kme acutely improves systemic vascular resistance at rest and during incremental exercise but not brachial macro and micro-vascular endothelial function, in people with T2DM.

Experimental, meteorological, and physiological factors affecting the short-term repeated PWV measurements, and measurement difficulties: A randomized cross-over study with two devices

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Background: To utilize arterial stiffness to its full potential in clinical practice, large longitudinal studies with repeated pulse wave velocity (PWV) measurements are required. Quantifying measurement error of frequently used devices by monitoring short-term repeated PWV changes (STR-PWV) where no clinically meaningful change is anticipated, and reducing measurement difficulties; are needed for conducting and interpreting such research.

Methods: We systematically investigated a number of experimental and meteorological conditions, physiological variables and participant characteristics, to find out if and how they affected: a) recorded PWV values, specifically STR-PWV changes, and b) measurement difficulties. To measure carotid-femoral (cfPWV) or aortic (PWVao) PWV, respectively, we conducted a 2-week longitudinal block-randomized cross-over trial with two blinded observers and two routinely-used devices: applanation tonometry SphygmoCor CvMS and oscillometric Arteriograph. Each participant was recorded 12 times throughout the course of three visits spaced seven days apart. Recordings were done twice in the morning and twice in the afternoon. Data were analyzed using multilevel mixed-effects models.

Results: Our sample (N=35) had uniform and a wide-range distribution of BMI, blood pressure, and age. In addition to age and mean arterial pressure (MAP), which had a significant impact on both cfPWV and PWVao, other device-specific significant factors seemed to point to a measuring technique. cfPWV as a more direct measure of arterial stiffness was also affected by hypertension status, outdoor-temperature, interaction of MAP with the outdoor-temperature, and order of visit. Contrary, PWVao measurements which is derived at a single brachial site more strongly depended on age than cfPWV, depended on personal characteristics such as height, sex, and on heart rate. Female sex significantly increased, and recording in afternoon vs morning significantly decreased measurement difficulties of both devices.

Conclusion: We quantified short-term measurement errors and proposed how to improve PWV measuring protocols to reduce these errors, and measurement difficulties.

An association between SMYD2 rs1795061 polymorphism and persistent type II endoleak post-evar

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Background: Common gene variant SMYD2 rs1795061 was associated with abdominal aortic aneurysm (AAA) in the study performed by Jones et al. The most common complication occurring after endovascular abdominal aortic aneurysm repair (EVAR) is type II endoleak. The aim of our study was to study the association between SMYD2 rs1795061 C/T polymorphism and persistent type II endoleak during the 36-month follow-up post-EVAR.

Methods: The cohort comprises of patients undergoing EVAR between January, 2010 and December, 2018. A persistent type II endoleak was defined as any type II endoleak lasting longer than six months post-EVAR and included also a type II endoleak diagnosed after six months and more (6–36 months post-EVAR) on CT-angiography. Genotyping was performed using real-time polymerase chain reaction and subsequent high-resolution melting analysis in presence of unlabelled probe. The adjustments included age, hypertension, diabetes mellitus, dyslipidaemia, sex, smoking in multivariate analyses.

Results: A total number of 128 patients with mean age 73.0 ± 7.64 years were included in the study. Persistent type II endoleak was found in 23.4 % of patients (n=30). Compared to T allele carriers (CT/TT), CC homozygotes of SMYD2 rs1795061 polymorphism had 2.78-times higher risk of developing type II endoleak in univariate analysis and 3.24-times higher risk in multivariate analysis (OR 3.24; 95%CI 1.32–8.00; $p=0.011$). The probability of type II endoleak was lower by 64 % in T allele carriers (CT/TT) compared to CC homozygotes in univariate analysis ($p=0.020$) and by 69.0 % in multivariate analysis ($p=0.011$).

Conclusion: CC homozygotes of SMYD2 rs1795061 polymorphism had higher risk of developing type II endoleak during the 36-month follow-up period post-EVAR. If our results are confirmed in other studies it may help to identify patients with the greatest risk of type II endoleak and thus facilitate optimal treatment selection.

Larger body size in early adulthood increases the risk for surgery, rupture and dissection of the thoracic aorta

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Background: Larger body size is associated with larger aortic diameter and larger aortic diameter is a risk factor for aortic dissection. The cut-offs used for prophylactic surgery of ascending aortic aneurysms do not, with a few exceptions, take body size into consideration. How body size affects the risk of thoracic aortic disease is unknown. It is not known however how body size affects risk of adverse events from ascending aortic disease.

The aim of this study was to assess if body size in early adulthood impacts the risk of surgery, dissection and rupture of the risk of adverse thoracic aortic disease later in life. Events and from ascending aortic disease.

Material and Methods: The Swedish Conscription Database (SCD) includes the majority of Swedish 18-years old men, who at the age of 18 attended to mandatory military conscription between for military service 1969 and to 1995 were included in the study. Body size at conscription was assessed in terms of height, weight, body surface area (BSA) and body mass index (BMI). A composite outcome of surgery of the ascending aorta, death from thoracic aortic aneurysms, rupture of the thoracic aorta and dissection of the aorta was constructed, adverse events from ascending aortic disease was constructed using data from the Swedish inpatient register and the cause of death register. A cox regression analyses, adjusted for Marfan's syndrome, bicuspid aortic valve, coronary artery by-pass surgery, diabetes mellitus at conscription, systolic and diastolic blood pressure at conscription, educational level, income and civil status, risk factors of ascending aortic disease was performed.

Results: During a mean follow-up time of 35 years (SD 8.3). During this period, the composite endpoint occurred in 3300 adverse events were recorded in a population of close to 1.4 million individuals. The adjusted hazard ratio for the fourth highest versus lowest quartile compared to the first quartile for BSA was 1.87 (95% CI 1.70-2.07) for body surface area BSA, BMI 1.55 (95% CI 1.41-1.71) for body mass index BMI, height 1.58 (95% CI 1.43-1.73) for height, and weight 1.90 (95% CI 1.73-2.10) for weight. The results were robust in sensitivity analyses where excluding surgery is excluded from the composite endpoint.

Conclusion: Larger body size in early adulthood is a risk factor for surgery, dissection, and rupture of the thoracic ascending aorta. The results are consistent regardless if exploring body size as weight, height, BSA or BMI. Body size should be considered in clinical risk assessment.

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Correlation of Cholesterol Efflux Capacity with Femoral and Carotid Plaque Volume Measured by Sonographic 3D Plaque Volumetry

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Presentation cancelled by authors

Relationship Between the Severity of Exercise Induced Ischaemia and the Prevalence of Exercise Induced Calf Symptoms During Treadmill Testing With Transcutaneous Oximetry

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Objective: It was hypothesised that there is a linear relationship between the severity of exercise induced calf ischaemia and the prevalence of calf claudication on a treadmill until a plateau is reached. It was expected that no pain would be present in the absence of ischaemia and all severely ischaemic calves would be symptomatic.

Methods: This was a retrospective analysis of a cross sectional acquired database recording. Transcutaneous oxygen pressure (TcPO₂) on the chest and on each calf was used to evaluate calf ischaemia during treadmill tests with simultaneous recording of calf pain in 7 884 subjects (15 768 calves). The minimum value of calf changes from rest minus chest changes from rest (DROPm) was calculated. Regression analyses were used to determine the correlation between the proportion of exercise induced symptoms present in the calves and each unit of DROPm values. Analysis was repeated after objective determination of the cutoff point between the linear increase and the plateau.

Results: A linear relationship was found between the degree of ischaemia and the proportion of symptomatic calves for DROPm values ranging from 0 mmHg to -28 mmHg (proportion = $-0.014 \times \text{DROPm} + 0.32$, $r = 0.961$, $p < .001$). For DROPm values lower than -28 mmHg (severe ischaemia), on average one of three limbs remained asymptomatic. The biphasic relationship between DROPm and prevalence of symptoms persists after exclusion of patients with diabetes mellitus, exercise induced hypoxaemia, and no evidence of lower extremity arterial disease (LEAD).

Conclusion: The relationship between exercise induced pain and ischaemia is biphasic with a linear increase in the proportion of symptomatic limbs with ischaemia severity, until a plateau is reached for the more severely ischaemic limbs. The presence of exercise related calf symptoms should not automatically be reported as indicating the presence of LEAD; and the absence of exercise induced symptoms is not proof that ischaemia does not occur during exercise.

Prevalence of medial arterial calcification in hallux digital arteries in patients with incompressible ankle arteries and elevated ankle-brachial indices

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Introduction: Medial arterial calcification (MAC) will cause incompressible arteries (IA) and falsely elevated ankle-brachial indices (ABI >1.4), disqualifying ABI to detect lower extremity arterial disease. In these situations, international guidelines recommend toe blood pressure measurements (often performed at the base of the hallux) and toe-brachial indices (TBI) as an alternative test, since MAC is less common in the toes than in the ankle. However, the prevalence of MAC in toe arteries in patients with IA and ABI >1.4 has not been well studied, although MAC in toe arteries potentially could distort TBI in a similar way that MAC in ankle arteries can distort ABI.

Methods: Single-center retrospective study of 791 patients admitted for lower limb blood pressure measurements 2019–2020. All 59 patients with IA or ABI >1.4 and foot radiographs performed within ± 2 years were further analyzed with respect to radiographic signs of MAC within the digital arteries of the hallux. A MAC-score of 0–2 (0: none, 1: <1.0 cm, 2: ≥ 1.0 cm) was assigned by a single reviewer blinded to clinical information.

Results: There were 45 male (76%) and 14 female (24%) patients. Mean age was 74.9 ± 12.8 years. Radiographic MAC within the digital arteries of the hallux was present in 30 (51%); 21 with a MAC-score of 1, and 9 with a MAC-score of 2. MAC was also seen in the 1st metatarsal artery in 50 (85%) patients. All patients with MAC within the hallux arteries also had MAC within the 1st metatarsal artery.

Conclusion: MAC is a common finding in hallux digital arteries in patients with IA or ABI >1.4, with an observed prevalence of 51% in this small study. This should be considered when interpreting toe blood pressures and TBI in this patient category.

Primary stenting of the superficial femoral artery in patients with intermittent claudication has sustained effects on Health-related quality of life up to 36 months which are no longer detectable at 60 months

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Objectives: A randomized study showed increased health-related quality of life (HRQoL) 12 and 24 months after primary stenting of the superficial femoral artery (SFA) in intermittent claudication (IC). We now present an extended follow-up of HRQoL 36 and 60 months after randomization to either primary stenting or best medical treatment (BMT) alone.

Design: Multicenter randomized controlled trial conducted at seven vascular clinics in Sweden between 2010 and 2020.

Materials: One hundred patients randomized on a 1:1 basis to either primary stenting (n = 48) or BMT (n=52) followed for 60 months.

Methods: HRQoL assessed by the Short Form 36 Health Survey (SF-36) and EuroQoL 5 dimensions (EQ5D) 36 and 60 months after randomization was the primary outcome. Walking Impairment Questionnaire (WIQ) score, reinterventions, progression to chronic limb threatening ischaemia (CLTI), amputation, and death were secondary outcomes.

Results: Primary outcome: In intergroup comparisons at 36 months follow-up, data was available for 63 patients, the stent group had significantly better scores in the SF-36 domain Role Physical (RP, p = 0.023) and also the Physical Component Summary (PCS, p = 0.032) compared to the control group. There was no intergroup difference in any SF-36 domain at 60 months. No intergroup difference was observed for EQ5D at 36 (p = 0.532) or 60 months (p = 0.508). WIQ was significantly better in the stent group compared to the control group (p = 0.029) at 36 months whereas no difference was detectable at 60 months. In the stent group, SF-36 measures Physical Function (PF; p = 0.012), RP (p = 0.013), Bodily Pain (BP; p = 0.007), and PCS (p = 0.016) had improved at 36 months, and BP (p = 0.044) had improved at 60 months compared to baseline, whereas no primary outcome measure had improved in the control group at 36 and 60 months.

No differences in terms of progression to CLTI, amputation or mortality between the two treatment groups were found. However, the stent group underwent more reinterventions (17 vs 6) during the study period (p = 0.03).

Conclusions: Benefits on HRQoL of stent treatment in the SFA compared to BMT alone in IC patients were detectable at 36 months of follow-up, but no longer measurable after 60 months in intergroup comparison. HRQoL benefits of SFA stenting in IC are transient, but may nevertheless be valuable for the patient.

Secretome of allogeneic mesenchymal bone marrow stem cells in treatment of patients with no-option critical limb ischemia (SALI) – pilot study

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Background: Decreased number and function of autologous stem cells of patients with severe atherosclerosis was identified as limitation of stem cell therapy. The use of allogeneic mesenchymal stem cells (MSCs) released factors has potential to overcome this limitation. Accordingly, in the current study we tested the efficacy and safety of MSC-derived secretome of young healthy donors in treatment of patients with no-option critical limb ischemia (NO-CLI).

Methods: Ten patients (mean age, 67±6 years, M:F 8:2) with advanced CLI (Rutherford 5) not eligible for revascularization, were treated by below-the-knee intramuscular applications of 20ml of secretome from allogeneic MSCs. Secretome (3,08x10⁹ nanoparticles/mL, mean size distribution 79nm) was prepared in controlled GMP facility from bone marrow MSCs of 2 young healthy donors, harvested for other medical purpose. Primary endpoints were limb salvage plus wound healing, and absence of local and systemic adverse events at 3 months follow-up. Secondary endpoints were changes in transcutaneous oxygen pressure (tcpO₂), ankle-brachial index (ABI), and pain scale (0–10).

Results: We didn't observed any adverse events after application of allogeneic secretome. After 3 months there was improvement in local ulcer healing in 7/10 pts (70%), in two patients there was no change of followed parameters, in one case there was progression of ischemia with need of major limb amputation. In overall group there was significant improvement in pain scale (4.9 ±1.4 to 2.8±0.8, p=0.2), improvement in tcpO₂ (8±8mmHg to 25±19mmHg, p=0.09), and no change in ABI (0.27±0.2 to 0.26±0.1, NS), or Rutherford category of CLI (5±0 to 4.7±0.8, NS).

Conclusion: First results of pilot observation showed safety and promising efficacy of intramuscular application of allogeneic MSCs derived exosomes in treatment of patients with NO-CLI. Regenerative potential of allogeneic secretome need to be tested in larger and randomised studies.

Circulating biomarkers predict symptomatic but not asymptomatic carotid artery stenosis

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Background: Subjects exposed to risk factors such as age, gender, hypertension, diabetes mellitus, and smoking are prone to atherosclerotic events.

Aims: The main aim of this longitudinal cohort study was to determine whether the role of novel plasma biomarkers for atherosclerotic carotid artery disease is different in subjects developing symptomatic carotid artery stenosis (CAS), as opposed to those with incident asymptomatic CAS.

Methods: The following biomarkers were measured in 5550 middle-aged subjects in a population-based cohort study: C-reactive protein (CRP), lipoprotein-associated phospholipase A2 (Lp-PLA2) mass and activity, proneurotensin, midregional pro-adrenomedullin (MR-proADM), midregional pro-atrial natriuretic peptide (MR-proANP), N-terminal pro B-type natriuretic peptide (NT pro-BNP), copeptin, and cystatin C. After exclusion of those with prevalent CAS, subjects were thereafter followed in national patient registers for 23.4 (interquartile range 19.5-24.3) years regarding incident symptomatic and asymptomatic CAS.

Results: Among 110 patients with confirmed incident CAS, 56 were symptomatic and 54 were asymptomatic. When including conventional risk markers in a Cox regression analysis, NT pro-BNP (Hazard ratio [HR] 1.59; 95% confidence interval [CI] 1.20 – 2.11), MR-proADM (HR 1.40; CI 1.13 – 1.73), Cystatin C (HR 1.21; CI 1.02 – 1.43), and CRP (HR 1.53; CI 1.13 – 1.73) were independently associated with incident symptomatic CAS, whereas no plasma biomarker was associated with incident asymptomatic CAS.

Conclusion: Plasma biomarkers NT pro-BNP, MR-proADM, Cystatin C, and CRP were independently associated with incident symptomatic CAS, whereas no such association could be demonstrated with incident asymptomatic CAS.

Association between aortic arterial stiffness, carotid intima-media thickness and carotid plaques in middle-aged healthy individuals with increased risk of cardiovascular disease

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Background: Vascular ageing is caused by functional and structural changes of arterial walls making them stiffer. Aortic pulse wave velocity (aPWV) is a measure of aortic stiffness and has been suggested to be an independent marker of cardiovascular disease. Carotid intima-media thickness (cIMT) and plaques are other markers of arteriosclerosis and subclinical atherosclerosis. Some previous studies have found an association between aPWV, cIMT and plaques. In this cross-sectional study we aimed to explore the association in different age groups in a middle-aged healthy population at increased cardiovascular risk.

Methods: A total of 724 participants, aged 47, 57 and 67 years, from the trial Visualization of asymptomatic atherosclerotic disease for optimum cardiovascular prevention (VIPVIZA) were enrolled in the present study. The 47-year-old age group comprised 63 individuals, the group of 57-year-olds were 192 individuals and the 67-year-olds were 469 individuals. The subjects underwent an oscillometric measurement of aPWV and a carotid ultrasound examination. Linear and ordinal logistic regression models were used to investigate the association between aPWV and cIMT and between aPWV and carotid plaques respectively. Analyses were conducted for the overall study group and stratified for age groups.

Results: After adjustments for potential covariates a significant association between aPWV and cIMT ($\beta=0.022$, 95% CI: 0.006-0.038, $P=0.006$) were seen in the age group of 57-year-olds as well as between aPWV and carotid plaques (OR: 1.213, 95% CI: 1.022-1.440, $P=0.027$). In the 47-year-old age group a significant association was seen between aPWV and plaques (OR: 2.188, 95% CI: 1.057-4.531, $P=0.035$). No significant associations were seen in the group comprised of 67-year-olds.

Conclusion: aPWV is positively associated with cIMT and presence of carotid plaques in younger middle-aged individuals and may be used as a marker of arteriosclerosis and subclinical atherosclerosis.

Local thrombolysis versus endovascular mechanical thrombectomy plus local thrombolysis in patients with extensive deep venous thrombosis - multicentric observational study.

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Background: In selected patients with symptomatic iliofemoral deep vein thrombosis (DVT), early endovascular thrombus removal can reduce the risk and severity of post-thrombotic syndrome (PTS). The aim of this observational non-randomized multicentric study was to compare efficacy and safety of catheter directed thrombolysis (CDT) to combination of CDT and mechanical/pharmaco-mechanical thrombectomy (PMT).

Methods: From 2014 to 2019, 110 patients (mean age 39±15 years, M:F=44:66) with acute or subacute extensive iliofemoral DVT were treated in 3 centres by mechanical endovascular thrombectomy (Aspirex or AngioJet) with or without local CDT (Group A, n=53), or only by local CDT (Group B, n=57), both adjunctive to anticoagulation (15±9 months), and compression therapy. The early complications and development of PTS assessed by Villalta score after 12 months of follow-up were compared.

Results: Patients treated by PMT had significantly better early recanalization rate (no or <50% recanalization 3/57 vs 16/57, p=0.002), shorter duration of CDT (27±16 vs 49±17 hours, p<0.001), no bleeding complications (0/53 vs 6/57, p=0.03), and shorter hospital stay (4±2 vs 5±2 days, p=0.03), compare to pts treated only by CDT. In both groups, endovascular approach led to complete elimination of severe form of PTS. Importantly, in pts with no history of recurrent DVT in treated segments (n=85), PMT led also to significant reduction of mild to moderate PTS at 12-month follow-up (2/41 vs 10/44, p=0.03), compare to CDT alone.

Conclusion: Endovascular treatment of acute/subacute extensive DVT completely eliminates severe forms of PTS. Combination of catheter thrombectomy with local thrombolysis is safer methods with faster symptoms improvement and shorter hospital stay compare to CDT alone. In addition, when focusing on pts without previous history of DVT in treated segments, PMT reduces the later development of mild to moderate forms of PTS.

The role of endovascular laser in the treatment of large intramuscular venous malformations

Marco Fresa

Background: Congenital venous malformations (VMs) are the most common vascular anomalies. Treatment of intramuscular VMs represent a challenge for the vascular specialist. Surgery may lead to invasive and mutilating excisions, often allowing only partial removal, with an increased risk of recurrence. Sclerotherapy is a mainstream technique, resulting in endothelium destruction, fibrosis, and subsequent shrinkage of the vascular lesion. However, this technique may not be efficient in cases of large and infiltrating VMs. Endovenous thermal ablation has been found to be more effective than sclerotherapy for transmural vascular destruction and has therefore been employed in the treatment of VMs.

Materials and methods: We describe a case series of a combined technique for the treatment of large intramuscular VMs associating endovenous laser ablation with sclerotherapy, and the experience in our institution.

Results: In these small series, we report a high immediate technical success, clinical and radiological improvement, with no complications.

Conclusion: This preliminary results show that combining thermal ablation and sclerotherapy for the treatment of voluminous intramuscular VM is safe and technically feasible. The combination of a wide direct intimal thermal damage with chemical sclerotherapy is the force of this approach.

Safety and efficacy of Rivaroxaban as extended-phase anticoagulation in patients with cancer and venous thromboembolism. A preliminary data analysis from the Mac Project

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Background: Recent guidelines suggest extended-phase anticoagulation with direct oral Xa inhibitors (OAXI) in patients with cancer-associated venous thromboembolism (CAT), but to a low degree of certainty. More information on the outcome of these patients beyond the initial 6-month anticoagulation is needed. We report preliminary data on patients with CAT enrolled in the MAC (Monitoring AntiCoagulants) Project, who were given rivaroxaban as extended-phase anticoagulation.

Methods: The MAC Project is an ongoing prospective-cohort, multi-center, observational study held in Italy. The Project aims to collect real-life information about unselected patients given oral anticoagulants for VTE, over a 5-year follow-up period. Exclusion criteria are life expectancy < 6 months, refusal to sign the consent, or to attend the planned follow-up visits. All patients are followed-up prospectively, with visits scheduled at 3, 6, and 12 months during the first year, and then annually for up to 5 years. The primary efficacy outcome is the incidence of symptomatic recurrent VTE; the primary safety outcomes are the incidence of major and non-major clinically relevant bleeding, of adverse events, and of all-cause mortality.

Results: The mean follow-up was 19 months (SD 16; Q1 6, Q3 29 months). Sixty-four (11%) of 604 patients had CAT. Recurrent VTE occurred in 9.3% and in 8.1% of patients with and without CAT, respectively (odds ratio [OR] 1.2, 95% confidence interval [CI] 0.5 to 2.9; P=0.6). Major bleeding was recorded in 4.7% and in 2.6% of patients with and without CAT, respectively (OR=1.8, 95% CI 0.5 to 6.6, p=0.4). Non-major clinically-relevant bleeding occurred in 4.7% and in 4.1% of patients with and without CAT, respectively (OR=1.2, 95%CI 0.3 to 3.9, p=0.7). The relative figures for fatal haemorrhage and all-cause death were 1.6% versus 0%, and 1.6% versus 0.4%, in patients with and without CAT, respectively.

Discussion: Rivaroxaban appears to be both effective and safe given as extended-phase anticoagulation in patients with CAT. Of note, patients in the MAC Project were treated for a mean period of over 18 months; that is, 3-fold the standard 6-month course of pivotal clinical trials.

Cocoa flavanol consumption improves lower extremity endothelial function in healthy individuals and people with type 2 diabetes

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Introduction: Diabetes and age are major risk factors for the development of lower extremity peripheral artery disease (PAD). Cocoa flavanol (CF) consumption is associated with lower PAD risk and improves brachial artery (BA) endothelial function. We assessed if femoral artery (FA) endothelial function and dermal microcirculation are impaired in people with type-2 diabetes mellitus (T2DM) and evaluate the acute effect of CF consumption on it.

Methods: In a randomised, controlled, double-blind, cross-over study, 22 individuals (n=11 healthy, n=11 T2DM) without cardiovascular disease were recruited. Participants received either 1,350 mg CF or placebo capsules on 2 separate days in random order. Endothelial function was measured as flow-mediated dilation (FMD) using ultrasound of the common FA and the BA before and at 2 hours after interventions. The cutaneous microvasculature was assessed using optical coherence tomography angiography.

Results: Both baseline FA-FMD and BA-FMD were lower in T2DM (FA:3.1±1.1%, BA:4.8±0.8%) as compared to healthy (FA:5.6±0.8%, BA:6.0±0.7%; each $p<0.001$). While in healthy FA-FMD was similar to BA-FMD ($p=0.144$; 94±14%), in T2DM FA-FMD was lower than BA-FMD ($p=0.003$; 68±22%). The baseline FA blood flow was lower in T2DM (424±238 vs 732±347 mL/min, $p=0.037$). T2DM had lower microvascular dilation in response to occlusion in hands and feet.

CF increased both FA and BA-FMD at 2 hours as compared to placebo in both healthy and T2DM (FA:2.9±0.4%, BA:3.0±0.8, each $p_{\text{intervention}}<0.001$). Baseline FA blood flow and microvascular diameter increased in feet (3.5±0.8 μm , $p_{\text{intervention}}<0.001$). Systolic blood pressure and pulse wave velocity decreased after CF in both groups (-7.2±2.2 mmHg, $p_{\text{intervention}}=0.004$; -1.3±0.3 m/s, $p_{\text{intervention}}=0.002$).

Conclusion: While T2DM was associated with pronounced impairment of femoral endothelial function and blood flow, CFs increase endothelial function not only in the BA but also the FA both in healthy people and people with T2DM who are at increased risk of developing PAD.

Spatial mapping of atherosclerotic carotid plaques to identify morphological features with an increased risk of stroke

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Introduction: Carotid guidelines recommend invasive treatment of extracranial carotid stenosis mainly based on the degree of stenosis and symptom status for decades. However, there are subgroups of patients with imaging features associated with an increased risk of stroke. Therefore, a precise multimodal plaque analysis, suitable for everyday clinical practice, is necessary to better stratify the individual risk.

Methods: Preoperative plaque imaging MRI and intracranial sequences were used to investigate plaque morphology. After carotid endarterectomy, more than twenty samples from the internal carotid artery were histologically processed and analyzed by immunohistochemistry to identify key features of plaque morphology such as inflammation, proliferation, apoptosis and intraplaque hemorrhage. Furthermore, unstable and stable plaques were analyzed by hybridization-based RNA in situ sequencing (HybRISS) in order to visualize atherosclerotic processes at single cell and molecular level.

Results: Plaque imaging sequences and subsequent histologic workup as gold standard showed valuable comparability. Relevant areas, including the fibrous cap, necrotic core, and critical features as intraplaque hemorrhage could be described accordingly. Immunohistochemical staining of SMA, CD68, Caspase-3, Ki-67 and Glycophorin-A confirmed the corresponding lesions with special attention to the transition from fibrous cap to core and the plaque shoulder. In addition, the transcriptome visualization by HybRISS offers a new way to investigate single cell RNA expression in situ without the loss of spatial resolution. The gene expression patterns and cell clusters were regionally matched with plaque histology and imaging and correspond to immunohistochemistry analyses at protein level.

Conclusion: Crucial plaque characteristics that influence plaque stability can be evaluated noninvasively and routinely very well by MRI. Our data suggest, that – in addition to symptom status and stenosis grade – this approach might help to offer a more personalized and preventive therapy of extracranial carotid stenoses. However, more data are needed to translate this sort of advanced imaging in clinical practice.

Low dose Rivaroxaban to prevent recurrences of venous thromboembolism in cancer patients: A real-world experience

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Introduction: Cancer patients are at high-risk for venous thromboembolism (VTE) and its recurrences. For this reason, international guidelines suggest long-term anticoagulation for secondary prophylaxis beyond 6 months in this population. However, this is a conditional recommendation with low evidence level since there are no data on the optimal type and dose of anticoagulant that should be used. The present study aims to describe a real-world experience on the extended use of rivaroxaban 10 mg once daily in secondary prevention of VTE in cancer patients.

Methods: Cancer patients who received rivaroxaban 10 mg for the secondary prevention of VTE were enrolled. All patients had previously completed at least six months of full-dose anticoagulation for the treatment of a VTE qualifying event, defined as VTE either in usual or unusual sites. The primary efficacy endpoint was any type of objectively verified VTE recurrence. Primary safety endpoints were major bleedings and clinically relevant non-major bleedings (CRNMB), defined according to the International Society of Thrombosis and Haemostasis criteria.

Results: Our study included 106 patients, whose baseline characteristics and information about the qualifying VTE event are shown in the attached table. Median follow-up time was of 333 days (IQR 156-484). We observed 4 VTE recurrences, with a cumulative incidence of 3.8%. All 4 recurrences were proximal lower limb DVTs in patients whose qualifying previous event was a proximal lower limb DVT. In 2 patients, the VTE recurrence developed in the presence of extrinsic vascular compression. In terms of safety, we observed no major bleedings (0.0%) and 3 CRNMB (2.8%).

Conclusions: This study presents preliminary evidence that extended therapy with low dose rivaroxaban (10 mg) may be considered as a therapeutic strategy and could be safely administered to cancer patients to prevent recurrences of VTE. Large-scale studies are needed to confirm these data.

Baseline characteristics	Total (N=106)	VTE in usual site (N=60)	VTE in unusual site (N=46)
Sex - no. (%)			
Female	100 (94.3)	56 (93.3)	44 (95.7)
Male	6 (5.7)	4 (6.7)	2 (4.3)
Median age (IQR) - yrs	60 (50-69)	63 (56-72)	56 (47-64)
Primary cancer site - no. (%)			
Breast	31 (29.2)	15 (25.0)	16 (34.8)
Ovarian	43 (40.6)	28 (46.7)	15 (32.6)
Endometrial	17 (16.0)	7 (11.7)	10 (21.7)
Cervical	7 (6.6)	3 (5.0)	4 (8.7)
Colorectal	5 (4.7)	3 (5.0)	2 (4.3)
Others	7 (6.6)	7 (11.7)	0 (0.0)
Synchronous	4 (3.8)	3 (5.0)	1 (2.2)
Cancer stage - no. (%)			
Localized	25 (23.6)	12 (20.0)	13 (28.3)
Metastatic (without evidence of brain metastasis)	81 (76.4)	48 (80.0)	33 (71.7)
Metastatic (with brain metastasis)	6 (5.7)	4 (6.7)	2 (4.4)
Cancer activity - no. (%)			
Active cancer	94 (88.7)	53 (88.3)	41 (89.1)
History of cancer	12 (11.3)	7 (11.7)	5 (10.9)
Venous Thromboembolism Index Event - no. (%)			
Typical	60 (56.6)		
Atypical	46 (43.4)		
Venous Thromboembolism Index Event site - no. (%)			
Pulmonary Embolism	39 (36.8)	39 (65.0)	0 (0.0)
Proximal Deep Vein Thrombosis	28 (26.4)	28 (46.7)	0 (0.0)
Distal Deep Vein Thrombosis	13 (12.3)	13 (21.7)	0 (0.0)
Upper-extremity Deep Vein Thrombosis non catheter-related	3 (2.8)	1 (1.7)	2 (4.4)
Upper-extremity Deep Vein Thrombosis catheter-related	45 (42.5)	2 (3.3)	43 (93.5)
Atrial thrombosis catheter-related	1 (0.9)	0 (0.0)	1 (2.2)
Splanchnic Thrombosis	1 (0.9)	1 (1.7)	0 (0.0)
Outcomes			
Efficacy			
Venous Thromboembolism recurrence rate - no. per 100 person-years	4.0	7.5	0.0
Venous Thromboembolism recurrence site - no. (%)			
Pulmonary embolism	0 (0.0)	0 (0.0)	0 (0.0)
Proximal Deep Vein Thrombosis	4 (100.0)	4 (100.0)	0 (0.0)
All-cause mortality rate - no. per 100 person-years	11.0	13.2	8.5
Safety			
All Bleeding Events incidence - %	27.4	28.3	26.1
Major Bleeding incidence - %	0.0	0.0	0.0
Clinically relevant non major bleeding incidence - %	2.8	3.3	2.2
Minor bleeding incidence - %	24.5	25.0	23.9

Health related quality of life in outpatient treatment of pulmonary embolism

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Introduction: Outpatient treatment of pulmonary embolism (PE) has been studied already in the 1990s, however, even if current international guidelines suggest outpatient treatment for selected low-risk patients, the proportion of outpatient treatment of PE is still low in most industrialized countries. Evaluation of health-related quality of life (HRQoL) in PE patients is scarce. The well-being of outpatients with deep vein thrombosis (DVT) has already been established; therefore, our aim was to evaluate HRQoL in outpatient treated PE patients and compare it with HRQoL in DVT patients.

Material and methods: A multicenter cohort study involving 3 Vascular medicine units in Skane County, covering 615 000 inhabitants, was started in 2020. After performing a power calculation, enrollment of 63 PE and 63 DVT patients treated on outpatient basis was planned. Patients were invited to complete a Pulmonary embolism Quality of life (PEmbQoL) questionnaire (PE), as well as questionnaires aimed to evaluate the general well-being, EQ-5D-3L instrument, including EQ-VAS (PE and DVT). This was planned on three occasions: within one week, after six weeks, and six months after diagnosis.

Results: Interim analysis of baseline HRQoL showed 37 PE patients, mean age of 58 (std 15) and an EQ-VAS score of 65 (std 25) compared to 63 DVT patients, mean age 66 (std 12) and an EQ-VAS score 70 (std 20). An EQ-VAS score of 76 is seen in the general Swedish population. Gender distribution was predominately male PE (59%) and DVT (54%), in both patient groups immobilization, malignancy and surgery was the predominant provoking factors.

Conclusion: At interim analysis of the acute phase, the general wellbeing measured by EQ-VAS of PE and DVT patients chosen for outpatient medical care are comparable. Further follow up until 6 months after diagnosis will be evaluated with details on different dimensions of QoL and PEmb-QoL.

Contrast-enhanced ultrasound for endoleak detection following endovascular repair of popliteal artery aneurysm

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Introduction: Endoleak, persistent blood flow in the aneurysm sac, after endovascular popliteal aneurysm repair (EPAR) carries a risk for aneurysm sac expansion, which may cause venous stasis, nerve compression and rupture. Routine post-EPAR surveillance is recommended, including duplex ultrasound (DUS). Contrast-enhanced ultrasound (CEUS) has superior sensitivity compared to DUS, perform comparable to computed tomography angiography after endovascular aortic aneurysm repair and does not entail ionizing radiation or nephrotoxicity. This study aims to investigate the presence of endoleak, endoleak classification and aneurysm sac expansion after EPAR using CEUS.

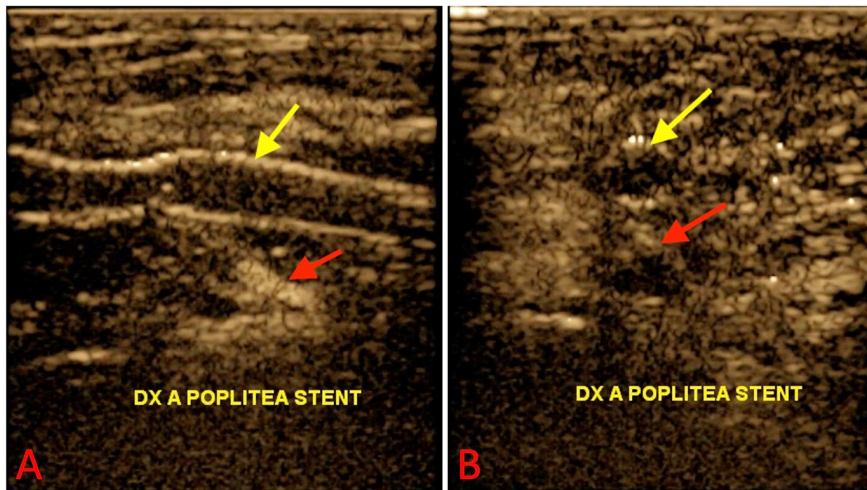
Methods: Cross-sectional study of EPAR-treated patients with expanded polytetrafluorethylene stent-grafts between 2009 and 2019 at a tertiary referral endovascular center. Twenty-six patients with 31 aneurysms were re-invited and examined with CEUS. A single vascular sonographer performed all examinations. Endoleak occurrence and classification were assessed by a core-lab of three CEUS-experienced physicians in a consensus-based process following a predefined protocol.

Results: Median follow-up was 57 months (range 33–143 months). Endoleak was detected in 16 PAA's, categorized as type I (n=3), type II (n=10, fig. 1), type III (n=1) or indeterminate (n=2). Median maximal PAA diameter was 24 mm (range 15–55 mm) at index procedure compared to 17 mm (range 6–43 mm) at follow-up ($p<0.001$). Maximal aneurysm sac diameter was smaller at follow-up than at the index procedure in both PAA with and without endoleak ($p=0.005$ vs. $p<0.001$, respectively). There was no difference in aneurysm sac shrinkage at follow-up between patients with or without endoleak ($p=0.28$). Freedom from aneurysm sac growth was 97%. Aneurysms with endoleak underwent fewer re-interventions than aneurysms without endoleak (6% vs. 40%, $p=0.037$).

Conclusion: Contrast-enhanced ultrasound was sensitive in endoleak detection after EPAR. Aneurysm sac shrinkage was found in both patients with and without endoleaks. Contrast-enhanced ultrasound appears useful for targeted examinations rather than routine surveillance after EPAR.

▼
FIGURES AND TABLES

Figure 1.



Type II endoleak (red arrow) on contrast-enhanced ultrasound in a popliteal artery aneurysm treated with EPAR, shown in sagittal (A) and transversal (B) projections. The stent graft (yellow arrow) is occluded.

Low incidence of ipsilateral stroke in patients with asymptomatic carotid stenosis – A nationwide cohort study in Sweden 2008-2017

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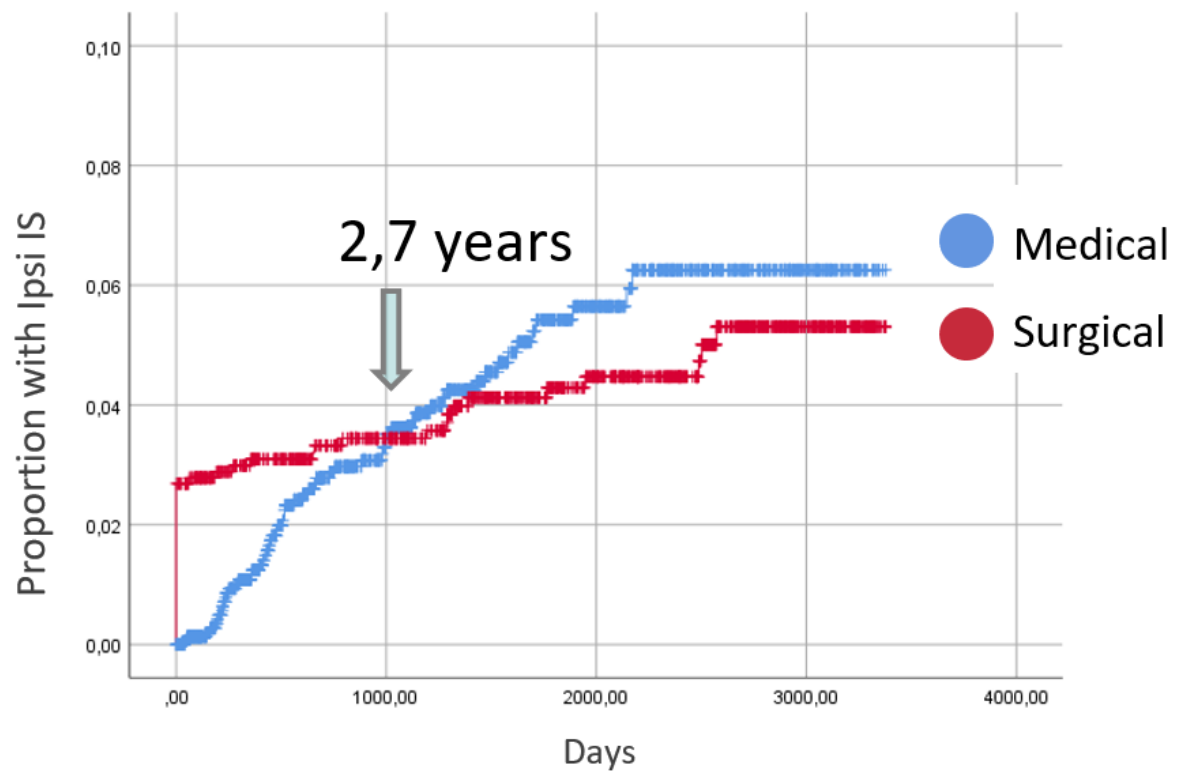
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Background: There has been a lack of consensus on how to manage patients with asymptomatic carotid stenosis. Recent studies suggest ipsilateral ischemic stroke (IS) rates of 1 %/year or less with modern medical treatment, putting into question the net benefit of surgery considering perioperative complications.

Methods: The Vascular registry of Sweden (Swedvasc) was used to identify patients that had surgical treatment for asymptomatic carotid stenosis 2008-2017. The Swedish stroke register (Riksstroke) was used to identify patients that had a stroke more than 30 days after surgery. Medical records were retrieved to decide laterality of the stroke. Primary outcome was ipsilateral ischemic stroke (IS). For comparison, patients receiving best medical treatment due to a significant but asymptomatic contralateral carotid stenosis in connection with surgically treated symptomatic carotid stenosis were analyzed ('medically treated group').

Results: In total 1,046 patients had primary surgery for asymptomatic carotid stenosis. Seventeen patients, 1.6%, had ipsilateral IS during mean follow-up time of 5.1 years, that is a yearly event rate of 0.3%. The corresponding event rate in the 'medically treated group' (1560 patients) was 1.1%/year. In the surgically treated group, 2.7% had perioperative complications stroke or death. Number needed to treat (NNT) to avoid one ipsilateral IS over a period of five years was 100, taking into account perioperative complications.

Conclusion: Event rates were extremely low in both groups. However, the NNT was high and taking the perioperative risks into account in the surgical group, there is a 'break even' at 2.7 years in relation to the medical group. This suggests that medical treatment is preferable in most cases. However, if high-risk patients could be identified (such as high-risk plaques) surgery may be beneficial for some patients.



Digital ulcers in systematic sclerosis: inpotrance of finger systolic pressure

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Introduction. The digital ulcers of systemic sclerosis are frequent and disabling. Their pathogenesis is multifactorial but vascular factors are preeminent. In addition to the emblematic capillary microangiopathy, the involvement of digital arteries is important to consider but few studies were able to quantify it up to now. SCLEROCAP study, a multicenter observational follow-up study about the predictive value of capillaroscopy in systemic sclerosis offered the opportunity to study it further.

Methods. During this study, five centers performed a systematic evaluation of the finger systolic pressure (FSP) in the last four fingers of both hands, using the same Perimed laser-doppler device. In the present work, the baseline FSP were compared between fingers with vs without digital ulcers or scars, before and after adjusting for the capillaroscopic pattern.

Results. 326 subjects benefited from FSP measurements that were performed in a total of 2537 fingers. 10.8% of those had active ulcers or scars, which were more often found on the second and third fingers of the right hand. FSP was lower than 50mmHg in 4.3% of the fingers and 37.2% of those had ulcers. There was no significant difference according to the side, and finger number, but a significant association was found with capillaroscopic Cutolo late pattern ($P=0.05$). Most importantly, a low FSP was strongly associated with the presence of digital ulcers ($P<0.001$) and this link was independent from the capillary pattern.

Conclusion. These results confirm the importance of the arterial factor in the pathogenesis of sclerodermic ulcers, which is independent from the microangiopathy and could have an important predictive value. This value will be assessed in the ongoing 3-year follow-up study.

ORAL

4612-A-2223

Diagnostic and therapeutic management of the thoracic outlet syndrome. Review of the literature and report of an Italian experience

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Presentation cancelled by authors

POSTER 1

4551-A-2223

Saccular Renal Artery Aneurysm presenting with epigastric pain: Case Report

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Introduction: Renal artery aneurysms (RAA) are rare with an incidence of 0.1% in the general population. However, to date, its true incidence and natural history remain elusive. Controversy over criteria for repair still persists.

Case Report: This is a case of a 47-year-old female admitted due to intermittent crampy epigastric pain and nausea. She is hypertensive and dyslipidemic, with a history of nephrolithiasis since five years prior, for which she is maintained on sodium bicarbonate tablets. On admission, Computed tomography (CT) scan showed a saccular aneurysm at the left renal artery, before bifurcating into the segmental arteries. The tip is directed infero-posteriorly, near the ipsilateral pelvis measuring 1.5 x 1.1 cm (length x width) with a neck of 0.5 cm, exhibiting medial peripheral calcification but without signs of rupture or dissection; abdominal aorta is normal, without evidence of focal aneurysmal dilatation. Abdominal PET scan showed stable ovoid focus with rim calcification at the left renal hilum relating to the known renal artery aneurysm. Patient subsequently underwent endovascular repair with stent assisted coiling and embolization of renal artery aneurysm (Stent-jail technique).

Conclusion: Most patients with RAA have no symptoms and may present incidentally on imaging; Epigastric pain can be a manifestation of renal artery aneurysm. CT angiography is the diagnostic of choice to demonstrate RAA. Our patient underwent coiling of the said aneurysm with stenting to avoid dislodgment of the said coils- "jail technique" Compared with open surgery, endovascular repair is associated with lower rate of operative complications as well as shorter length of stay, which can be a valuable treatment option, providing a successful outcome



POSTER 2

4643-A-2223

Increased arterial diameter and arterial wall stiffness of non-aortic elastic arteries in subjects with abdominal aortic aneurysm

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Introduction: It has been proposed that abdominal aortic aneurysm (AAA) is caused by a systemic arterial dilating diathesis affecting arteries distant from the aorta. Arteries in the upper extremity of patients with AAA are however scarcely studied and it remains unclear whether muscular and elastic arteries are differently affected by the hypothesized systemic dilating diathesis. The aim of this study was to study arterial diameter and wall stiffness along the upper extremity in men with AAA.

Methods: 26 men with AAA (mean age \pm standard deviation, 69.3 ± 4.0 years) and 58 men without AAA (69.8 ± 4.9 years) were included in the study. An ultrasound wall tracking system (7.5 MHz) was used to measure arterial diameter, diameter change, and intima-media thickness (IMT). Oscillometric brachial blood pressure was measured, and carotid pulse pressure wave recorded with applanation tonometry.

Results: Men with AAA had significantly larger arterial diameters of the distal and proximal brachial artery, axillary, and common carotid artery, compared to controls. After adjustment for body mass index (BMI) and mean blood pressure (MAP) the difference remained only for the axillary and carotid artery (8.86 ± 1.03 vs 7.94 ± 0.88 mm, $p < 0.01$; 8.46 ± 1.30 vs 7.55 ± 0.95 mm, $p < 0.01$, respectively). No difference was seen in IMT when adjusting for BMI in above mentioned arteries. Stiffness (β), local pulse wave velocity, and Young's elastic modulus were higher in the carotid artery in AAA compared to controls, even after adjusting for BMI and MAP. No difference in arterial stiffness was seen in the upper extremity.

Conclusion: Dimension and wall stiffness of muscular arteries within the upper extremity were similar in both groups, while AAA is accompanied by outward remodeling and stiffening of adjacent elastic arteries. Thus, AAA might be a focal manifestation of a systemic disease involving elastic arteries.

POSTER 3

4308-A-2223

Benefits of manta closure device in reduction of access site complications in percutaneous endovascular aortic repair

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Purpose: The most common complications of percutaneous endovascular therapy of aortic diseases (PEVAR/TEVAR) are complications of the arterial access site. We evaluated the occurrence of access site complications using Manta (Manta® Vascular Closure Device, Teleflex®) versus Proglide (Perclose ProGlide® Suture-Mediated Closure, Abbott Vascular®).

Materials and methods: Retrospective single center analysis of access site complications in 155 patients treated by PEVAR/TEVAR in 2013/2014 (238 punctured common femoral arteries (CFA)) using Proglide VCD (group A) versus 147 PEVAR/TEVAR patients treated in 2020/2021 (215 punctured CFA) using Manta VCD (group B).

Results: The failure of VCD with severe bleeding occurred in 12 patients from group A (7.7% of patients/ 5.0% of punctured CFA) versus 2 patients from group B (1.3% of patients/ 0.9% CFA) ($p<0.01$). ALI caused by VCD occurred in 5 patients from group A (3.2% of patients/ 2.1% CFA) versus 5 patients from group B (3.3% of patients/ 2.3% CFA) ($p=NS$). Surgical treatment of VCD complications was required in 15 patients from group A (9.7% of patients/ 6.3% CFA) versus 4 patients from group B (2.7 % of patients/ 1.9% CFA) ($p=0.02$). Postprocedural USG/CT examination found CFA PSA in 20 patients from group A (12.9% of patients/ 6.4% CFA) versus 2 patients from group B (1.3% of patients/ 0.9% CFA) ($p<0.001$).

Conclusion: Occurrence of severe access site complications in PEVAR/TEVAR patients treated in our center was significantly lower using Manta VCD compared to Proglide VCD in term of severe bleeding, need for surgical treatment and CFA pseudoaneurysm.

POSTER 4

4315-A-2223

An association between type II endoleak and postprocedural sac diameter and volume post-evar

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Background: Type II endoleak is the most common complication occurring after endovascular abdominal aortic aneurysm repair (EVAR). The aim of our study was to evaluate the impact of persistent type II endoleak on sac dynamic 36-months post-EVAR.

Methods: The cohort comprises of 210 patients undergoing EVAR between January, 2010 and December, 2018. Assessment of abdominal aortic diameter and volume was performed using semi-automated segmentation software (TatraMed, Bratislava, Slovak Republic). Sac expansion was defined as sac growth of at least 5 mm compared with preoperative CTA, sac regression as a decrease of at least 5 mm, and stable sac size as an absolute change < 5 mm. The adjustments included age, hypertension, diabetes mellitus, dyslipidaemia, sex, smoking, preprocedural diameter/volume in multivariate analysis.

Results: Sac regression was found in 22.4% of patients with persistent type II endoleak compared to 41.1% without it ($p=0.021$), sac progression in 18.4% of patients with type II endoleak compared to 7.8% without it ($p=0.04$), and stable sac in 59.2% of patients with persistent type II endoleak compared to 51.2% of patients without it ($p=0.338$). Persistent type II endoleak almost three times increased probability of sac progression in multivariate analysis (OR 2.94; 95%CI 1.09–7.90; $p=0.033$) compared to patients without persistent type II endoleak. The probability of sac regression in persistent type II endoleak was lower by 57.0% in multivariate analysis (OR 0.43; 95%CI 0.20–0.92; $p=0.031$) compared to patients without type II endoleak. In multivariate analysis, the presence of persistent type II endoleak was associated with 4.31 mm greater anteroposterior sac diameter ($p=0.014$) and with 22.0 cm³ greater sac volume ($p=0.034$) compared to patients without type II endoleak.

Conclusions: Persistent type II endoleak patients had greater anteroposterior sac diameter and sac volume compared to patients without persistent type II endoleak.

POSTER 5

4317-A-2223

An association between rs7635818 polymorphism located on chromosome 3p12.3 and the presence of abdominal aortic aneurysm

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Background: The association between gene variant rs7635818 located on chromosome 3p12.3 and abdominal aortic aneurysm (AAA) was not unambiguously determined by the results of genome-wide association studies. This polymorphism is located near CNTN3 gene encoding contactin-3, which belongs to the immunoglobulin superfamily of cell adhesion molecules essential for tissue architecture integrity, regulation of inflammation and cell apoptosis. The aim of our study was to examine association between rs7635818 and AAA in the Slovak population.

Patients and methods: A cross-sectional study was conducted between August 2016 and March 2020. The study included 166 AAA patients, and a control group of 163 subjects without AAA with comparable distribution of genders. The anteroposterior diameter of the abdominal aorta was determined by duplex ultrasonography. AAA was defined as subrenal aortic diameter ≥ 30 mm. DNA samples were genotyped using real-time polymerase chain reaction and subsequent high-resolution melting analysis in presence of unlabelled probe. Genetic models were adjusted to age, sex, smoking, arterial hypertension, diabetes mellitus, creatinine and BMI.

Results: The abdominal aortic diameter in CC homozygotes of the rs7635818 polymorphism was 7.66 mm greater compared to GG homozygotes (42.5 ± 22.0 mm vs 34.8 ± 21.3 mm; $p=0.022$) and 5.88 mm greater compared to G-allele carriers (GC/GG) (42.5 ± 22.0 mm vs 36.6 ± 21.0 mm; $p=0.04$) in univariate analysis. In the additive model, presence of each C-allele of rs7635818 polymorphism was associated with an almost 50% increase in probability of developing AAA (OR 1.49; 95% CI 1.06–2.08; $p=0.020$). Compared to GG homozygotes, CC homozygotes had more than two times higher risk of developing AAA (OR 2.23; 95% CI 1.14–4.39; $p=0.020$). The risk of AAA was also 1.79-times higher for CC homozygotes compared to G-allele carriers (GC/GG) (OR 1.79; 95%CI 1.01–3.19; $p=0.047$).

Conclusions: Slovak population.

POSTER 6

4510-A-2223

Arterial tortuosity in patients with rare vascular disease

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Introduction: Increased arterial tortuosity index (ATI) has been associated with various cardiovascular and respiratory complications. However, the extent and relevance to rare vascular diseases remain to be fully elucidated. We describe ATI in patients with rare vascular diseases and the association with clinical and demographic characteristics.

Methods: This is a retrospective analysis of patients included in the RAVAD registry who were followed at the Malformation and Rare Vascular Disease Center, Lausanne University Hospital (Switzerland). Computed tomography (CT) images of patients were retrieved between January 2019 and April 2022. Patients with rare vascular disease were compared to patients with suspected rare vascular diseases, and inflammatory arterial diseases. ATI was measured as the ratio of aortic length to geometric length. Multivariate logistic regression were used to determine the association of ATI and potentially relevant predictors of arterial tortuosity including age, gender, diagnosis, and lesion type.

Results: One hundred eighty-two patients were included in the study. The mean age upon CT scan was 46.2 years, 67.6% of patients were aged ≥ 40 , and 61.5 % were females. ATI was more pronounced in patients with arterial dissection and aneurysm (mean, 1.09 [SD, 0.26]; N=59) compared to those with fibromuscular dysplasia (mean, 1.02 [SD, 0.17]; N=30), inflammatory arterial diseases (mean, 0.97 [SD, 0.19]; N=43) and connective tissue diseases (mean, 0.97 [SD, 0.20], N= 37). Our analysis demonstrated that ATI was higher in patients aged ≥ 40 compared to those aged < 40 (1.1 vs. 0.86; $p < 0.05$) and was significantly correlated with height, hypertension, and presence of arterial ectasia/aneurisms ($p < 0.05$).

Conclusions: Our preliminary results suggest that ATI increases with age, height, hypertension and the presence of ectasia/aneurism. Although further studies are needed, measurement of ATI may be of value in evaluating prognosis of vascular conditions in patients with rare vascular diseases.

POSTER 7

4488-A-2223

Plateletcount as a prognostic factor in Covid-19 patients

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Introduction: About a quarter of cases of COVID-19 infection display thrombocytopenia and about half of patients will die due to coagulopathy. The mechanisms leading to thrombocytopenia are not yet well known. Infection-related sepsis may be the main reason to develop thrombocytopenia in COVID-19 patient.

Methods: The aim of our study was to examine platelet count in COVID-19 patients and compare it to a control group consisting of subjects with a negative swab. Secondly, to correlate the platelet value both to the respiratory parameters and to the outcome (hospitalization and mortality) of patients with SARS-CoV-2 virus infection.

Results: The mean platelet values differed between patients with positive or negative SARS-CoV-2 swab (242.1 ± 92.1 COVID-19 negative vs 215.2 ± 82.8 in positives, $p < 0.001$). In COVID-19 patients the platelet count correlated with the oxygen delta A-a ($p = 0.001$, $\rho = -0.149$), with its increase over the expected ($p = 0.013$; $\rho = -0.115$), with the PaO₂ values ($p = 0.036$; $\rho = 0.093$), with the PCO₂ values ($p = 0.003$; $\rho = 0.134$) and with the pH values ($p = 0.016$; $\rho = -0.108$). Discharged patients had a mean platelet value of 234.3 ± 68.7 , those hospitalized in ordinary hospitalization a mean value of 204.3 ± 82.5 , those admitted to intensive / subintensive care a mean value of 201.7 ± 75.1 . In the group of COVID-19 patients, the survivors had an average platelet value at entry of 220.1 ± 81.4 , while the deceased of 206.4 ± 87.7 .

Conclusions: Our data confirm that SARS-CoV-2 infection induces thrombocytopenia. The reduction in platelet counts correlates with the main arterial blood gas parameters. Platelet count values were progressively lower depending on the severity of the disease and the degree of hospitalization. COVID-19 subjects who died had lower platelet values compared to the survivors.

POSTER 8

4522-A-2223

Acute infrarenal aortic thrombosis in Covid-19: an old treatment for a new disease

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A.S.L.

Introduction: COVID-19 represents a major worldwide health problem with a different spectrum of clinical presentation. It is associated with higher rate of arterial or venous thrombosis. These complications are related to increased blood hypercoagulability via the upregulation of many procoagulant cytokines in endothelial cells of blood vessels, which can cause venous thrombo-embolism. However, in a small percentage of cases the SARS-CoV-2 infection can cause arterial thrombosis (AT), mostly in the context of myocardial infarction and stroke.

Methods: We report the case of a 58-year-old-man, with recent Sars-Cov2 asymptomatic infection and no history of cardiovascular disease, that was referred to our department with pain, cold lower limbs with no pedal pulses. A Computed Tomography Angiography showed complete occlusion of infra-renal aorta, both common iliac arteries and left popliteal artery with no sign of atherosclerotic disease in other districts.

Results and conclusions: Thrombo-embolectomy by Fogarty's catheter was performed with complete restoration of arterial patency. The pedal pulses reappeared. The postoperative course was uneventful and the patient was discharged with aspirin and low-molecular-weight heparin, replaced, after one month, by dual antiplatelet therapy. AT represent a rare and life-threatening complication of SARS-Cov-2 infection. The causes are still unknown. Evidence suggests that AT could be produced both from endothelitis with diffuse endothelial damage and infiltration by inflammatory cells, characterized by elevation of D-dimers, prothrombin, and fibrinogen. To date, after two years, the pathogenesis remains unknown. It is necessary to investigate the cause of AT COVID-19 related to decrease its incidence and consequently mortality.

POSTER 9

4632-A-2223

Is hematopoietic clonality of indeterminate potential a risk factor for pulmonary embolism?

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Introduction: Unprovoked pulmonary embolism (uPE) is a severe and frequent condition. Identification of new risk factors is mandatory to identify patients that would benefit from a long-term treatment. Clonal hematopoiesis of indeterminate potential (CHIP) is defined by the acquisition of somatic mutations that drive clonal expansion in the absence of cytopenia. Its prevalence is estimated of 5% in the population above 65 years. Since inflammation and endothelial dysfunction may share a pathophysiological pathway, we hypothesized that CHIP, may be a risk factor for uPE.

Methods: We conducted a pilot retrospective observational study. Patients with uPE between 18 to 65 years old were included. PE was considered as unprovoked, when no transient nor persistent risk factor was present and when thrombophilia testing was negative. We excluded documented atherosclerosis, personal or familial history of VTE and presence of cytopenias. CHIP proportion in uPE patients were analyzed using next generation sequencing of the coding sequence of a custom panel composed by DNMT3A, ASXL1, SF3B1, TET2 and TP 53.

Results: Upon 61 patients with uPE consecutively included, a total of 19 somatic mutations were found in 12 patients (20%) IC95% [10 - 20]. 15 mutations were found in DNMT3A gene, 3 in ASXL1 and one in TET2. There was no difference in terms of age, PE location, DVT presence and risk stratification in CHIP carriers and non carriers.

Conclusion: We report for the first time, the presence of high rates of CHIP in patients presenting with uPE. Thus, CHIP may be a new risk factor for VTE. These results need to be confirmed in an ongoing prospective case-control study including more patients and using a more diverse gene panel to better determine CHIP incidence in uPE.

POSTER 10

4631-A-2223

Myocardial infarction in women under 50 : possible implication of clonal hematopoiesis of indetermined potential

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Introduction: Women have a poorer prognosis following acute myocardial infarction than men, both during in-hospital and short-term follow-up, with a higher risk of death. This is incompletely explained by differences in atherosclerotic risk factors or by delays in care. Clonal hematopoiesis of indeterminate potential (CHIP) is defined as the acquisition of somatic mutations that drive clonal expansion in the absence of cytopenia and dysplastic hematopoiesis. It has been reported a link between CHIP and premature atherosclerosis. We sought the presence of CHIP in non-smoking women under the age of 50 with AMI.

Methods: We included in our analysis women from WAMIF study who were non-active smokers, and without biological thrombophilia. For CHIP analysis, DNA samples were analyzed using next generation sequencing with a custom panel of genes implicated in CHIP (DNMT3A, ASXL1, SF3B1, TET2, SH2B3, JAK2 and TP53).

Results: Among the 72 included patients, the median age was 45 years (40 – 47). Fourteen women had diabetes mellitus (19.4%), 16 had hypertension (22.2%), 12 had dyslipidemia (16.7%) and 18 had a familial history of cardiovascular disease (25%). CHIP was found in 13 women (18.1%; 95% confidence interval [CI], 10 – 28.9) with a variant allele frequency of at least 1%. The genes involved were DNMT3A (6 patients), SH2B3 (4 patients), ASXL1 (3 patients) and CALR in one patient.

Conclusion: The prevalence of CHIP in our study population was four-fold higher than that in the general population of the same age range. Consequently, we hypothesize that CHIP could act as a trigger for premature atherosclerosis in women before 50 years of age. As CHIP is already considered as a risk factor for cardiovascular disease, it appears to be particularly frequent in this subgroup of women and its mechanism of action needs to be further studied.

POSTER 11

4576-A-2223

Anti-cardiolipin IGM positive with digital ischaemia: is it anti-phospholipid syndrome?

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Background: Systemic Scleroderma (SSc) is commonly associated with Raynaud's phenomenon. However, digital ischaemia in SSc can be caused by peripheral arterial disease (PAD) and even anti-phospholipid syndrome (APLS).

Aim: To report a case of a gentleman presented with positive anti-cardiolipin IgM on two occasions 12 weeks apart.

Case: 58-year-old gentleman with underlying SSc since 2005 and PAD diagnosed since 2015, presented in November 2017 with painful toe discoloration after a trivial trauma. His pain and discolouration persisted after a course of antibiotics and analgesics. With persistent signs and symptoms, he was admitted for further evaluation. He quit smoking more than 10 years ago.

Investigation: Arterial duplex showed mild diffuse disease of the arteries in the lower limb except complete occlusion of the right dorsalis pedis artery. Further CT angiogram only showed thrombus at the abdominal aorta and complete occlusion of left internal iliac artery. APLS screening showed anti-cardiolipin IgM antibodies of 27, negative lupus anticoagulant, negative anti-cardiolipin IgG and anti-beta2globulin.

Progress: He was continued on aspirin, statin. Prostaglandin infusion was administered during the episode of toe discoloration as Raynaud's phenomenon responds to vasodilator. His toe discoloration improved over 6 months without anti-coagulation as APLS in him is inconclusive. His anti-cardiolipin IgM decreased to 22, twelve weeks later.

Conclusion: With regards to this gentleman, his digital ischaemia is due to multiple causes. However, based on the presentation, the distribution of the disease, the diagnosis is more suggestive of Raynaud's phenomenon.

Discussion: Prevalence of anti-phospholipid syndrome in scleroderma ranged from 0 to 41%. The scleroderma patients exhibited an atherogenic lipid profile and subclinical atherosclerosis and have an increased risk for cardiovascular events. Dysregulation of vascular tone control and deficiency of the vasodilatory neuropeptides in scleroderma is proposed as a mechanism in the development of Raynaud's phenomenon. Decreased fibrinolysis and enhanced platelet aggregation is documented and undoubtedly contributes to microvascular thrombosis.

POSTER 12

4540-A-2223

Prevalence and determinant factors of endothelial dysfunction in ANCA associated Vasculitis

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Background and aims: Atherosclerosis and its complications are one of the leading causes of death in patients with antineutrophil cytoplasmic antibodies (ANCA)- associated vasculitis (AAV). The aim of this study is to evaluate the prevalence and the determinant factors of endothelial dysfunction (ED) in AAV patients.

Methods: We prospectively enrolled 50 consecutive patients with AAV without previously cardiovascular events. Of these patients we collected epidemiological and clinical data and evaluated the ED using the flow mediated dilation (FMD) and the digital peripheral artery tonometry (PAT). Finally, we try to determine the process of accelerated atherosclerosis through the measurement of carotid intima-media thickness (cIMT) and arterial stiffness (AS).

Results: ED assessed by PAT, was found in 16 patients (32%). Average values of C-reactive protein at baseline and cIMT were higher in patients with ED by PAT than controls ($p=0.04$ and $p=0.05$ respectively). Moreover, 50% of men and 18% of women showed impaired endothelial function by PAT ($p=0.03$). The male sex was the only independent parameter associated with ED by PAT ($p=0.01$). ED evaluated by FMD was found in patients with a higher disease activity assessed by the Birmingham Vasculitis Activity Score (BVAS) and higher erythrocyte sedimentation rate levels compared with controls ($p=0.05$ and $p=0.04$ respectively). The multivariate analysis showed that a higher BVAS was the only parameter associated with ED by FMD ($p=0.03$). Moreover, cIMT and AS were found to be higher than the same parameters of accelerated atherosclerosis measured in the normal population, and they worsen with age.

Conclusions: One third of patients with AAV had endothelial dysfunction. Male sex, inflammation and disease activity appear to be the main determinants of impaired endothelial function in patients with AAVs. Further studies are needed to clarify the role of ANCA-associated vasculitis in the atherosclerotic process.

POSTER 13

4537-A-2223

Catheter-related right atrial thrombosis in cancer patients: A retrospective analysis

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Background and aims: Literature data on catheter-related right atrial thrombosis (CRAT) are scarce. In this study we investigated characteristics of cancer patients with CRAT to provide a better characterisation and to improve the knowledge of this disease.

Methods: We retrospectively analysed data of 21 consecutive cancer outpatients with CRAT that referred to our Thromboembolic Pathology Unit over a period of 3 years. Of these patients we collected epidemiological and clinical data and evaluated the efficacy (resolution of the thrombosis and recurrences) and safety (bleedings) of the different anticoagulant treatments used.

Results: In our study, the median age was 57 years. All patients had active neoplasia: 8 (38%) ovarian, 5 (24%) uterine, 5 (24%) colorectal, and 3 (14%) breast cancer. Of them, 15 (71%) were metastatic. In 5 (24%) cases, thrombosis was present at other sites, in addition to the right atrium. In 2 cases, the diagnosis of CRAT was made by echocardiography, while in the other 19 cases by CT-angiography, with confirmation by echocardiography in 15 patients. The median follow-up was 10 months. Nineteen (90%) patients received anticoagulant treatment for 3-6 months. After completion of the treatment period, 9 (43%) patients extended treatment with low dose anticoagulation. In 12 (57%) patients there was complete resolution of CRAT, in 5 (24%) a partial resolution, and in 3 (14%) the thrombus remained stable. No major bleedings occurred. There were only 4 minor bleedings: 2 epistaxis and 2 genital bleedings. One pulmonary embolism occurred during anticoagulant treatment.

Conclusions: With the increase of patients with central venous catheters, CRAT is becoming less uncommon than previously thought. Early treatment may lead to complete thrombosis resolution in more than half of patients. Anticoagulants are safe with low risk of bleeding. The risk of recurrences is like that displayed by thrombosis in usual sites in cancer patients.

POSTER 14

4647-A-2223

Spontaneous carotid plaque regression in a chronic myleoid leukemia (CML) patient

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Introduction: Tyrosine kinase inhibitors (TKI) are highly effective for the treatment of CML although with several off-target side effects including cardiovascular toxicities. Although it targets the oncogene BCR-ABL, activation of the Discoidin Domain Receptor 1 (DDR1) by KTI is also responsible for the activation of several cellular processes (namely adhesion, migration, differentiation, or cytokine production). However, the progression and reversibility of the cardiovascular toxicity under KTI is not clearly established.

Here, we report the case of a patient with CML who exhibited a spontaneous carotid plaque progression and regression while under TKI.

Methods: The patient (aged 38 yrs, smoker, BMI 38) was treated for CML (Bcr/Abl negative) by nilotinib (300mg twice day) for 15 months with a complete molecular and cytologic remission. He was also treated for a chronic B hepatitis (Tenofovir disoproxil 245mg), one month after TKI was started. The patient was included in a follow-up protocol (NCT03746054, PALERMO study, Angers France) including regular ultrasound evaluation.

Results: After 10 months of TKI, an iso-echogenic, regular, and homogeneous plaque was detected at the carotid bulb. The plaque totally regressed within 6 months later, without any changes in the treatments. The gray scale median value (a measurement of the plaque density) was positively associated to the LDL/HDL ratio ($R^2=0,896$) and negatively to triglycerides suggesting that the PR was linked to the lipid profile.

Conclusion: To our knowledge, this is the first report of a spontaneous plaque regression in a patient treated by KTI. This case suggests that KTI-induced plaques are linked to lipid ratio, and can regress with favorable lipid profile ratio independently from lowering lipid drugs. Arterial plaque need to be screened during KTI treatments and lipid profile should be carefully monitored during these therapeutics.

POSTER 15

4531-A-2223

Popliteal artery aneurysm: Preliminary results of a population screening

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Introduction: Popliteal artery aneurysm (PAA) is frequently asymptomatic but, as abdominal aortic aneurysm (AAA), has potentially dramatic consequences resulting in arterial thrombosis and/or peripheral embolism with higher risk of limb ischemia and permanent sequelae (mainly amputation). Data about prevalence and natural history of PAA are very limited in men and absent in women. Moreover, the benefit of PAA screening has never been assessed so far. We aim to evaluate, by a population screening, the prevalence and characteristics of PAA.

Methods: Monocentric, observational, prospective, Swiss cohort study. The following were included: men aged ≥ 65 years; women ≥ 65 years with history of smoking or arterial hypertension; men or women aged ≥ 55 years with familial history of aneurysm. Subjects with known or previously operated aneurysm as well as patients received aneurysmal screening in the last 12 months were excluded.

Results: At the time of our analysis, 252 consecutive subjects, 53% men and 47% women, were screened. Median age was 69.2 and 70.4 years in men and women, respectively. We found 3 (2.3%) PAA in men and none in women. All three patients had a history of smoking. None of the patients required vascular surgery in the following 12 months. Concerning cardiovascular risk factors distribution, 70.7% of men was former or current smokers (vs 66.4% in women, $p = 0.564$). No differences in body mass index, dyslipidemia, and arterial hypertension were found in the two groups. Conversely, chronic renal failure and diabetes were more frequent in men.

Discussion: The preliminary results of our study showed a non-negligible prevalence of PAA in men and highlighted the importance of PAA screening, considering the potential dramatic consequences of disease. These data need to be confirmed in a large sample-size. A multicentric international study, based on an opportunistic screening for PAA, is currently ongoing (NCT05360108).

POSTER 16

4517-A-2223

Sex Differences in Revascularization for Acute Lower Limb Ischemia

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Introduction: Acute lower limb ischemia (ALI) remains a significant threat to limbs and lives. Previous reports have found associations between female sex and higher rates of major adverse events, such as mortality and amputation. Undergoing fasciotomy after revascularization has also been associated with higher rates of major adverse events but has been inversely associated with female sex. It is not known if the higher rates of major adverse events and lower rates of fasciotomy are a direct effect of sex, or if they are a result of mediators. The present study aims to investigate if there is a direct effect of sex on these outcomes.

Methods: This is a retrospective cohort study of patients undergoing revascularization for ALI between 2001 and 2018. Patients (709; 45.9% female) were followed up until April 2022, for major amputation and mortality. A propensity score to having female sex was created. Cox-regression was used for time to event variables: 90-day and one-year major amputation, mortality and combined major amputation and mortality. Logistic regression was used for analysis of in-hospital fasciotomy. Both crude and propensity score adjusted models were performed.

Results: Mortality at one year was 21.2% for female and 14.7% for male patients, with an unadjusted HR of 1.50 (95%CI:1.05-2.13, p=0.025) and unadjusted OR for fasciotomy of 0.52 (95%CI:0.31-0.87, p=0.013) for female sex. After propensity score adjustment the HR for one-year mortality was 0.94 (95%CI:0.68-1.51, p=0.94) and OR for fasciotomy was 0.48 (95%CI:0.27-0.87, p=0.016). Both adjusted and unadjusted HR for all other outcomes were non-significant, at 90-days and one year.

Conclusion: There was an increased HR for one-year mortality for female sex, but this evanesced after adjusting for propensity score, suggesting that the effect of female sex on mortality is through mediators. Female sex remains associated with fasciotomy after propensity score adjustment.

POSTER 17

4629-A-2223

Upper arm versus forearm transcutaneous oximetry during upper limb abduction in patients with suspected thoracic outlet syndrome

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Purpose: thoracic outlet syndrome (TOS) is common among athletes and should be considered as being of arterial origin only if patients have “clinical symptoms due to documented symptomatic ischemia”. We previously reported that upper limb ischemia can be documented with DROPm (minimal value of limb changes minus chest changes) from transcutaneous oximetry (TcpO2) in TOS. We hypothesised that forearm (F-) DROPm would better detect symptoms associated with arterial compression during abduction than upper arm (U-) DROPm, and that the thresholds would differ.

Methods: retrospective analysis of a longitudinally acquired database. We studied 175 patients (350 arms) with simultaneous F-TcpO2 and U-TcpO2 recordings and considered tests to be positive (CS+) when upper limb symptoms were associated with ipsilateral arterial compression on either ultrasound or angiography. We determined the threshold and diagnostic performance with a receiver operating characteristic (ROC) curve analysis and calculation of the area under the ROC curve (AUROC) for absolute resting TcpO2 and DROPm values to detect CS+. For all tests, a two-tailed $p < 0.05$ was considered indicative of statistical significance.

Results: while resting U-TcpO2 and resting F-TcpO2 were not predictive of CS+ results, the AUROCs were 0.68 ± 0.03 vs. 0.69 ± 0.03 (both $p < 0.001$), with the thresholds being 7.5 vs. 14.5 mmHg for the detection of CS+ results for U-DROPm vs. F-DROPm respectively.

Conclusion: in patients with suspected TOS, TcpO2 can be used for detecting upper limb arterial compression and/or symptoms during arm abduction, provided that different thresholds are used for U-DROPm and F-DROPm.

POSTER 18

4513-A-2223

Development and Implementation of an Ambulatory Integrated Care Pathway Tool for Peripheral Arterial Disease Patients: the Vascular Passport. From Knowledge to Awareness.

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Background: Despite its high prevalence, peripheral artery disease (PAD) remains an under-recognised and under-treated condition. Patients' lack of knowledge about the disease, and low awareness of its consequences contribute to this misrecognition. Additionally, none or partial implementation of existing guidelines' recommendations by physicians results in suboptimal management of PAD patients.

Integrated care pathways (ICP) represent a multi-modal approach in hospital setting to promote evidence-based treatments together with patient's empowerment in a collaborative relationship of care.

Aims: We present the "Vascular Passport", an ICP developed and implemented at the angiology and vascular surgery departments of the University Hospital of Lausanne (CHUV, Switzerland). Aim of the passport is: i) to support a more standardized management of PAD patients taking into account national and international guidelines, ii) to promote patients awareness on their disease and treatment. The final goal is to facilitate a structured and shared-decision of cardio-vascular (CV) secondary prevention for PAD patients.

Methods: Structured analysis of several current CV guidelines, in order to adapt recommendations to the local context, was firstly performed. Thereafter a local ICP model was developed.

Results: Development of an ICP vascular model based on: 1) Development of an algorithm for anti-thrombotics, and lipid-lowering therapies in secondary CV prevention; 2) Development of a patient held booklet, the "vascular passport", designed for patients and physicians to describe, record, and evaluate medical screening, treatment and results. The passport is also a tool for determining patient objectives and allow collaboration between patient, treating physician, and vascular specialists.

Conclusions: The present vascular passport is the first model of integrated care pathway, for promoting better adherence to best clinical practice in PAD and for enabling patients to understand the process and outcome of their personal care. Our long-term results on outcomes will provide the evidence of the potential wider applicability of the model in other settings.

POSTER 19

4590-A-2223

Can concomitant above-knee femoropopliteal bypass with artificial graft affect the outcome of femorofemoral bypass with artificial graft ?

Won-Min Jo

Introduction: Few have studied the effect of concomitant femoropopliteal (FEM-POP) bypass surgery on the outcome of femorofemoral (FEM-FEM) bypass in patients with peripheral arterial disease (PAD). This study was aimed to analyze the risk relationship of concomitant FEM-POP bypass on the patency of FEM-FEM bypass.

Methods: From March 2009 to April 2020, a total of 27 patients who underwent FEM-FEM bypass surgery using polytetrafluoroethylene grafts were retrospectively analyzed according to concomitant FEM-POP bypass surgery. The mean follow-up duration was 38.20 ± 34.56 months.

Results: The overall primary patency of the FEM-FEM bypass grafts in all 27 patients was 83.7%, 78.5%, and 72.0% at one, two, and three years, respectively. The overall limb salvage rate was 100%, 94.1%, and 86.9% at one, two, three years, respectively. Among them, 10 patients underwent FEM-FEM bypass only (group 1). The other 17 patients needed a concomitant FEM-POP bypass and these patients were classified into three groups (group 2, ipsilateral FEM-POP, n = 5; group 3, crossover FEM-POP, n = 6; and group 4, bilateral FEM-POP, n = 6). The comparison of the primary patency of group 1 with the concomitant FEM-POP groups (sum of groups 2, 3, and 4, that is, group 5, n = 17) revealed a statistical difference (P = 0.036). Among the concomitant FEM-POP groups, group 2 had the lowest primary patency of the FEM-FEM bypass significantly (P = 0.07). The limb salvage rate of group 4 was significantly low.

Conclusion: A concomitant FEM-POP bypass influenced the outcome of FEM-FEM bypass surgery. Subsequent occlusion of the infra-inguinal reconstruction was a strong predictor of FEM-FEM bypass failure. In addition, a concomitant bilateral FEM-POP bypass is a risk factor affecting the limb salvage rate in FEM-FEM bypass.

POSTER 20

4273-A-2223

Novel cardiovascular biomarkers associated with peripheral arterial disease

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Background: Peripheral arterial disease (PAD) is a common atherosclerotic disease with severity ranging from asymptomatic to chronic limb threatening ischemia. The aim of the present study was to identify novel biomarkers associated with PAD.

Methods: Levels of 91 cardiovascular specific proteins in plasma samples were measured by the Proseek Multiplex CVD III96x96 panel in 267 65 year old men recruited from a screening program for abdominal aortic aneurysm (AAA). Levels of protein biomarkers were compared in men with and without PAD (defined as an ankle brachial index of ≤ 0.9) and their diagnostic potential was calculated by receiver-operating characteristic analysis.

Results: The prevalence of PAD was 14.2% (38/267). After adjustment for multiple comparisons, levels of the following 11 biomarkers remained significantly higher ($p < 0.0001$) in patients with PAD: secretoglobin family 3A member 2, osteoprotegerin, urokinase-type plasminogen activator surface receptor, serum macrophage chemokine ligand 16, matrix metalloproteinase 9, p-selectin, growth differentiation factor 15, elafin, cystatin B, trefoil factor 3, and fatty acid-binding protein 4. Multivariable logistic regression analysis (adjusted for smoking, use of antihypertensive and lipid-lowering medication, and metformin) showed that 11 biomarkers were significantly associated with higher risk of PAD with odds ratios ranging from 1.6 to 2.4. Area under curve calculated by receiver operating characteristic curve analysis (diagnostic value) for each protein biomarker ranged from 0.63 to 0.74.

Conclusion: We have identified multiple proteins with a potential to be diagnostic biomarkers for PAD, and further research is warranted to clarify their potential predictive and prognostic value.

POSTER 21

4547-A-2223

Venous thromboembolism in sportsmen – many questions, fewer answers

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Regular sport activities decrease the risk of venous thromboembolism (VTE) as was proved in the population-based case-control study by van Stralen et al. A participation in sport activities reduces the risk of VTE compared to others doing no sport (OR 0.64;95% CI 0.58-0.71) regardless of the differences in risks for various frequencies, intensities, and types of sport.

But sport activities may lead in certain cases to cause VTE with potentially fatal consequences:

Sport activities pose potentially risk of VTE and may lead to enforcing Virchow triad: Hypercoagulability might be achieved by excessive perspiration without the adequate liquid supply. Administration of anabolic steroids, inherited thrombophilia or oral contraceptives increase blood coagulation factors. The stasis of blood might be achieved due to travelling or excessive abdominal press in bodybuilding. Damage of venous wall is daily problem in the collisional and contact sports.

We present two case studies: 25-y patient is professional World Cup skier. The second patient is 51-y, top manager, but in his free time he cycles on routes of the Tour de France. The case studies underline the complexity of the issue and the need for a creative approach by a general practitioner.

Both, prevention and treatment of VTE of a sportsman requires an acceptance of his priorities and goals by a physician. A sportsman, his coach and manager must be well educated not only in medical prevention but also in nonmedical measures. It seems that education plays crucial role in prevention of VTE of sportsmen.

4548-A-2223

Community activities – Booster of primary prevention even during pandemic COVID-19

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A community is an ensemble of people with different characteristics, people who form social relationships, share common interests, values and goals. The community is a place where one can receive emotional support, appreciation and practical help in everyday life.

Moving activities significantly contributes to the quality of life, maintenance and improvement of health. Interest in common physical activities under professional guidance is a good starting point for community creation. It implies the interest of community members in a healthy lifestyle, including diet, stress prevention and active participation in screening programs.

The Covid-19 pandemic period required a creative approach in community activities. The swimming club was probably the most limited in its activities, but the members encouraged and guided each other in adhering to anti-epidemic measures, alternative physical activities and participation in the vaccination program. Members of the yoga community have moved to the online space, which has made it possible to bring theoretical knowledge about exercise and diet, exercise guidance. The content was formulated into the Yoga Against Fear program. After the measures are released, the group immediately meets personally what is supported even by mayor.

The community of Nordic walking proved to be the most advantageous in terms of continuity during the Covid-19 pandemic. The use of the poles in a relatively brisk motion requires a safe distance. The activity takes place outdoors, which is in line with epidemic measures too.

Community activities based on the common efforts of its members for a healthy lifestyle are beneficial for their members in terms of strengthening physical and mental resilience. Thanks to professional leadership as well as long-term relationships, they provide their members with a background that has the potential to mitigate the strain, especially on the outpatient sphere of the health system during the Covid-19 pandemic.

POSTER 23

4546-A-2223

Motivation of students and teachers of Slovak medical university for physical activity

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Physical activity is a key modality of a healthy lifestyle. It is assumed that students and teachers of the university with mission to educate for prevention and a healthy lifestyle, follow the principles of a healthy lifestyle in their personal lives. According to WHO adults aged 18–64 years should do at least 150–300 minutes of moderate-intensity aerobic physical activity

Methods: We analyzed and compared the physical activity of teachers and students of the Slovak Medical University in Bratislava. The group consisted of 101 teachers and 242 students. Data collection was performed through an anonymous electronic questionnaire.

Results: 44 teachers (43.56%) and 60 students (24.79%) engage in physical activity for more than 150 minutes per week. We analyzed the motivation of respondents to physical activity. 144 respondents are motivated to perform physical activity by friends (18.81% of teachers and 51.65% of students). 137 respondents chose the family as the main motivation (66.34% of teachers and 28.93% of students). Social networks, the internet, television and advertising motivate only 3 students (1.24%).

Conclusion: It is astonishing that only a quarter of medical university students meet the WHO recommendations for physical activity. We explain the low share of motivation through social networks and the internet to physical activity and, on the contrary, motivation mainly by close people (family in teachers and friends in students) in the current pandemic situation, when personal contact becomes highly valued.

POSTER 24

4358-A-2223

Abdominal Vascular Compression Syndromes (AVCS): Comprehensive Evaluation of Median Arcuate Ligament, Nutcracker, May-Thurner, Superior Mesenteric Artery, and Pelvic Venous Congestion Syndromes presenting with multiple compression syndromes and Intervention Algorithm based on Interconnectivity of these Syndromes: A Single-Center 40+ Patient Experience.

Kurtis Kim

Presentation cancelled by authors

POSTER 25

4359-A-2223

Multisystemic Presentation of Iliac Venous Compression disease (May-Thurner Syndrome) that Improves or Resolves after Intervention: A Single-Center Experience of a 289-Patient Analysis of Non-Thrombotic Iliac Venous Compression Interventions and Outcome

Kurtis Kim

Presentation cancelled by authors

POSTER 26

4549-A-2223

Venous aneurysms – our case reports

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Introduction: Venous aneurysms are rare; however, they can occur in majority of large vessels. Deep vein aneurysms are often associated with deep vein thrombosis and pulmonary embolism. We are presenting cases of three patients with venous aneurysms who underwent surgical procedures.

Cases: First patient was 47-years old female with pulmonary embolism and on long term anticoagulants diagnosed with popliteal vein aneurysms with wall thrombus confirmed by CT scan. She was indicated for resection of aneurysm and reconstruction of popliteal vein. Postoperatively there were no complications, the reconstruction was patent and the patient's anticoagulation treatment was continued for three months after surgery. Second patient was 45- years old female with swelling, pain and feeling of pressure in her left leg lower limb. She was diagnosed with aneurysm of gastrocnemius vein, CT phlebography confirmed the finding, a wall thrombus was present. Patient was treated with aneurysm resection and vein reconstruction. The postoperative time has been without complications. Third patient was 63- years old male with bilateral symptoms of chronic vein insufficiency. Sonography and CT examinations verified saphenofemoral insufficiency, stem varicosity and VP aneurysm on the left leg without signs of thrombosis. Indicated for resection of the aneurysms and direct suture of the popliteal vein. Postoperative period was complicated by two hematomas on the thigh that were evacuated, the patient's hypocoagulation condition was treated. The patient was released from inpatient care on a minimum dose of LMWH. In the next course he was without signs of bleeding. the swelling subsided. Popliteal vein was permeable, slightly dilated over the suture.

Conclusion: Venous aneurysms are rare vascular malformations. Most patients have a painful mass in the limb and ultrasonographic examination, CT phlebography, and MRI are required for making diagnosis. Thromboembolic complications in deep venous aneurysms are relatively common, therefore the management of most venous aneurysms has been surgical to avoid their potential complications

POSTER 27

4536-A-2223

A single center retrospective cohort study comparing different anticoagulants for the treatment of catheter-related thrombosis of the upper extremities in women with gynecological and breast cancer

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Introduction: Catheter-related thrombosis (CRT) of the upper extremities is a frequent complication among cancer patients that carry a central venous catheter (CVC) and may lead to pulmonary embolism (PE) and loss of CVC function. Despite its clinical impact, no anticoagulant treatment scheme has been rigorously evaluated in these patients. In addition, there is no proven evidence that direct oral anticoagulants (DOACs) are efficacious and safe in this setting because cancer patients with CRT of the upper extremities were not included in the clinical trials that led to the approval of DOACs for the treatment of cancer-associated venous thromboembolism (VTE).

Methods: We performed a single center retrospective cohort study on women with gynecologic or breast cancer treated with either low-molecular-weight heparin, fondaparinux, or DOACs for CRT of the upper extremities. Only patients who received anticoagulation at the proper therapeutic dose and for at least 3 months were included in the analysis. Effectiveness was evaluated in terms of preservation of line function, residual thrombosis, and recurrence of VTE (including PE). Safety was evaluated in terms of death, major bleeding (MB), and clinically relevant non-major bleeding (CRNMB).

Results: We identified 74 women who fulfilled the criteria to be included in the analysis. Of these, 31 (41.9%) had been treated with fondaparinux, 21 (28.4%) with enoxaparin, and 22 (29.7%) with the DOAC edoxaban. We found no differences between patients treated with the three different therapeutic approaches, in terms of preservation of line function, incidence of residual thrombosis, and VTE recurrence (including PE). Safety was similar as well, with no MBs recorded in any treatment group.

Conclusion: These results, although retrospective and based on a relatively small sample size, indicate that, in women with gynecologic or breast cancer, CRT of the upper extremities may be treated with similar effectiveness and safety with fondaparinux, enoxaparin, and edoxaban. Further studies are needed to substantiate these findings.

POSTER 28

4648-A-2223

Abnormal level of plasma Lp(a) in patients with lymphoedema

Pascal giordana, Elsa Buresi, Verena Fassbender, Elise Gilbert, Georges Leftheriotis

Introduction: Lymphoedema result from an accumulation of fluid in the limb's interstitial compartment due to a chronic dysfunction of the lymphatic system. It can be primary, with no known cause, or secondary, particularly following neoplasia. Since the limb lymphatic system return the lipids from the peripheral tissues back into the general circulation and to the liver for their elimination into the bilia. Although there is a return of the lipids via the venous circulation (trans-capillary reabsorption), this cholesterol reverse transfer (CRT) accounts for the majority of lipid return via lipoproteins that differ in concentration and properties from those found into the plasma.

A high level of cholesterol has a negative effect on lymphatic flow and lymphatic insufficiency has an effect on lipid homeostasis and favours the deposition of adipose tissue in peripheral tissues. These effects are all the more marked when there is a local inflammatory state.

Among the various lipoproteins, lipoprotein (a) [Lp(a)] are considered highly atherogenic lipoprotein, leading to a higher rate of coronary and cerebrovascular events : A [LP(a)] >30 mg/dl is considered an abnormal level while Lp(a) > 50 mg/dl is threshold for a high cardiovascular risk.

Here we present first data on the potential contribution of lymphoedema to an abnormal Lp(a) plasma level.

Methods: The blood lipid profile including total cholesterol (TC), triglycerides (TG), HDL cholesterol (HDLc), LDL cholesterol (LDLc), apolipoproteins A and B and LP(a) of 20 patients with limb lymphoedema were screened in our lymphology unit.

Results: Nine of the 20 patients (45%) exhibited abnormal LP(a) levels (0.34 - 1.04 mg/dl). Ten patients were treated for dyslipidaemia, and among them, 5 showed an abnormal LP(a) level. There was no correlation with primary or secondary nature of the lymphedema, nor with age (mean age 69 years, 48-83 years) or duration of lymphedema (1 to 34 years). The BMIs ranged from 20 kg/m² to 54 kg/m². We found no significant change in plasma LP(a) levels between the first and fifth days of the compression cure.

Discussion: Patient with primary or secondary lymphoedema exhibit a high rate of abnormal plasma [LP(a)] compared to the prevalence ranging from 15 to 20% in the general population. The lack of a relationship with the compression cure of the lymphoedema is not consistent with a possible replenishment and release of Lp(a) from the lymph into the plasma.

Conclusion : This pilot study shows that patients with lymphoedema exhibit a higher level of plasma Lp(a) suggesting that they could exhibit a higher risk for atheroma. The mechanism for this high level of Lp(a) remains unclear and a possible link with a higher cardiovascular risk in these patients remains to be further examined.

POSTER 29

4330-A-2223

The Search for protective factors against macrovascular Complications in patients at high risk – the Escaper study

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Background: Some patients at high cardiovascular (CV) risk due to risk factor burden or concomitant disease escape or postpone serious CV complications. Examples include patients with type 1 diabetes (T1D) of long duration but without macrovascular complications, or obese subjects with normal cardiac function. The protective mechanisms are not known, however, even if observational studies have shown that late progressors to diabetes complications have a better lipid profile and hepatic function compared to early progressors.

Aims: To characterize individuals without major CV complications in spite of heavy risk factor burden, in order to find and map protective mechanisms.

Methods: We will invite (a) patients with T1D with duration >30 years but without macrovascular complications, nephropathy, or severe retinopathy; (b) patients with Chronic Kidney Disease (CKD-5) waiting for renal transplantation but without signs of atherosclerosis on preoperative pelvic artery CT; and (c) obese subjects with normal cardiac function on echocardiography, and without hypertension and diabetes.

Subjects will undergo an extensive CV phenotyping including echocardiography, ultrasound of carotid arteries, MRI of heart and aorta, as well as extensive lab analyses and genotyping based on ethical approval and informed consent.

Results: We have identified 300 patients with longstanding T1D. In addition we expect to see about 10 patients annually with CKD without atherosclerosis waiting for renal transplant. In this group, biopsies will also be taken from arteria epigastrica. Finally we expect to see 20-30 individuals with obesity but normal hearts out of 3000 attendees in local population-based screening cohorts.

Conclusion: In the ESCAPER study we aim to search for protective mechanisms against CV events in spite of risk. The project will last several years as these subjects are rare. However, by use of local registers we are confident to find a good number of individuals to match the inclusion criteria for further investigations.

POSTER 30

4634-A-2223

Diagnosis of coronary artery disease by use of random forest and ordinal regression models

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Introduction: Prediction models are the focus of attention in clinical medicine and with recent developments, interest is increasingly diminished in the use of various sources of information. Recent studies have shown that machine learning models provide accurate forecasts in the decision-making process of Coronary Artery Disease (CAD). Many variables are associated with cardiovascular disease and by the way affecting the high risk of a patient being diagnosed with CAD. In this study we investigate several clinical variables affecting the diagnosis of a patient with CAD: chest pain, age, sex, glyated hemoglobin, triglycerides level, fasting blood glucose, single-nucleotide polymorphisms located in the collagen, smoking history, Alpha-fetoprotein, suffering from hypertension, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol.

Methods/design: The purpose of this study is to increase the accuracy of classifying a patient with potential risk of CAD. Observational study was conducted and 510 participants from two different hospitals were enrolled. Clinical presentations were diagnosed according to their clinical manifestation, electrocardiography characteristics and cardiac biomarkers in terms of: stable angina, unstable angina, acute myocardial infarction. All participants were performed coronary angiography to definitely figure out the numbers of coronary artery stenosis in terms of: none-significant (< 50% stenosis), single, multiple vessels stenosis. The main purpose is to combine all information in such an optimal way to obtain accurate evaluations of a patient diagnosed in one of the three levels of CAD.

Results: Using classification machine learning models such as random forest we looked at the variable importance. Statistical methods such as ordinal regression models are used to estimate the probability of a patient diagnosed with CAD. HbA1c level and ANGINA were significantly associated with the severity of coronary artery diseases. Sex plays an important role in CAD probability diagnosis. Male are more likely to be diagnosed with CAD compared to female. We also observed that predicted probabilities for a male being in 3-rd category of CAD increase by the increase of the HbA1c levels.

Conclusions: In this study, we evaluated the ability of various machine learning algorithms to predict CAD risk evaluation in a patient. Random forest and decision trees gave a better view of variable importance and then using ordinal regression model we achieved the prediction of probabilities for a patient to be diagnosed in one of the three levels of CAD risk (low-medium-high).

POSTER 31

4500-A-2223

In postmenopausal women, lower limb peripheral arterial disease, assessed by ankle-brachial index, may be a strong predictor of cardiovascular risk.

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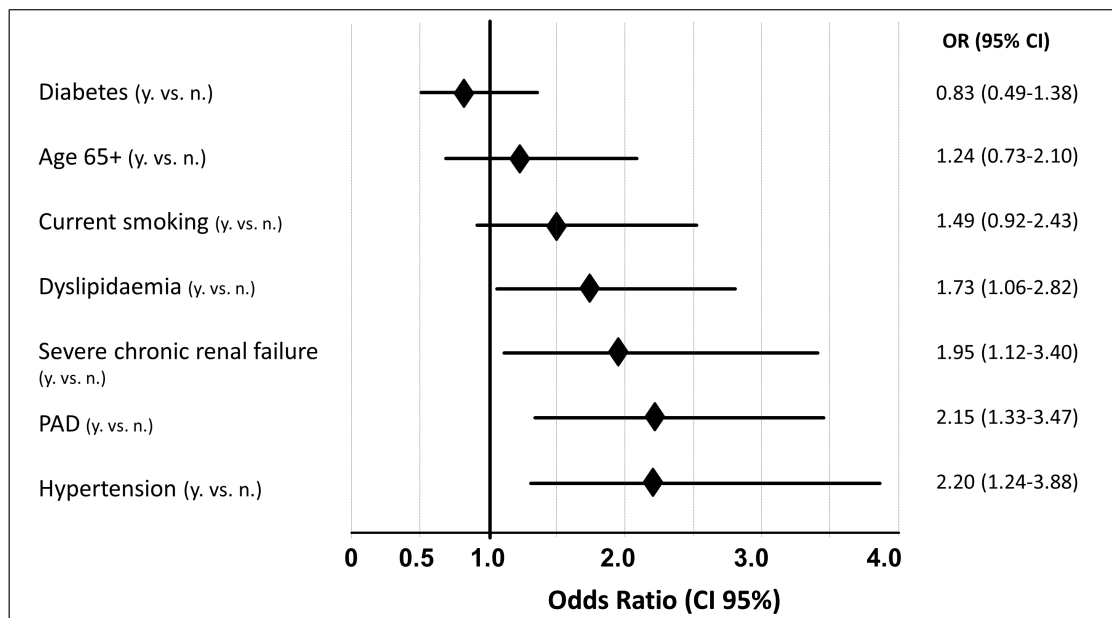
Introduction: Lower limb peripheral arterial disease (PAD) is a leading atherosclerotic disease in the elderly. However, awareness of the disease is poor, particularly in women.

Methods: In this retrospective, cross-sectional study, postmenopausal women referred to our Angiology Division were tested for PAD, defined as an “ankle-brachial index” (ABI) ≤ 0.9 or ≥ 1.4 (in the latter case with a “toe-brachial index” < 0.7), or a history of lower limb arterial revascularization. Aim of our study was to assess cardiovascular (CV) risk profile in postmenopausal women with and without PAD, and to evaluate the role of PAD and six classic CV risk factors (CVRFs), namely age, current smoking, hypertension, dyslipidaemia, severe chronic renal failure, and diabetes in predicting CV disease (CVD), defined as coronary artery disease and/or cerebrovascular disease.

Results: Overall, 850 patients were included, 39.4% of whom with PAD. Compared with women without PAD, those with PAD were older (75.2 vs 66 years, respectively; $p < 0.001$), and displayed higher rates of other CVRFs ($p < 0.001$ for each). A personal history of CVD was reported in 18.8% of women with PAD and in 6.1% of those without PAD ($p < 0.001$). At multivariate regression analysis, PAD (odds ratio [OR]: 2.15; 95% confidence interval [CI]: 1.33-3.47), and hypertension (OR: 2.20; 95%CI: 1.24-3.88) were the strongest factors associated with CVD presence (Figure 1).

Conclusion: PAD is a strong marker of CVD in this selected series of postmenopausal women. If confirmed in the general population, PAD screening through ABI calculation may be considered for CV risk assessment in postmenopausal women.

Figure 1. Association between both PAD and major CVRFs and CVD at multiple logistic regression analysis.



CI: confidence interval; OR: odds ratio; PAD: peripheral arterial disease.

POSTER 32

4618-A-2223

Predictors of Recurrent Bleeding after Hospitalization for Gastrointestinal Bleeding with Oral Anticoagulants: a 2-Year Prospective Follow-up Study

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Clinical course after gastrointestinal (GI) bleeding with oral anticoagulants remains unclear. We performed a prospective observational study in a cohort of 103 patients discharged after being hospitalized for GI major bleeding (MB) or clinically relevant non-major bleeding (CRNMB) while on oral anticoagulant therapy. Main clinical outcomes were GI rebleeding and mortality during a follow-up of 2 years, also comparing the rates of rebleeding and mortality in patients who resumed anticoagulation with those who did not.

During the 2-year follow-up, GI rebleeding occurred in 23 patients (22.3%). Rebleedings were significantly more common among patients who resumed anticoagulation (27.3%) than in those that did not at the time of hospital discharge (7.7%). Death was recorded in 19 patients (18.4%). Most deaths (63.1%) occurred in patients who did not resume anticoagulation upon hospital discharge. More data are needed to confirm these results and to found predictors factors of rebleeding and death.

POSTER 33

4633-A-2223

Evaluation of office and ambulatory central blood pressure by two methods and their changes after lifestyle or MEDmedicallCAL intervention in hypertension

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Background: Central systolic blood pressure (cSBP) can be evaluated in office and also in ambulatory condition, during 24-hour monitoring. The aim of our study was to measure office brachial systolic BP (bSBP) and cSBP in the office and brachial SBP and cSBP in 24-hour setting.

Methods: Office cSBP was measured with PulsePen (PP cSBP), while 24-hour ambulatory brachial SBP (24h bSBP), and cSBP were evaluated with Mobil-O-Graph. For the calculation of 24-hour cSBP both systolic/diastolic and systolic/mean BP calibration methods were considered (24h cSBPC1 and 24h cSBPC2, respectively). In new hypertensive patients (HT) the measurements were repeated 3 months after the initiation of antihypertensive medication. In white-coat hypertensive patients (WhHT) after lifestyle modifications the measurements were repeated at 12 months.

Results: 105 patients were involved with 22 HT and 22 WhHT subjects. bSBP (140.8 ± 17 mmHg) was higher than PP cSBP (128.2 ± 13.1 mmHg, $p < 0.05$). 24h bSBP (128.3 ± 10.3 mmHg) was higher than 24h cSBPC1 (117.8 ± 9.3 mmHg, $p < 0.05$), but equal with 24h cSBPC2 (131.1 ± 11.1 mmHg). For medical intervention bSBP ($\Delta 20.4$ mmHg) and PP cSBP ($\Delta 16$ mmHg) decreased markedly, and 24h bSBP ($\Delta 10.9$ mmHg), 24h cSBPC1 ($\Delta 10.1$ mmHg) and 24h cSBPC2 ($\Delta 9$ mmHg) decreased equally (all $p < 0.05$). For lifestyle changes only bSBP changed significantly ($\Delta 6.2$ mmHg).

Conclusions: These results suggest differences in absolute values of cSBP in office and 24h with different calibrations, but similarities in the changes of the magnitude of cSBP in office and 24-hour with bSBP in the similar settings.

POSTER 34

4584-A-2223

Cerebral blood flow measurements: comparison of phase contrast MRI and color doppler ultrasound

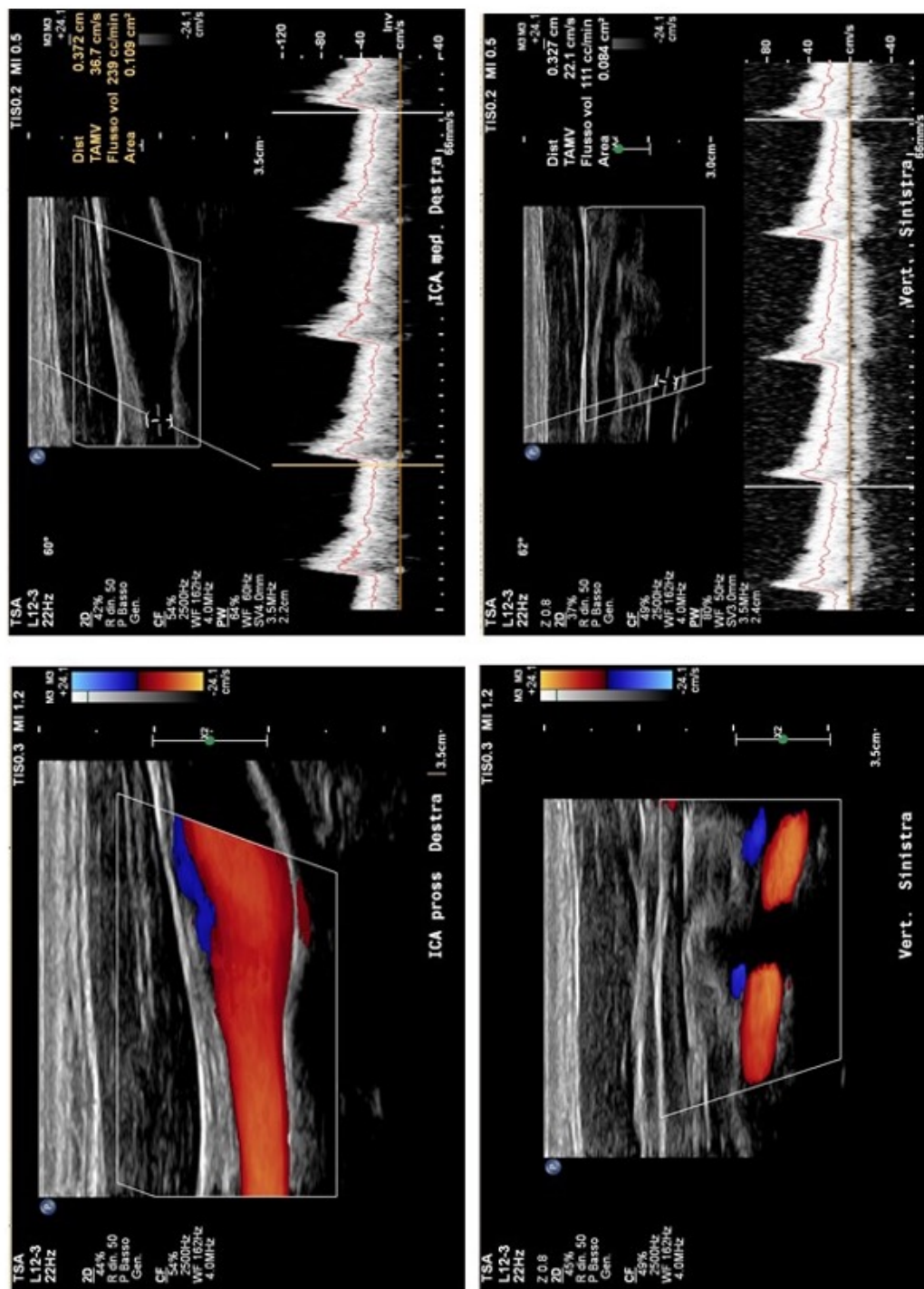
Marcello Mancini, Raffaele Liuzzi

Background: Phase Contrast Magnetic Resonance imaging (PC-MRI) is one of the technique used to measure CBF. Color Doppler ultrasound (CDUS) is wide accessible, non-invasive and low cost technique that can be used for blood flow measurement at level of the extracranial cerebral arteries. The aim of this study is to evaluate the concordance between measurements of CBF performed with PC-MRI and CDUS.

Methods: 96 subject (74 Multiple Sclerosis (MS) patients and 22 Healthy Controls (HCs) underwent CDUS examination and, after about 15 days, a PC-MRI. Internal Carotid arteries (ICa) and Vertebral arteries (Va) Color Doppler examination was performed using a 9-3 MHz transducer. Angle-corrected time-averaged flow velocity and the diameter of the vessels were measured. Blood flow (BF) was calculated as the product of angle-corrected time-averaged flow velocity and the cross-sectional area of the vessel. PC-MRI acquisitions were performed on a 3T scanner. CBF volume was determined as the sum of flow volumes in the ICa and Va of both sides.

Results: A significant difference was found in BF measured with CDUS between Vas with respect to PC-MRI measurements (PC-MRI vs CDUS: left Va $93,2 \pm 39,7$ vs $70,3 \pm 37,0$, $p < 0,001$; right Va $86,4 \pm 41,7$ vs $67,9 \pm 38,1$, $p < 0,001$). No difference was found for ICa (left $232,7 \pm 51,3$ vs $236,1 \pm 60,3$, $p = 0,726$; right $235,8 \pm 49,8$ vs $241,7 \pm 57,9$, $p = 0,372$). A significant correlation was found between CDUS and PC-MRI Blood flow measurements. Bland-Altman plots showed no apparent bias in the differences on ICAs BF measured with PC-MRI and CDUS.

Conclusions: The data presented here suggest that CDUS is not reliable in evaluating Vas flow. ICa BF measurement is more accurate and therefore, it can be proposed the use of only extracranial internal carotid arteries examination to evaluate CBF. These data provide a basis for the clinical application of CDUS measurement at the bedside to monitor CBF modifications.



Internal Carotid artery and Vertebral artery color Doppler images in longitudinal plan (a e c) and measurements of blood flow with Doppler pulsed wave spectral analysis (b e d).

POSTER 35

4614-A-2223

Feasibility and characterization of ApoE^{-/-}Fbn1C1039G^{+/-} mouse model of vulnerable plaque, by high frequency ultrasound

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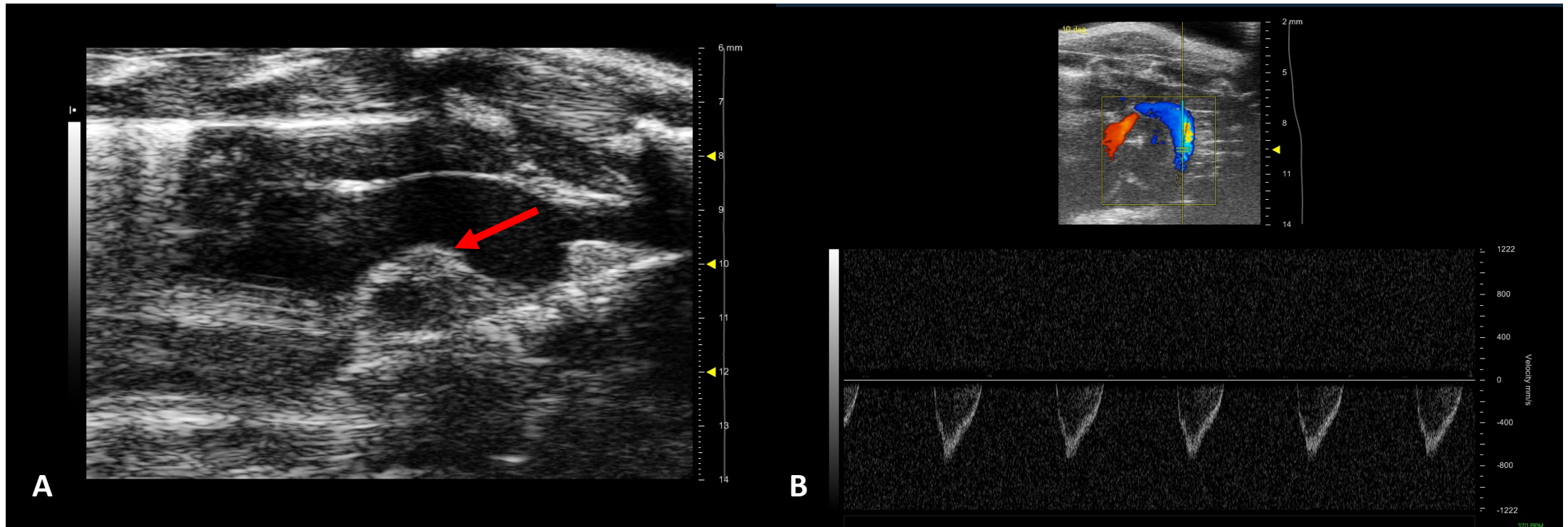
Introduction: Atherosclerotic cardiovascular disease is one of the main causes of mortality in the western world. However, current imaging techniques used to observe arterial stenosis, provided limited information about vulnerable atherosclerotic plaques responsible for the majority of acute vascular incidents. Mouse models of atherosclerosis are an essential tool to investigate plaque progression from stable to vulnerable, as well as plaque rupture and acute complications. Apolipoprotein E^{-/-} Fibrillin1C1039G^{+/-} (ApoE^{-/-}Fbn1C1039G^{+/-}) mice (double knockout, DKO) under high fat diet developed atherosclerotic lesions including neoangiogenesis, hemorrhages, spontaneous ruptures and sudden death for acute complications. These genetic mutations result in fragmentation of vessel wall elastic fibers, increased arterial stiffness and, in association with dyslipidemia and hypercholesterolemic diet, lead to highly unstable plaques. The aim of this study is characterizing a mouse model of atherosclerotic plaques by noninvasive preclinical imaging.

Material & methods: Preclinical Imaging using High Frequency Ultrasound (Vevo 2100, VisualSonics, Toronto, Canada), allows to perform morphofunctional and molecular evaluation of cardiovascular, renal, and hepatic features of DKO. Ultrasonographic cardiac parameters and pulse wave velocity measurement in the aortic arch were collected from 8 to 20 weeks of high fat diet in 10 mice DKO and compared to 10 mouse model of stable plaque, ApoE^{-/-}.

Results & Conclusions: This study has proven the feasibility and the sensibility of high frequency ultrasound in detailed description of the mouse model of vulnerable plaques. The application of noninvasive method as well as the use of animal model are valid tools to investigate mechanisms of plaque vulnerability, and to test new diagnostic and risk stratification tools, or therapeutic strategies.

Motz JT, et al. In vivo Raman spectral pathology of human atherosclerosis and vulnerable plaque. J Biomed Opt. 2006

Lee L, et al. Aortic and Cardiac Structure and Function Using High-Resolution Echocardiography and Optical Coherence Tomography in a Mouse Model of Marfan Syndrome. PLoS ONE. 2016



HFUS of mouse aortic arch in $\text{ApoE}^{-/-}/\text{Fbn1}^{\text{C1039G}+/+}$ after 13 weeks of high fat diet A) B-mode of atherosclerotic plaque (arrow) ; B) Pulsed wave velocity of descending arch for measuring aortic stiffness in mice

POSTER 36

4501-A-2223

Body composition assessment by dual-energy X-ray absorptiometry: A useful tool for the diagnosis of lipedema.

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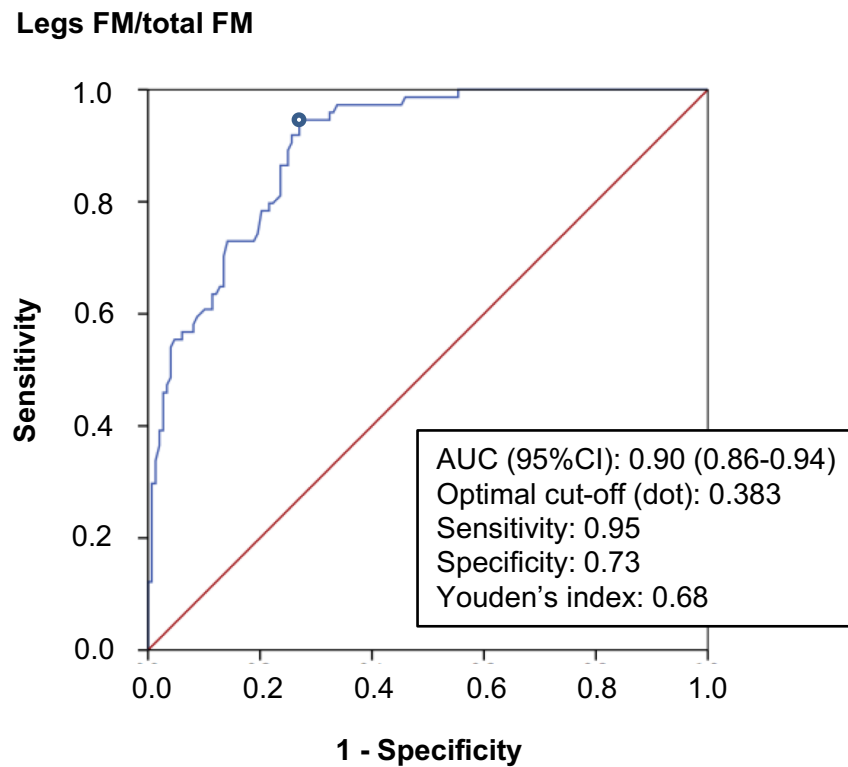
Introduction: Lipedema is a poorly known condition. Diagnosis is based almost exclusively on clinical criteria, which may be subjective and not always reliable. This study aimed to determine cutoff values of fat mass (FM) indices in patients with lipedema and healthy controls to provide an additional tool for the diagnosis of this condition.

Methods: In this single-center case-control study at Lausanne University Hospital, Switzerland, women with clinically diagnosed lipedema underwent regional body composition assessment by dual-energy X-ray absorptiometry (DXA). The control group without clinical lipedema was matched for age and body mass index (BMI) at a ratio 1:2 and underwent similar examination. Regional FM (legs, arms, trunk, and head/neck, android and gynoid FM) was measured in (kg) and divided by BMI (kg/m²), FM index (FMI, kg/m²), and total FM (kg). The trunk/legs and android/gynoid ratios were calculated. For all DXA-derived indices of FM distribution, we defined the receiver operating characteristic (ROC) curves, calculating the area under the curve (AUC), sensitivity, specificity, and Youden's index.

Results: We included 222 women (74 with lipedema and 148 controls). Overall, the mean age was 41 years (standard deviation [SD] 11) and mean BMI was 30.9 kg/m² (SD 7.6). A statistically significant difference was observed for all DXA-derived indices of FM distribution between groups, except for arm FM/BMI, trunk FM/BMI, arm FM/FMI, and arm FM/total FM. The ROC curve analysis of legs FM/total FM, as a potential indicator of lipedema, resulted in an AUC of 0.90 (95% confidence interval 0.86-0.94). According to Youden's index, optimal cut-off value identifying patients with lipedema was 0.384. Sensitivity and specificity were 0.95 and 0.73, respectively (Figure 1).

Conclusions: Body composition assessment by DXA and particularly calculation of the legs FM/total FM index is a simple tool that may help clinicians ruling out lipedema in doubtful cases.

Figure 1. AUC and optimal cut-off value obtained from ROC curve analysis of legs FM/total FM index as an indicator of lipedema.



AUC: area under the curve; BMI: body mass index; CI: confidence interval; FM: fat mass.

POSTER 37

4645-A-2223

Glomerular filtration rate estimated from cystatin C and creatinine performance in predicting arterial stiffness after a 17-year follow-up in the urban Swedish population

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Background: This study aims to define the relationship between vascular aging and early stages of chronic kidney disease (CKD) in a Swedish urban population with 17 years of follow-up. The impact of eGFR based on either creatinine or cystatin C, or in combination, on aortic stiffness later in the lifetime is studied.

Methods: 5049 participants from Malmö Diet and Cancer Study that underwent baseline examination (1991-1996) and later participated in the cardiovascular arm (MDCS-CC) (2007-2012) are evaluated. Only those with measured plasma creatine and plasma cystatin C at the baseline are enrolled. eGFR is calculated using six different cystatin C (eGFR_{CYS}) and creatinine (eGFR_{CR}) equations: Chronic Kidney Disease Epidemiology Collaboration 2012 (CKD-EPICR, CKD-EPICYS, CKDCR-CYS), eGFR_{CYS} based on Caucasian, Asian, pediatric, and adult cohorts (CAPA), the Lund-Malmö revised equation (LMrev), the Modified Full Age Spectrum formula (EKFC). Carotid intima-media thickness at baseline is also analyzed. Aortic stiffness was measured as carotid-femoral pulse wave velocity (cfPWV) after the mean follow-up of 17 years.

Results: This is an ongoing study whose results will be summarized in September 2022. cfPWV subgroups is classified according sex-specific quartiles: 1st quartile (Q1) – women [5.3-8.7], men [5.93-8.96]; 2nd quartile (Q2) – women [8.71-9.9], men [8.97-10.36]; 3rd quartile (Q3) – women [9.91-11.5], men [10.37-12.15]; and 4th quartile (Q4) – women [11.51-20.8], men [12.16-24.53]. So far, multiple linear regression analysis with log-transformed cfPWV as a dependent variable show better performance of eGFR_{CR}, e.g., LMrev, predicting cfPWV in men. Hence, in men, lower creatinine-based eGFR is independently significantly associated with higher cfPWV (Table 5). While in women, the results are contradicting, revealing that slightly higher LMrev was associated with higher cfPWV.

Conclusion: We show so far that out of six different eGFR equations, only LMrev could show the relationship with arterial stiffness after 17 years of follow-up in men. Interestingly, cystatin C-based eGFR could not confirm the same pattern.

POSTER 38

4518-A-2223

Evaluation of long-term effects of antihypertensive treatment on vascular function in relation to blood pressure control in primary hypertension: results from the Doxazosin-Ramipril study

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Introduction: Arterial stiffness and endothelial dysfunction are associated with increased cardiovascular risk. There are few studies evaluating long-term effects of extended antihypertensive treatment on structural and functional vascular changes in primary hypertension. The aim of this long-term follow up was to evaluate indices of arterial stiffness and endothelial function in relation to blood pressure (BP) control in well controlled hypertension. Second, we compared the effects of treatment blocking the renin-angiotensin system to other medications.

Methods: Hypertensive patients (n=31, age 61±13 years, 42% women) initially randomized double blind to ramipril or doxazosin for 3 months, were re-evaluated after an open long-term 81±13 months follow-up. Aortic BP, pulse wave velocity (PWV), and augmentation index (Aix) were assessed by pulse wave analysis (SphygmoCor), endothelial dependent and independent function by forearm post-ischemic flow-mediated vasodilation (FMD), and by glyceryl trinitrate, respectively.

Results: Brachial and aortic systolic BP were reduced from 0 to 81 months (150±11 to 138±16 and 140±16 to 129±16 mm Hg, by -12±3, P<0.001, and -11±3 mm Hg, P=0.003; mean ±SEM). There were small changes in PWV and Aix, which occurred already at 3 months. Endothelium independent vasodilatation increased (3.6±1.7 %; P=0.039) whereas FMD remained unchanged. Carotid-femoral PWV related to aortic systolic BP (r=0.42, P=0.035), brachial systolic BP (r=0.40, P=0.048), and aortic pulse pressure (r=0.40, P=0.049). Aix related to aortic pulse pressure (r=0.43, P=0.017) and aortic/brachial pulse pressure ratio (r=0.56, P=0.001). No long-term differences in relation to treatment blocking the renin-angiotensin system were observed.

Conclusion: Treatment was efficient to maintain BP control also during long-term follow up. PWV was reduced early and persisted at long-term follow up, when the expected increases in PWV with advancing age were accounted for. Endothelium independent vasodilation improved, possibly reflecting structural remodelling by treatment. Further studies of long-term treatment effects on structural vascular changes in hypertension are warranted.

POSTER 39

4652-A-2223

Aortic stiffness modelling using high-resolution photoplethysmography and single-lead ECG

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Introduction: Aortic stiffness is an independent predictor of cardiovascular risk and is critically involved in the development of cardiovascular disease. It is, however, rarely applied in clinical practice as it requires complicated methodology, time and expensive equipment. We assessed whether high-resolution photoplethysmography (PPG) and single-lead ECG, both methods readily available in healthcare and consumer devices, could be used to assess aortic stiffness.

Methods: Simultaneous recordings of infrared PPG (earlobe and index finger), single lead ECG (PowerLab, ADInstruments) at 1000 Hz were made in 33 subjects and repeated within 2 wks. Carotid-femoral pulse wave velocity (cfPWV, SphygmoCor, AtCor Medical) and aortic pulse wave velocity (aoPWV, Arteriograph, Tensiomed) were measured as references.

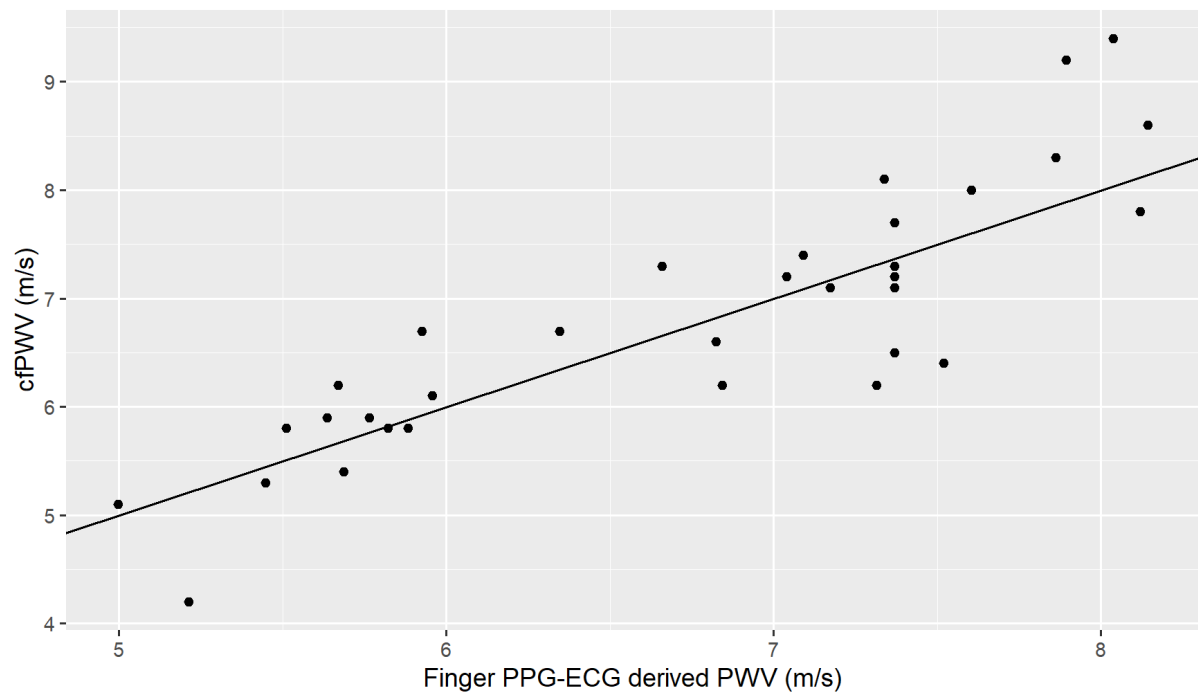
Pulse wave analysis extracted 23 PPG features previously associated with arterial stiffness, which in different combinations with body height and ECG were used in modelling of cfPWV and aoPWV. Visit 1 was used for training and visit 2 for testing.

Results: Mean age was 44 (range 21–66) ys, 19 were men, and 5 had hypertension; office BP was 119±12/72±9 mmHg. PWV measures were comparable at visit 1 and 2 (cfPWV 6.74±1.17 vs 6.80±1.18 m/s; aoPWV 7.66±1.80 vs 7.55±1.52 m/s).

The top earlobe PPG-ECG based models showed moderate prediction of both cfPWV (root mean square error, RMSE, 0.93 m/s, mean average error, MAE, 0.75 m/s and $r^2=0.45$) and aoPWV (RMSE 1.24 m/s, MAE 0.79 m/s and $r^2=0.32$). Finger PPG-ECG based models performed better and showed strong prediction of both cfPWV (RMSE 0.59 m/s, MAE, 0.46 m/s and $r^2=0.75$) and aoPWV (RMSE 0.89 m/s, MAE 0.68 m/s and $r^2=0.69$).

Conclusion: High-resolution PPG in combination with single-lead ECG, advanced feature extraction and modelling can be used to assess aortic stiffness. Assessing aortic stiffness with these readily available methods may facilitate cardiovascular risk evaluation and improve treatment and prognosis.

Prediction of cfPWV using finger PPG-ECG



POSTER 40

4644-A-2223

Usefulness of the Metabolic Score for the Insulin Resistance Index in Assessing the Risk of Increased Arterial Stiffness in Middle-Aged Adults With Metabolic Syndrome

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Background: The Metabolic Score for Insulin Resistance (METS-IR) is a non-insulin-based metabolic index used as a substitution marker of insulin resistance and cardiometabolic risk. The main objective of this study was to evaluate the association between METS-IR and arterial parameters among the middle-aged Lithuanian population with metabolic syndrome.

Methods: A total of 4945 subjects (2408 women and 2537 men) with metabolic syndrome were enrolled. Anthropometric, laboratory, and main arterial parameters (carotid-femoral pulse wave velocity (cfPWV), carotid intima-media thickness (CIMT), ankle-brachial index (ABI), cardio-ankle vascular index (CAVI)) along with cardiovascular risk factors were evaluated.

Results: The prevalence of abnormal arterial stiffness measured by ABI was 5.0%, by CIMT – 34.1%, by CAVI – 16.3%, and by cfPWV – 13.3%. After stratifying subjects into METS-IR quartiles, we observed statistically significant differences in all arterial parameters among METS-IR quartiles. After adjustment of covariates, we observed that participants in the top level had a 2.655-fold risk of low ABI ($p = 0.024$) compared with those from the bottom level, and a 0.381-fold risk of abnormal CAVI ($p < 0.001$). However, analysis by gender revealed the risk of abnormal CAVI only among women (0.337-fold, $p = 0.002$), and the risk of low ABI only among men (2.909-fold, $p = 0.045$). Men also had a 2.090-fold risk of abnormal CIMT ($p = 0.005$). Multiple logistic regression models between normal and borderline categories of cfPWV, and CAVI showed significant differences between the first and the fourth quartiles of METS-IR for both sexes (1.656-fold for cfPWV in men and 1.796-fold in women ($p < 0.05$), 0.309-fold for CAVI in men and 0.360-fold in women ($p < 0.001$)).

Conclusion: METS-IR can be used as an independent predictor of increased arterial stiffness measured by CAVI for women, and CIMT and ABI for men among the middle-aged Lithuanian population with metabolic syndrome.

POSTER 41

4649-A-2223

Measuring aortic stiffness during atrial fibrillation; A validation

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¹ Danderyd Hospital

Background: Aortic stiffness may predict atrial fibrillation (AF), even better than blood pressure (BP) levels, but since we lack validated methods to examine aortic stiffness in ongoing AF the reasons for these findings are still unclear. This study aimed to investigate the reliability of measuring aortic stiffness in AF.

Material and Methods: Patients with persistent atrial fibrillation were investigated with the Arteriograph and the SphygmoCor to measure carotid-to-femoral Pulse Wave velocity (cfPWV) and Aortic augmentation Index (AIx) before and after electrical cardioversion (ECV). Paired samples t-tests were performed to compare these variables in AF and sinus rhythm (SR). To control for rhythm-dependent changes in BP and HR, linear regressions were performed, with the difference of MAP and HR in AF and SR as covariates.

Results: 40 patients were included with a mean age of 64±8 years, 25% females and 43% with hypertension. There was no difference in cfPWV between AF and SR using Arteriograph (10.1±1.5 vs 10.0±1.8 m/s, p=0.52). A rhythm-dependent difference for cfPWV was found with the SphygmoCor (9.3±1.8 vs 8.5±1.6 m/s, p<0.001). When measuring AIx, an increase was observed after ECV for both methods (Arteriograph; 20.1±13.3 vs 29.2±12.6%, p<0.001, SphygmoCor; 18.1±9.1 vs 24.9±9.0%, p<0.001). For the Arteriograph, the results for cfPWV were not dependent on changes in BP and HR (MAP; p=0.32, HR; p=0.22). With SphygmoCor changes in BP but not HR did impact the results (MAP; p=0.01, HR; p=0.22).

Conclusion: With the Arteriograph, cfPWV can be reliably measured during AF and can be used in further studies to establish the role of aortic stiffness in AF. The automatised Arteriograph shows advantages to the golden standard SphygmoCor. AIx, a measure dependent on central blood pressure, changes with rhythm for both methods, but further studies are needed to establish underlying mechanics for these findings.

Key words: Aortic stiffness; atrial fibrillation; Arteriograph; SphygmoCor; pulse wave velocity.

POSTER 42

4493-A-2223

Relationship between central artery stiffness and new adiposity indexes in Spanish men

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Introduction: Central artery stiffness (AS) is commonly used parameter for detecting subclinical atherosclerosis. Several adiposity indexes can be used to estimate obesity. The objective was to investigate the association between central AS with adiposity indices in Spanish men.

Methods: This cross-sectional study was conducted in a consecutive sample of 158 men (67 with AS) without peripheral arterial disease (age mean 56.68 ± 12.81), who had lived in Cáceres (Spain). Six adiposity indexes, including the body mass index (BMI), body shape index (ABSI), body roundness index (BRI), conicity index (CI), weight-adjusted-waist index (WWI) and waist-to-height ratio (WHtR) were investigated. Central AS was measured by carotid-femoral pulse wave velocity (cfPWV) with Complior® device (Artech Medical, Pantin, France) according to the recommendations. Central AS was considered if $cfPWV \geq 10$ m/s.

Results: Between adiposity indexes studied, cfPWV correlated with BMI ($r=0.176$; $p=0.027$), ABSI ($r=0.368$; $p<0.001$), BRI ($r=0.384$; $p<0.001$), CI ($r=0.417$; $p<0.001$), WWI ($r=0.464$; $p<0.001$) and WHtR ($r=0.384$; $p<0.001$). Comparison of adiposity indexes according to the presence of central AS ($cfPWV \geq 10$ m/s), gave significant differences in all the indexes assessed ($p<0.05$). After adjusting by age, sex, smoking and level of physical activity, these differences are maintained, except for BMI. According to the ROC analyses, WWI provided the largest area under the curve ($AUC=0.734$; $p<0.001$), and BMI showed the lowest value ($AUC=0.621$; $p=0.010$).

Conclusions: All new adiposity index have been related with central AS. Men with central AS obtained higher values. WWI was the best adiposity index for estimating central AS.

This work was supported by GR21043 founded by Consejería de Economía, Ciencia y Agenda Digital of Junta de Extremadura (Spain).

POSTER 43

4494-A-2223

Association between new anthropometric indexes and carotid intima media thickness (cIMT) in Spanish men

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Background: Carotid artery intima-media thickness (cIMT) is commonly used parameter for detecting subclinical atherosclerosis. Several anthropometric indexes can be used to estimate obesity. The objective was to determine the relationship between cIMT with new anthropometric indices to predict obesity in Spanish men.

Methods: This cross-sectional study investigated a consecutive sample of 500 men without peripheral arterial disease (age mean 62.83 ± 11.4), who had lived in rural areas of Cáceres (Spain). Seven obesity indexes, including the body mass index (BMI), body shape index (ABSI), abdominal volume index (AVI), body roundness index (BRI), conicity index (CI), weight-adjusted-waist index (WWI), and waist-to-height ratio (WHtR) were investigated. Carotid ultrasonography was performed with the patient in supine decubitus and the neck slightly hyperextended, following the recommendations of the Mannheim Consensus. The cIMT was measured automatically with the equipment's specific software. cIMT value higher than 0.9 was considered carotid subclinical atherosclerosis.

Results: Between anthropometric indexes assessed, cIMT correlated with ABSI ($r=0.245$; $p<0.001$), AVI ($r=0.176$; $p<0.001$), BRI ($r=0.251$; $p<0.001$) CI ($r=0.263$; $p<0.001$) and WWI ($r=0.311$; $p<0.001$), but no BMI ($r=0.049$; $p=0.276$). Comparison of adiposity indexes according to the cIMT value (cIMT<0.9 vs cIMT \geq 0.9), gave significant differences ($p<0.05$), except for BMI. After adjusting by age, sex, smoking and level of physical activity, these differences are maintained. According to the ROC analyses, WWI provided the largest area under the curve (AUC=0.662; $p<0.001$), and BMI showed the lowest value (AUC=0.510; $p=0.725$).

Conclusions: All new adiposity index, except BMI, have been association with cIMT. Men with carotid subclinical atherosclerosis obtained higher values. WWI was the best adiposity index for estimating central carotid subclinical atherosclerosis.

Funding: This work was supported by GR21043 founded by Consejería de Economía, Ciencia y Agenda Digital of Junta de Extremadura (Spain).

POSTER 44

4512-A-2223

Decreased serum levels of irisin predicted heart failure in patients with Type 2 diabetes mellitus

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Presentation cancelled by authors

POSTER 45

4523-A-2223

Improvement of predictive utility of natriuretic peptide for heart failure with preserved ejection fraction with apelin in Type 2 doabetes mellitus patients

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Presentation cancelled by authors

POSTER 46

4638-A-2223

Multi-district vascular pathology: Multidisciplinar managment

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Presentation cancelled by authors

POSTER 47

4526-A-2223

Critical upper limb ischemia

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Presentation cancelled by authors

POSTER 48

4527-A-2223

Syphilitic pseudoaneurysm with dual vascular location

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Presentation cancelled by authors

POSTER 49

4528-A-2223

Anti phospholipid syndrome revealed by arterial occlusion

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Presentation cancelled by authors

POSTER 50

4479-A-2223

What is the role for extended anticoagulant prophylaxis in post-hospitalized COVID-19 CV-risk patients? A retrospective cohort study

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Presentation cancelled by authors

POSTER 51

4535-A-2223

Safety and efficacy of rivaroxaban for extended-phase anticoagulation of patients with unprovoked or recurrent venous thromboembolism. Real life data from the MAC-Project

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Presentation cancelled by authors

POSTER 52

4636-A-2223

Oral Porphyromonas gingivalis and Fusobacterium nucleatum Abundance in Subjects in Primary and Secondary Cardiovascular Prevention

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Presentation cancelled by authors

POSTER 53

4586-A-2223

Chronic limb ischemia with no revascularization option: Multidisciplinary management and results of a day hospital cohort offering at an hospital angiology unit

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Presentation cancelled by authors

POSTER 54

4635-A-2223

Influence of non-HDL-C levels on Carotid Intima-Media Thickness in healthy individuals and patients with co-morbidities

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Influence of non-HDL-C levels on Carotid Intima-Media Thickness in healthy individuals and patients with co-morbidities

Presentation cancelled by authors

POSTER 55

4642-A-2223

A simulation study for monitoring of blood viscosity using nano scale biomedical system

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Presentation cancelled by authors

POSTER 56

4521-A-2223

Lunar cycle, seasonal variation, and prevalence of symptomatic carotid artery stenosis presentations: Correlation or coincidence? A single center report

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Presentation cancelled by authors

POSTER 57

4539-A-2223

Safety of antithrombotic therapy in patients with hereditary hemorrhagic telangiectasia: Updated data from the Gemelli hospital prospective study

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Presentation cancelled by authors

POSTER 58

4495-A-2223

Prevalence and predictive value of the thrombin-antithrombin complex levels in patients with abdominal aortic aneurysm and peripheral arterial disease undergoing endovascular interventions

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Presentation cancelled by authors

POSTER 59

4496-A-2223

High platelet reactivity and low platelet response to aspirin in patients with peripheral artery disease treated with percutaneous transluminal angioplasty (PTA) of the arteries of lower limbs

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Presentation cancelled by authors

POSTER 60

4639-A-2223

Endothelial dysfunction in obstructive sleep apnea.

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Presentation cancelled by authors

POSTER 61

4619-A-2223

Successful endovascular treatment for May-Thurner syndrome complicated with left iliofemoral thrombosis

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Presentation cancelled by authors

POSTER 62

4620-A-2223

Endovascular repair of carotid pseudoaneurysm after carotid endarterectomy: a case report

Nadia Moulahi, Chaker Jaber , Imtinene Ben Mrad , Mouna Bousnina , Amine Jemel, Karim Kaouel

Presentation cancelled by authors

POSTER 63

4621-A-2223

Endovascular management of a ruptured popliteal artery aneurysm in a patient with Behçet's disease

Nadia Moulahi, Chaker Jaber , Imtinene Ben Mrad , Mouna Bousnina , Amine Jemel, Karim Kaouel

Presentation cancelled by authors

POSTER 64

4623-A-2223

Solitary plexiform neurofibroma of the neck differential diagnosis of carotid paraganglioma

Nadia Moulahi, Rim Miri, Bilel Derbel, Zied Daoued , Taoufik Kalfat, Raouf Denguir

Presentation cancelled by authors

POSTER 65

4627-A-2223

Post-COVID-19 patients show vascular sequelae that last up to 6 months

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Presentation cancelled by authors

POSTER 66

4509-A-2223

Atypical iliac vein compression syndrome (AIVCS) due to A vertebral spondylophyte

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Presentation cancelled by authors

POSTER 67

4538-A-2223

Effects of gastrointestinal resection and ostomy surgery on the plasma concentration of Apixaban.

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Presentation cancelled by authors

POSTER 68

4499-A-2223

Upper extremity deep vein thrombosis in cancer patients: Our experience

Maria Amitrano, Francesca Cannavacciuolo, Mariagrazia Nunziata, Natalina Iuliano, Valeria Iorio, Mariangela Raimondo, Giuseppe Antignani, Sara Mangiacapra

Presentation cancelled by authors

POSTER 69

4637-A-2223

A rare case of mesenteric thrombosis

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Presentation cancelled by authors

POSTER 70

4502-A-2223

Coronary arteriovenous fistula with congenital peripheral arteriovenous malformation in a 20-year old: A serendipity or a mystery?

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Presentation cancelled by authors