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### **P189: IDENTIFYING PTPN14-DEPENDENT MECHANISMS THAT INFLUENCE CLINICAL MANIFESTATIONS OF HEREDITARY HEMORRHAGIC TELANGIECTASIA**

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## P188

## EFFECTS OF RADIOTHERAPY ON LARGE VESSELS IN HODGKIN LYMPHOMA SURVIVORS

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New chemotherapeutic drugs and radiation therapy have significantly improved cancer patient's survival, although the cardiovascular (CV) side effects of cancer treatment are increasingly important. In previous studies, an increased risk of cerebrovascular complications such as stroke and transient ischemic attack was described in patients undergoing neck radiotherapy.

**Aim:** To evaluate vascular carotid structural (IMT, plaque) and functional (carotid stiffness) damage, and changes in arterial stiffness (Carotid-femoral pulse wave velocity; cf-PWV) in Hodgkin Lymphoma survivors previously treated with radiotherapy.

**Patients and methods:** We enrolled 206 Hodgkin lymphoma survivors (mean age  $54 \pm 14$  years, 51% males, mean follow-up of  $9 \pm 6$  years). CV risk factors were investigated and atherosclerotic carotid damage was assessed by standard carotid ultrasound evaluation for intima-media thickness (IMT) measurement (MeanMax-IMT, CBMax, Tmax;  $n = 167$ ); in 141 patients radiofrequency-based carotid stiffness analysis (distensibility; distensibility coefficient, DC; compliance coefficient; CC) was also performed. Cf-PWV measurement were obtained in 154 patients.

**Results:** A significant correlation between radiotherapy dose and: MeanMax-IMT ( $r = 0.20$ ;  $p < 0.05$ ), Tmax ( $r = 0.20$ ;  $p < 0.05$ ), distensibility ( $r = 0.24$ ;  $p < 0.05$ ), DC ( $r = 0.24$ ;  $p < 0.05$ ), CC ( $r = 0.24$ ;  $p < 0.05$ ) was observed. Patients were divided into 4 groups according to radiotherapy dose (Dose: 20–30; 31–36; 37–42; >42 Gy). An increase in Tmax ( $1.27 \pm 0.61$ ,  $1.35 \pm 0.59$ ,  $1.46 \pm 0.69$ ,  $1.76 \pm 1.12$  mm,  $p$  for trend  $< 0.05$ ) and in the prevalence of carotid plaque (29%, 31%, 47% and 55%,  $p$  for trend  $< 0.05$ ) was observed as related to dose-category. One-hundred-seventeen patients received neck irradiation (67 bilateral; 50 unilateral). In unilaterally irradiated patients, MeanMaxIMT was greater in the irradiated side as compared to unirradiated carotid artery and the difference reached statistical significance in the group of patients who received a high radiotherapy dose ( $0.97 \pm 0.35$  vs  $0.92 \pm 0.34$   $p < 0.05$ ). Cf-PWV was significantly greater only in patients that received high dose (>42 Gy), as compared to all the other dose groups ( $9.7 \pm 2.3$  vs  $8.3 \pm 2.2$ ,  $8.0 \pm 1.5$  and  $8.3 \pm 1.4$ ,  $p < 0.05$ ).

**Conclusions:** In this large number of HL survivors, carotid IMT, plaque prevalence and aortic and carotid stiffness were significantly related with radiotherapy doses. Carotid IMT, carotid and aortic stiffness were significantly higher in the irradiated carotid arteries, but only at doses >42 Gy, suggesting that there may be a dose threshold for radiotherapy-induced carotid wall damage.

## P189

## IDENTIFYING PTPN14-DEPENDENT MECHANISMS THAT INFLUENCE CLINICAL MANIFESTATIONS OF HEREDITARY HEMORRHAGIC TELANGIECTASIA

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Hereditary Hemorrhagic Telangiectasia (HHT) is a genetic disorder caused predominantly by loss of a single allele of *ENG* (HHT1) or *ACVRL1* (HHT2). Global incidence is about 1 in 5,000. Clinical manifestations include cutaneous, mucosal and/or gastrointestinal (GI) tract telangiectases that can cause severe epistaxis or GI bleeding. Some patients (10–50%) develop arteriovenous malformations (AVMs) in the lung, brain or liver. We previously showed that genetic variants of *PTPN14* (Phospho-Tyrosine Phosphatase Non-Receptor Type 14) genetically associate with the presence of lung AVMs. Homozygous loss of *PTPN14* has also been reported to cause lymphedema due to lymph EC hyperplasia.

Other studies, in tumor epithelial cells, show that *PTPN14* can dephosphorylate b-catenin, modulate HIPPO signaling and regulate tyrosine kinase receptor turnover through endosomal pathways.

To investigate its role in ECs and its interactions with the endoglin/ACVRL1 axis, we studied the effect of *PTPN14* knock down on differential expression of components of BMP9 and TGF- $\beta$  signaling pathways in primary human umbilical artery ECs (HUAEC). *PTPN14* expression had no effect on pSmad2/3 or pSmad1/5/8 activation but affected protein levels of VEGFR2 and EphrinB2. *PTPN14* may thus act on a network of interacting signaling pathways,

including endoglin and ACVRL1, by regulating cell surface receptor presentation and endocytic turnover.

Studies are ongoing to address this issue in greater molecular detail. Elucidating the molecular mechanisms involved should contribute to a better understanding of the molecular pathology of HHT, and the regulation of angiogenesis versus stabilization of the vascular bed.

## P190

## CARDIOVASCULAR DISEASE IN AXIAL SPONDYLOARTHRITIS

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**Objectives:** To estimate the state of the brachiocephalic trunk in patients with axial spondyloarthritis (SpA) and the relationship of changes with the clinical manifestations of the underlying disease.

**Material and methods:** 55 patients with a diagnosis of axial spondyloarthritis were examined. The average age was  $35 \pm 0.8$  years, the duration of the disease was  $5 \pm 0.45$  years. The criterion for exclusion was the presence of clinical manifestations of diseases of the cardiovascular system (CVS). Control group in the amount of 20 people, corresponding to the sex and age, without clinical manifestations of diseases from the musculoskeletal system and CVS. All patients underwent a duplex study of the brachiocephalic trunk.

**Results:** Investigation of the intima-media vessel complex (IMC) as an indicator of the thickness of the subendothelial layers of the intima and / or muscle layer of the media is an early marker of the atherosclerotic process. The thickness of IMC was higher in patients with axial SpA ( $0.75 \pm 0.05$  mm) compared with the control group ( $0.68 \pm 0.08$  mm). The incidence of carotid plaque was higher than in the control group (40% vs. 28%,  $p < 0.05$ ). The presence of plaque was most often observed in patients with a longer duration of the disease, with hip joint damage, syndesmophytes, a higher limited functional capacity of the joints in the BASFI and BASMI indices.

**Conclusion:** The asymptomatic course of cardiovascular damage justifies the need for mandatory duplex research of the brachiocephalic trunk patients with axial spondyloarthritis.

## P191

## AORTIC STIFFNESS AND INFLAMMATION IN INFLAMMATORY BOWEL DISEASES: AN INDIVIDUAL PARTICIPANT DATA META-ANALYSIS

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**Importance:** The finding that aortic pulse wave velocity (aPWV) is increased may explain why patients with inflammatory bowel disease (IBD) have an increased cardiovascular risk despite the low prevalence of classic cardiovascular risk factors.

**Objective:** To determine why these patients have an increased aPWV.

**Data sources:** A systematic literature search for aPWV in IBD was performed using PubMed, Scopus, Web of Science, and Google Scholar databases.

**Study selection:** Inclusion criterion was peer-reviewed publications on clinical studies reporting original data.

**Data extraction and synthesis:** This study followed PRISMA-IPD 2015 guidelines. Data were provided for 4 cohorts in 3 countries (151 participants with ulcerative colitis [UC], 159 with Crohn disease [CD], and 227 controls). Using aPWV, cohort-specific z-scores were calculated after  $\log_e$ -transform and combined in meta-analysis to form pooled effects using a random-effects model.

**Main outcome and measures:** The aPWV, a reference measure of aortic stiffness, after adjusting for age, sex, mean blood pressure, known cardiovascular risk factors, and study of origin.

**Results:** The pooled z-score was 1.2 m/s. The aPWV was dependent on CD ( $\beta$  0.80 z-score [1.0 m/s], 95% confidence interval 0.61–1.00 z-score,  $P < 0.001$ )