

# **ABSTRACT BOOK**

## **Bleeding, Thrombosis, and Vascular Liver Diseases**

An EASL meeting organised by

Virginia HERNÁNDEZ-GEA  
Ton LISMAN  
Pierre-Emmanuel RAUTOU  
Erica VILLA

## Contents

### ORAL ABSTRACT PRESENTATIONS

OS-1-1-YI Anticoagulation improves overall survival in patients with cirrhosis and portal vein thrombosis: Individual patient data meta-analysis (important study).....	4
OS-1-2-YI Factor VIII/protein C ratio independently predicts liver-related events but does not indicate a hypercoagulable state in patients with advanced chronic liver disease .....	6
OS-1-3-YI Pre-operative tranexamic acid treatment enhances pro-regenerative hepatic fibrin (ogen) deposition in a mouse model of failed liver regeneration.....	8
OS-1-4 Procedural related bleeding in patients with liver disease (PROC-BLeeD)- interim results of a prospective multicenter study.....	9

### POSTER ABSTRACT PRESENTATIONS

PO-1-1 Evaluation of efficacy and safety of splenic artery embolization versus endoscopic treatment for secondary prophylaxis of variceal bleedings 12	
PO-1-2-YI Portal vein thrombosis is not associated with increased mortality or excess decompensation in cirrhosis patients: a case control study .....	13
PO-1-3-YI Performance of ten non-invasive liver function tests in predicting six-week mortality in acute variceal bleeding .....	14
PO-1-4-YI The peculiarities of the management of a patient with ischemic stroke in Rendu-Osler-Weber disease .....	15
PO-2-1-YI Assessment of liver stiffness measurement and ultrasound findings change during inotuzumab ozogamicin cycles for relapsed or refractory acute lymphoblastic leukaemia .....	16
PO-2-2 A rare cause of acute liver failure associated with Acquired thrombophilia .....	18
PO-2-3-YI Prediction of esophageal variceal rebleeding in cirrhosis using the P2/MS non-invasive index based on complete blood counts .....	19
PO-2-4 Shear stress influences the biological properties of pericytes-like cells .....	20
PO-2-5-YI Assessing the bleeding risk after liver biopsy using new clinical and biological tools: a prospective analysis of 306 procedures.....	21
PO-3-1 Management of adult patients with extrahepatic portal vein obstruction .....	22
PO-3-2 Non-cirrhotic portal hypertension in people living with HIV infection: significant progression to end stage liver disease .....	23
PO-3-3-YI Non-cirrhotic portal hypertension in a patient with protein C and S deficiency. A case report .....	24
PO-3-4-YI Red Cell Distribution Width as A Predictor of Outcome in Hospitalized Cirrhotic Patients.....	26
PO-4-1-YI Prevalence and associated factors of ascitic decompensation in patients with acute variceal bleeding .....	27
PO-4-2-YI Liver fibrosis markers as predictors of recurrent variceal bleeding in cirrhosis .....	28
PO-4-3-YI Association of C-type lectin-like receptor 2 and galectin-1 with portal venous system thrombosis in liver cirrhosis .....	29

PO-4-4-YI Performance of albumin, bilirubin and platelets criteria to predict the absence of high-risk esophageal varices .....	30
PO-4-5-YI Performance of bleeding risk scores in predicting mortality in acute variceal bleeding.....	31
PO-5-1-YI The efficacies and risks comparisons between direct oral anticoagulants and low molecular weight heparin or warfarin in both cirrhotic and non-cirrhotic portal vein thrombosis patients: systematic review and meta-analysis.....	32
PO-5-2-YI Improvement in portal vein thrombosis clot volume is associated with improved overall survival in cirrhosis patients with PVT: a justification for treatment? .....	33
PO-5-3-YI Impact of asymptomatic superior mesenteric vein thrombosis on the survival of patients with liver cirrhosis.....	34
PO-5-4-YI Safety and efficacy of direct oral anticoagulants (DOACs) in Budd-Chiari Syndrome (BCS)-an Austrian multicenter study .....	35
PO-5-5-YI Clinical significance of substantially elevated von Willebrand factor antigen levels in patients with advanced chronic liver disease .....	36
PO-6-1-YI Upper gastrointestinal bleeding in cirrhosis: predictive factors of recurrence.....	38
PO-6-2 Thrombophilia profile in patients with extrahepatic portal vein obstruction (EHPVO) .....	39
PO-6-3-YI Impact of prothrombin and factor V leiden mutations on the progression of fibrosis in patients with chronic hepatitis C .....	41
PO-6-4 Divergencies in macrophage activation markers soluble Cd163 and mannose receptor in patients with non-cirrhotic and cirrhotic portal hypertension.....	42
PO-7-1-YI Coagulopathy is not predictive of bleeding in patients with acute decompensation of cirrhosis and acute-on-chronic liver failure.....	44
PO-7-2-YI Natural history and clinical impact of non-neoplastic portal vein thrombosis in cirrhotics with hepatocellular carcinoma.....	45
PO-7-3-YI Invasive and non-invasive staging of Fontan-associated liver disease: The Valdig prospective Fonliver cohort .....	46
PO-7-4 High plasma thrombomodulin level indicated poor prognostic of liver cirrhosis: a prospective cohort study .....	48
PO-7-5-YI Impact of porto-systemic vein shunting on non-alcoholic liver disease and hepatocellular carcinoma development in a high fat diet mouse model.....	50
PO-8-1-YI A non-invasive diagnosis of oesophageal varices in patients with compensated liver cirrhosis.....	52
PO-8-2-YI The associations among von willebrand factor, ADAMTS13, and factor VIII with non-malignant portal vein thrombosis incidence: systematic review and meta-analysis.....	54
PO-8-3 The role of the cellular components of blood in platelet activation.....	55
PO-8-4 Portosinusoidal vascular disease and common variable immunodeficiency.....	57
PO-8-5 Potential role of cellular component of blood in ADP induced platelet aggregation ..	58

# ORAL ABSTRACT PRESENTATIONS

## OS-1-1-YI

### Anticoagulation improves overall survival in patients with cirrhosis and portal vein thrombosis: Individual patient data meta-analysis (important study)

Antonio Guerrero<sup>1</sup>, Laura Del campo<sup>2</sup>, Fabio Piscaglia<sup>3</sup>, Thomas Reiberger<sup>4</sup>, Guohong Han<sup>5</sup>, Francesco Violi<sup>6</sup>, Carlos Alberto Costa Noronha Ferreira<sup>7</sup>, Tellez luis<sup>1</sup>, Juan Carlos Garcia Pagan<sup>8</sup>, Tomás Artaza Varasa<sup>9</sup>, Dominique Valla<sup>10</sup>, Vincenzo La Mura<sup>11</sup>, Angelo Luca<sup>12</sup>, Carol Stanciu<sup>13</sup>, Marco Senzolo<sup>14</sup>, Lucio Amitrano<sup>15</sup>, François Durand<sup>16</sup>, Stefanescu Horia<sup>17</sup>, Bernhard Scheiner<sup>4</sup>, Stefania Basili<sup>18</sup>, Marta Magaz<sup>8</sup>, Filipe Gaio Castro Nery<sup>19</sup>, Sylvie Chevret<sup>20</sup>, Massimo Primignani<sup>11</sup>, Irina Girleanu<sup>13</sup>, Javier Zamora<sup>2</sup>, Agustin Albillos<sup>1</sup>

<sup>1</sup>Hospital Universitario Ramón y Cajal, Instituto Ramón y Cajal de Investigación Sanitaria (IRYCIS), CIBEREHD, Department of Gastroenterology and Hepatology, Madrid, Spain, <sup>2</sup>Hospital Universitario Ramón y Cajal (IRYCIS), CIBER Epidemiology and Public Health (CIBERESP), Clinical Biostatistics Unit, Madrid, Spain, <sup>3</sup>Azienda Ospedaliero Universitaria S.Orsola Malpighi, Department of Medical and surgical sciences, Bologna, Italy, <sup>4</sup>Medical University of Vienna, Vienna Hepatic Hemodynamic Lab, Division of Gastroenterology and Hepatology, Vienna, Austria, <sup>5</sup>Xijing Hospital, Fourth Military Medical University, Department of Liver Disease and Digestive Interventional Radiology, Xi'an, China, <sup>6</sup>Sapienza University, Department of Internal Medicine and Medical Specialties, Rome, Italy, <sup>7</sup>Hospital de Santa Maria-Centro Hospitalar Universitário Lisboa Norte, Serviço De Gastreenterologia e Hepatologia, Lisbon, Portugal, <sup>8</sup>Institut de Malalties Digestives i Metabòliques, Hospital Clínic-Institut de Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), CIBEREHD, University of Barcelona, Hepatic Hemodynamic Lab, Liver Unit, Barcelona, Spain, <sup>9</sup>Hospital Universitario de Toledo, Gastroenterology Department, Toledo, Spain, <sup>10</sup>Hôpital Beaujon, APHP, Clichy; and CRI-UMR 1149, Université de Paris and Inserm, Service d'Hépatologie, Clichy, France, <sup>11</sup>Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Angelo Bianchi Bonomi Hemophilia and Thrombosis Center and Fondazione Luigi Villa, Milano, Italy, <sup>12</sup>Mediterranean Institute for Transplantation and Advanced Specialized Therapies (IRCCS-ISMETT), Radiology Service, Department of Diagnostic and Therapeutic Services, Palermo, Italy, <sup>13</sup>University of Medicine and Pharmacy "Gr. T. Popa", Iasi, Romania, <sup>14</sup>Padova University Hospital, Multivisceral Transplant Unit, Gastroenterology, Padova, Italy, <sup>15</sup>Ospedale A Cardarelli, Gastroenterology Unit, Naples, Italy, <sup>16</sup>Hospital Beaujon, Hepatology and Liver Intensive Care, Clichy, France, <sup>17</sup>Regional Institute of Gastroenterology and Hepatology "O Fodor", Gastroenterology Department, Cluj-Napoca, Romania, <sup>18</sup>Sapienza-University of Rome, Department of Internal Medicine and Medical Specialties, Rome, Italy, <sup>19</sup>Instituto de Ciências Biomédicas Abel Salazar-Universidade do Porto, Porto, Portugal, <sup>20</sup>APHP, Hôpital Saint-Louis, Paris University, HUSLW Service de biostatistiques et information médicale, Paris, France

Email: [agustin.albillos@uah.es](mailto:agustin.albillos@uah.es)

**Background and aims:** The use of anticoagulation in patients with cirrhosis and portal vein thrombosis (PVT) is controversial. Observational series and aggregate-data meta-analysis have proven the safety and efficacy of anticoagulation to yield portal vein recanalization, but it is unknown whether this benefit translates into a survival improvement. Existing aggregated data meta-analysis are limited by the difficulties to adjust by confounders and by their cross-sectional nature. We conducted an individual patient data (IPD) meta-analysis to assess the efficacy of anticoagulation on overall survival and portal vein recanalization in patients with cirrhosis and PVT.

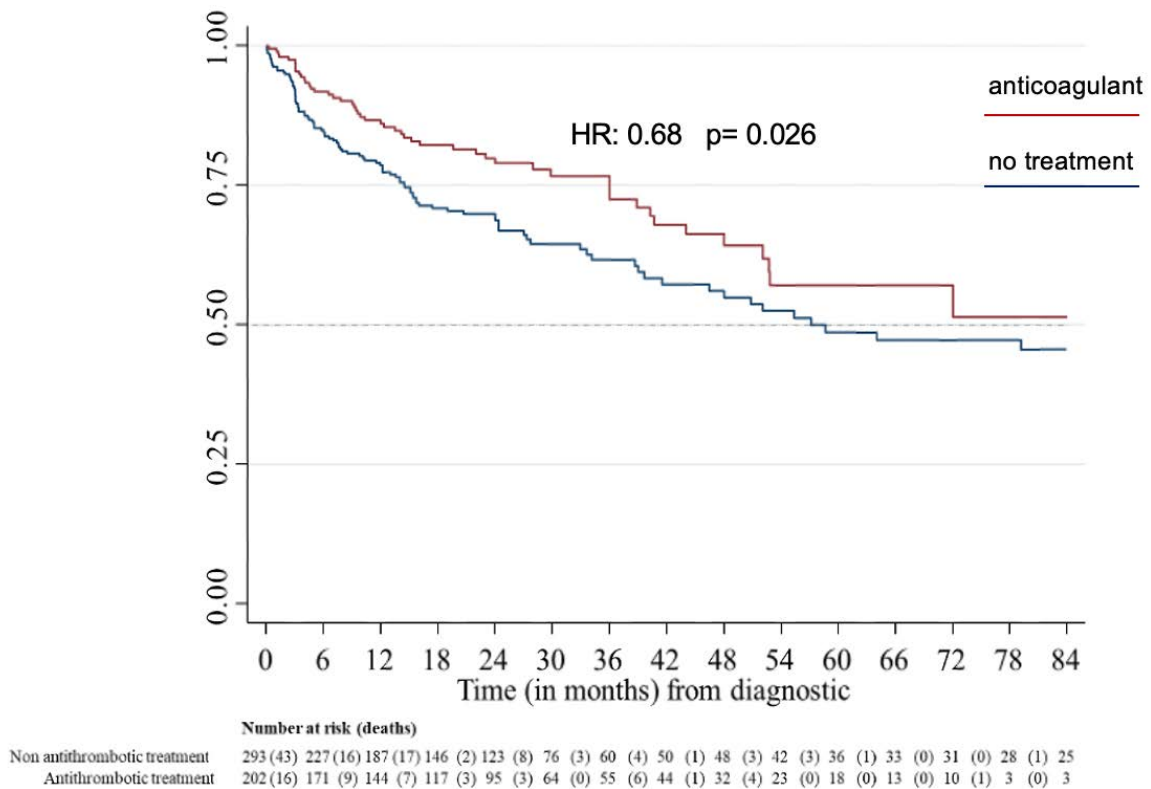
**Method:** Two review authors performed the literature search up to 1st June 2020. We included studies that compared the efficacy of anticoagulation [low molecular-weight heparin (LWMH)/Warfarin] vs. no treatment in cirrhosis with PVT. We used a one-stage meta-analysis for overall survival and thrombus recanalization. Mortality was analyzed as a time-to-event variable with Hazard Ratios (HR) calculated by a multilevel mixed-effects model with random-intercepts for studies. Thrombus recanalization was analyzed by mixed-effects logistic regression. All analysis were adjusted for age,

Child-Pugh, etiology, and PVT location and extension. Survival was described with Kaplan-Meier curves (PROSPERO registration #CRD42020140026)

**Results:** Five studies with a total of 500 patients assessed the effect of anticoagulants (n = 205) vs. no treatment (n = 295). During a median follow-up of 25.0 months (95%CI 15-52), 115 patients (39%) died in the no treatment group and 53 (25.8%) in the anticoagulant group. Anticoagulation increased overall survival (HR: 0.68, 95%CI 0.48-0.95, p = 0.026) (Figure). Recanalization, partial or complete, was more frequent in patients on anticoagulants (61.4 vs. 37.2%; OR 3.2, 95%CI 2.12-4.88, p = 0.000). Recanalization was independent of the anticoagulation type (LWMH: OR 2.7, 95%CI 1.53-4.77, p = 0.001 and VKA: OR 2.8, 95%CI 1.24-6.34, p = 0.013). The effect of anticoagulation on survival was independent of portal vein recanalization, as shown by the interaction analysis (p = 0.703)

**Conclusion:** Treatment with anticoagulants increases overall survival in patients with cirrhosis and PVT. The beneficial effect of anticoagulation is independent of portal vein recanalization.

Figure:



## OS-1-2-YI

### Factor VIII/protein C ratio independently predicts liver-related events but does not indicate a hypercoagulable state in patients with advanced chronic liver disease

Lorenz Balcar<sup>1 2</sup>, Bernhard Scheiner<sup>1 2</sup>, Rosa Johanna Nußbaumer<sup>1</sup>, Johanna Weinzierl<sup>1</sup>, Rafael Paternostro<sup>1</sup>, Benedikt Simbrunner<sup>1 2</sup>, Lukas Hartl<sup>1 2</sup>, Mathias Jachs<sup>1 2</sup>, David JM Bauer<sup>1 2</sup>, Albert Stättermayer<sup>1 2</sup>, Georg Semmler<sup>1 2</sup>, Matthias Pinter<sup>1</sup>, Prof. Peter Quehenberger, MD<sup>3</sup>, Michael Trauner<sup>1</sup>, Thomas Reiberger<sup>1 2</sup>, Ton Lisman<sup>4</sup>, Mattias Mandorfer<sup>1 2</sup>

<sup>1</sup>Medical University of Vienna, Department of Internal Medicine III, Division of Gastroenterology and Hepatology, Vienna, Austria, <sup>2</sup>Medical University of Vienna, Vienna Hepatic Hemodynamic Lab, Vienna, Austria, <sup>3</sup>Medical University of Vienna, Department of Laboratory Medicine, Vienna, Austria, <sup>4</sup>University of Groningen, Department of Surgery, Surgical Research Laboratory and Section of Hepatobiliary Surgery and Liver Transplantation, Groningen, Netherlands

Email: [lorenz.balcar@meduniwien.ac.at](mailto:lorenz.balcar@meduniwien.ac.at)

**Background and aims:** Thrombomodulin-modified thrombin generation assay (TM-TGA) results indicate a hypercoagulable state in patients with advanced chronic liver disease (ACLD) which may contribute to disease progression. The ratio of procoagulant factor VIII to anticoagulant protein C (FVIII/PC) has been suggested to reflect the haemostatic equilibrium as it correlates with *ex-vivo* thrombin generation. Moreover, FVIII/PC predicted decompensation and death in a small study not accounting for portal hypertension (PH) severity.

We investigated (i) the prognostic value of FVIII/PC (outcome-cohort) and (ii) whether FVIII/PC reflects the hypercoagulable state (as assessed by thrombomodulin-modified thrombin generation assay; TM-TGA-cohort) in patients undergoing hepatic venous pressure gradient (HVPG)-measurement.

**Methods:** (i) The outcome-cohort comprised n = 515 patients with evidence of advanced chronic liver disease (ACLD, liver stiffness measurement [LSM]≥10kPa and/or HVPG≥6mmHg) who were stratified according to clinical stage (CS): Probable compensated ACLD (cACLD):LSM≥10kPa-HVPG<6mmHg, CS0:cACLD-HVPG6-9mmHg, CS1:cACLD-HVPG≥10mmHg, CS2:decompensated ACLD (dACLD) with variceal bleeding, CS3:dACLD with non-bleeding decompensation, and CS4:≥2 decompensations.

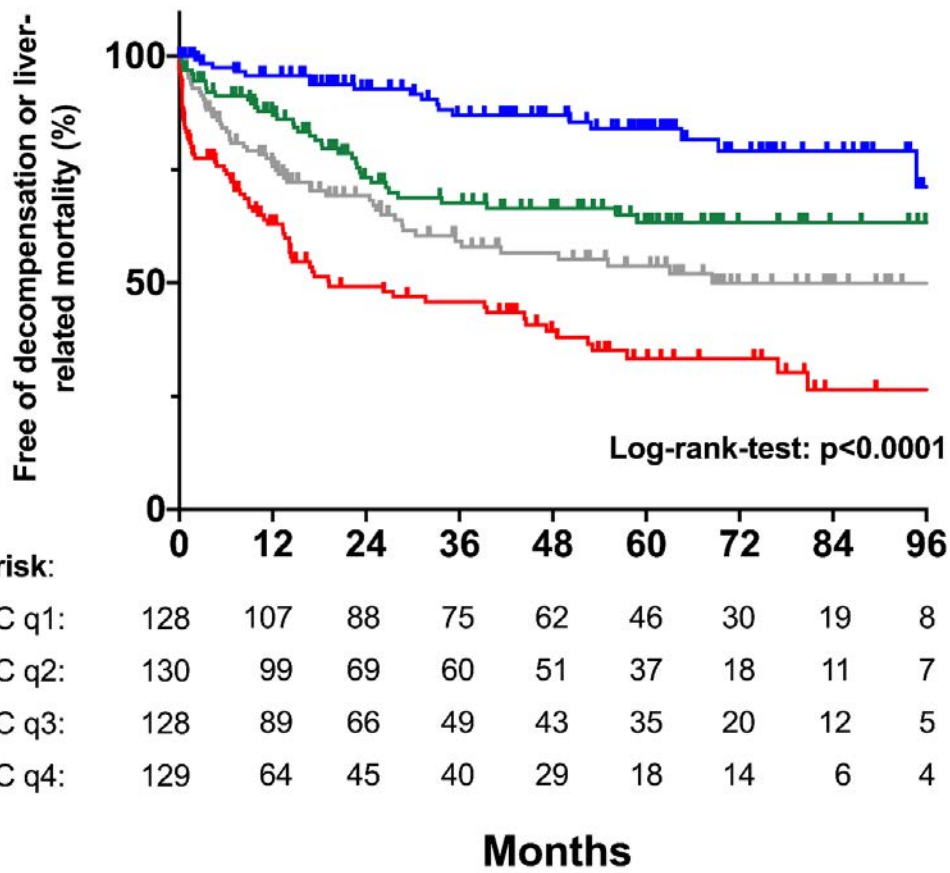
**Results:** (i) FVIII/PC significantly increased across CS (probable cACLD:2.1[IQR:1.7-2.8], CS0:2.4[1.9-3.5], CS1:3.2[2.6-4.7], CS2:3.1[2.7-3.8], CS3:4.0[3.1-5.9], and CS4: 4.1[3.2-6.4]; p < 0.001) as well as HVPG (p < 0.001) and MELD (p < 0.001) strata. Interestingly, FVIII/PC (aHR:1.06[95%CI:1.01-1.11]; p = 0.010) remained independently associated with decompensation/liver-related mortality, even after extensive multivariable adjustment.

(ii) FVIII/PC showed a weak positive correlation with endogenous thrombin potential in TM-TGA (Spearman's  $\rho = 0.265$ ; p = 0.001), but this association disappeared after adjusting for severity of liver disease.

**Conclusion:** FVIII/PC increases with CS, PH severity, and liver dysfunction. Even after adjusting for these factors, it remained a robust prognostic indicator. This should not be mistaken as evidence for the concept of hypercoagulability as a driver of disease progression, as the correlation between FVIII/PC and thrombin generation is confounded by liver disease severity, and thus, FVIII/PC does not reflect the haemostatic balance.

Figure:

— q1: <2.56   
 — q2: 2.56-3.53   
 — q3: 3.53-5.07   
 — q4: ≥5.07





## OS-1-3-YI

# Pre-operative tranexamic acid treatment enhances pro-regenerative hepatic fibrin (ogen) deposition in a mouse model of failed liver regeneration

Dafna Groeneveld<sup>1</sup>, Zimu Wei<sup>1</sup>, Lauren Poole<sup>1</sup>, James Luyendyk<sup>1 2 3</sup>

<sup>1</sup>Michigan State University, Department of Pathobiology and Diagnostic Investigation, East Lansing, United States, <sup>2</sup>Michigan State University, Department of Pharmacology and Toxicology, East Lansing, United States, <sup>3</sup>Michigan State University, Institute for Integrative Toxicology, East Lansing, United States

Email: [groene12@msu.edu](mailto:groene12@msu.edu)

**Background and aims:** Failed liver regeneration after partial hepatectomy can lead to serious complications including post-hepatectomy liver failure (PHLF). Coagulation cascade activation and hepatic fibrin (ogen) deposition drives intrahepatic platelet accumulation essential for liver regeneration after standard (i.e., 2/3<sup>rd</sup>) partial hepatectomy (PHx) in mice. Notably, failed hepatic fibrin (ogen) deposition is linked to development of PHLF in patients. The mechanisms for this failure are poorly understood, in part, because 2/3<sup>rd</sup> PHx in mice is not associated with failed liver regeneration. Aim: We tested the hypothesis that early coagulation activation and hepatic fibrin (ogen) deposition is disrupted in experimental 90% PHx-induced liver failure.

**Method:** Wild-type C57Bl/6J mice underwent sham surgery, 2/3<sup>rd</sup> PHx or 90% PHx and liver and plasma samples were collected 30 minutes later. In separate experiments, mice were treated with tranexamic acid (1200 mg/kg, i.p.) or vehicle (saline) 1 hour prior to sham or 90% PHx surgery.

**Results:** 2/3<sup>rd</sup> PHx caused an increase in cross-linked hepatic fibrin (ogen) and platelet accumulation, both of which were comparatively attenuated in mice after 90% PHx. The reduction in hepatic fibrin (ogen) deposition in mice after 90% PHx could not be attributed to reduced coagulation activation, as plasma thrombin-antithrombin (TAT) complexes were similarly increased in both 2/3<sup>rd</sup> PHx and 90% PHx groups. Intense fibrin (ogen) labelling was evident in the liver sinusoids after 2/3<sup>rd</sup> PHx. In contrast, hepatic fibrin (ogen) deposition after 90% PHx displayed a more punctuated pattern suggestive of increased local fibrinolysis. Notably, administration of the anti-fibrinolytic drug tranexamic acid prior to surgery increased hepatic deposition of cross-linked fibrin (ogen) in mice undergoing 90% PHx.

**Conclusion:** The results indicate that failed hepatic fibrin (ogen) deposition in mice after 90% PHx is rescued by pharmacologic inhibition of fibrinolysis. The results suggest that tranexamic acid administration may have pro-regenerative potential by rescuing defective hepatic fibrin (ogen) deposition in an experimental setting of failed liver regeneration.

## OS-1-4

### Procedural related bleeding in patients with liver disease (PROC-BLeeD)- interim results of a prospective multicenter study

Nicolas Intagliata<sup>1</sup>, Marina Serper<sup>2</sup>, Jonathan Stine<sup>3</sup>, Justin Boike<sup>4</sup>, Robert Rahmini<sup>5</sup>, Andrew deLemos<sup>6</sup>, Brett Fortune<sup>7</sup>, Jessica Davis<sup>8</sup>, Alberto Queiroz Farias<sup>9</sup>, MARIA DE FATIMA HIGUERA DE LA TIJERA<sup>10</sup>, Ryan Chadha<sup>11</sup>, Nahum Mendez Sanchez<sup>12</sup>, Douglas Simonetto<sup>13</sup>, Neil Shah<sup>14</sup>, Arpan Mohanty<sup>15</sup>, Patrick Northup<sup>1</sup>, Stephen Caldwell<sup>1</sup>

<sup>1</sup>University of Virginia, Medicine, Charlottesville, United States, <sup>2</sup>University of Pennsylvania, Philadelphia, United States, <sup>3</sup>Penn State University, State College, United States, <sup>4</sup>Northwestern University-Lincoln St. Beach, Evanston, United States, <sup>5</sup>Baylor Medical Center, Dallas, United States, <sup>6</sup>Atrium Health Carolinas Medical Center, Charlotte, United States, <sup>7</sup>Weill Cornell Medicine, New York, United States, <sup>8</sup>Veterans Affairs Medical Center, Washington, United States, <sup>9</sup>University of São Paulo School of Medicine, Brazil, <sup>10</sup>Hospital de General De Mexico, Ciudad de México, Mexico, <sup>11</sup>Mayo Clinic, Jacksonville, United States, <sup>12</sup>National Autonomous University of Mexico, Mexico City, Mexico, <sup>13</sup>Mayo Clinic, Rochester, United States, <sup>14</sup>UNC School of Medicine, Chapel Hill, United States, <sup>15</sup>Boston University School of Medicine, Boston, United States

Email: [nmi4d@virginia.edu](mailto:nmi4d@virginia.edu)

**Background and aims:** Patients with cirrhosis are prone to develop complications requiring hospitalizations and invasive procedures. Historically, patients with liver disease were perceived to be at higher risk to bleed. Currently available laboratory studies do not clearly predict risk of bleeding. We are prospectively enrolling hospitalized patients with decompensated cirrhosis to determine predictive factors for bleeding.

**Method:** At present, 10 institutions are actively enrolling patients and approximately 5 institutions are set to begin enrolment. Patients are identified from local cohorts and prospectively enrolled consecutively over designated periods to avoid bias. Data from the medical record are collected regarding patient characteristics, procedure characteristics, and outcomes during the hospitalization. Patients are followed until 28 days, death, liver transplantation, or if undergoing invasive surgery. Bleeding events are recorded and defined according to ISTH definitions of major and clinically relevant non-major bleeding (CRNM). Data are then uploaded into a central database. Three blinded, independent adjudicators review each bleeding event to verify categorization.

**Results:** Enrollment is now active and we anticipate more data and analysis to be available at the time of abstract presentation with updated results available. Currently, data is available from two centers still actively enrolling patients with a total of 223 patients enrolled undergoing a total of 631 procedures (2.8 procedures per patient admission). Mean laboratories at admission include creatinine 1.6 mg/dL (SD 1.2), albumin 2.9 g/dL (SD 0.7), total bilirubin 5.9 mg/dL (SD 8.1), INR 1.8 (SD 0.8), and platelet 130 k/uL (SD 81). At admission, 106 patients (47.5%) were started on medical thromboprophylaxis. Acute kidney injury was present in 92 patients (41.4%) and infection was present in 61 patients (27.5%). A total of 36 different types of procedures have been recorded, with paracentesis (299, 47%) as the most common procedure performed. A total of 14 bleeding events after procedures were identified (14/632, 2.2%). Major bleeding occurred in 6 cases total (6/632, 0.9%).

**Conclusion:** Major procedural related bleeding is rare in hospitalized patients with decompensated cirrhosis. We are currently enrolling patients at multiple centers in North and South America. Expanded and updated results will be presented from all involved centers as data are presently being collected.

**Figure:**

Procedures (n total)	Major bleed	CRNM	Other bleed	% Major bleed
Large volume paracentesis (169)	2	3	0	<b>1.1</b>
Diagnostic paracentesis (130)	0	1	0	<b>0</b>
Central venous catheter (49)	2	1	0	<b>4.0</b>
Dental tooth extraction (7)	0	1	1	<b>0</b>
EGD* (87)	2	0	0	<b>2.2</b>
Percutaneous gastric tube (1)	0	0	1	<b>0</b>

**POSTER  
ABSTRACT  
PRESENTATIONS**

## PO-1-1

# Evaluation of efficacy and safety of splenic artery embolization versus endoscopic treatment for secondary prophylaxis of variceal bleedings

Yurii Kuchin<sup>1</sup>, Pavlo Ivanchov<sup>1</sup>, Sergii Kozlov<sup>1</sup>, Elina Manzhali<sup>1 2</sup>, Valentin Shapovaluk<sup>2</sup>

<sup>1</sup>Bogomolets National Medical University, Kyiv, Ukraine, <sup>2</sup>Verum expert clinic, Kyiv, Ukraine

Email: [elinam@ukr.net](mailto:elinam@ukr.net)

**Background and aims:** An effective prophylactic treatment to prevent further episodes of acute variceal bleeding (AVB) is a high importance task for patients with cirrhosis who have experienced first episode of AVB.

**Method:** In comparative study, we evaluated the effectiveness and safety of endovascular partial splenic artery embolization ( "SAE" or Group 1, n = 117) versus endoscopic treatment ("ET" or Group 2, n = 188) for secondary prophylaxis of AVB in cirrhotic patients. ET group included sclerotherapy (n = 136) and band ligation (n = 52) treatment options. Additionally, patients of both groups were treated with propranolol (the daily dose of 40-60 mg). The end points of our 12 months study in both groups were: presence (or absence) of variceal bleeding episodes within mentioned period of observation, mortality rates (related and not related with AVB). Both groups were well matched with regard to gender proportions, age, endoscopic findings, severity of liver disease. The variables between the two arms were compared using the Fisher's exact test

**Results:** Variceal bleeding recurrence rate in "SAE" group was 47% (55 of 117) and AVB related mortality rate-9.4% (11 of 117). In "ET" group we obtained significantly higher rates of study variables: 69.7% (119 of 188, p < 0.001) and 25.5% (48 of 188, p < 0.01), respectively. Associated with AVB mortality rates were similar in both groups: 3.4% versus 3.2%; (NS).

**Conclusion:** Splenic artery embolization looks preferably to endoscopic prevention modalities for secondary prophylaxis of variceal bleedings. Possible explanation of the obtained results could be in direct influence of SAE procedure on elevated portal pressure and increased platelet count due to partial spleen ablation.

## PO-1-2-YI

### Portal vein thrombosis is not associated with increased mortality or excess decompensation in cirrhosis patients: a case control study

Lauren Carlini<sup>1</sup>, Benjamin Yeager<sup>2</sup>, Jennifer Miller<sup>1</sup>, Feng Su<sup>1</sup>, Prof. Patrick G. Northup, M.D.<sup>1</sup>

<sup>1</sup>University of Virginia, Gastroenterology and Hepatology, Charlottesville, United States, <sup>2</sup>University of Virginia, Medicine, Charlottesville, United States

Email: [le2pf@hscmail.mcc.virginia.edu](mailto:le2pf@hscmail.mcc.virginia.edu)

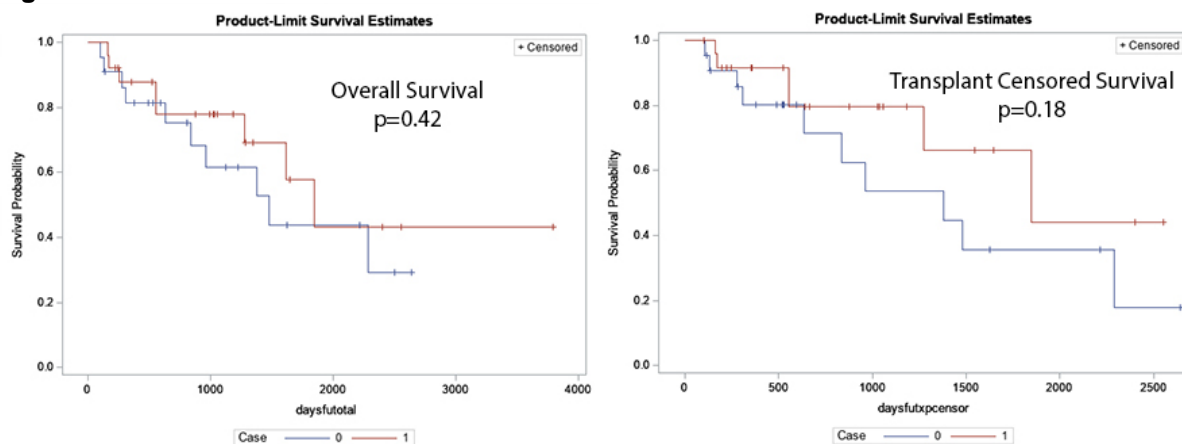
**Background and aims:** Studies on the natural history of portal vein thrombosis (PVT) in cirrhosis suffer from poor characterization of thrombosis and lack of adequate controls. The aim of our study was to investigate the risk of decompensation, all-cause mortality, and liver related mortality in cirrhosis patients after new PVT.

**Method:** A cohort of cirrhosis patients with new PVT on cross-sectional imaging (with or without involvement of the mesenteric and splenic vessels) was retrospectively matched with a concurrent cohort of cirrhosis patients with similar levels of disease severity without PVT over the study time period. Standardized definitions of hepatic decompensation and other clinical outcomes were compared between PVT cases and controls.

**Results:** 25 cases with new onset PVT were compared to 22 controls with persistent portal vein patency with equivalent age, etiology of liver cirrhosis, MELD score, and Child Turcotte Pugh score. 14 (56%) cases had main PV trunk and/or branch involvement only, while the remaining cases involved the mesenteric or splenic vessels. Over a mean follow-up period of 1, 077 days ( $\pm 825$  SD), 19 (76%) of cases with PVT had improvement in clot burden (mean  $-1.76$  ml of less clot burden,  $\pm 2.74$  SD). Compared to controls, the occurrence of PVT did not influence the rate of transplantation ( $p = 0.50$ ) or the time to decompensation (mean 556 days,  $p = 0.46$ ). With censoring at liver transplantation, there was no difference in survival between PVT cases and controls ( $p = 0.18$ ). Similarly, there was no difference in uncensored all-cause survival between groups ( $p = 0.42$ ). In an adjusted competing risks analysis with censoring at liver transplantation, MELD score was independently predictive of survival (HR 1.15,  $p = 0.02$ ) but presence of PVT was not (HR 0.49,  $p = 0.17$ ).

**Conclusion:** In a well characterized matched cohort of cirrhosis patients with and without PVT, there was no association between new onset PVT and time to decompensation, survival to transplantation, or overall all-cause survival. Severity of liver disease was the primary predictor of survival in this study.

Figure:



## PO-1-3-YI

### Performance of ten non-invasive liver function tests in predicting six-week mortality in acute variceal bleeding

Nouha Trad<sup>1</sup>, Mohamed Ghanem<sup>1</sup>, sondes bizid<sup>1</sup>, ben slimen baha<sup>1</sup>, khouloud boughoula<sup>1</sup>, Ben abdallah hatem<sup>1</sup>, Riadh Bouali<sup>1</sup>, Nabil Abdelli<sup>1</sup>

<sup>1</sup>*military hospital of tunis, gastroenterology, Tunisia*

Email: [nouha1med7@gmail.com](mailto:nouha1med7@gmail.com)

**Background and aims:** Acute variceal bleeding (AVB) is a life-threatening complication of portal hypertension.

Our objective was to evaluate the performance of ten non-invasive liver function tests in predicting six-week mortality in AVB.

**Method:** We performed a retrospective analysis of data from consecutive cirrhotic patients hospitalized for an AVB, recruited from January 2010 to December 2019. In addition to the CHILD score, the following scores were calculated: MELD, albumin-bilirubin grade (ALBI), platelet-albumin-bilirubin grade (PALBI), fibrosis-index based on 4 factors (FIB-4), aspartate-aminotransferase-to-platelet ratio (APRI), Lok index, cirrhosis discriminant index (CDS), King's score, Goteborg-University Cirrhosis Index (GUCI), and aspartate-aminotransferase to an alanine-aminotransferase ratio (AAR).

**Results:** A total of 224 patients were included with a mean age of  $61.02 \pm 13.21$  years and a sex ratio of 1.60. Viral infection was the most common etiology of cirrhosis (55.2%), followed by non-alcoholic steatohepatitis (21.3%). During follow-up, these patients were admitted 518 times to our department for decompensation of their disease. One hundred and forty-three admissions were related to AVB (27.6%). The six-week mortality rate was 25.7%. The following scores have been statistically associated with six-week mortality in the case of AVB: FIB-4 ( $p = 0.003$ ), ALBI ( $p = 0, 023$ ), PALBI ( $p = 0, 037$ ), King's score ( $p = 0, 039$ ) and CHILD score ( $p = 0, 043$ ). ALBI had the best area under the curve ROC (AUROC) in predicting six-week mortality (AUROC = 0.804 [95%CI: 0.609-0.999]) followed by PALBI (AUROC = 0.757 [95%CI: 0.490-0.999]) and CHILD score (AUROC = 0.601 [95%CI: 0.331-0.872]). At the cut-off of -1.37, ALBI had a sensibility and specificity of 75%% and 70.3% respectively in the prediction of six-week mortality.

**Conclusion:** In our study, ALBI, PALBI and CHILD score had the best prognostic value in predicting six-week mortality in the case of AVB. These simple, non-invasive tests could be useful in current practice to classify cirrhotic patients and guide management of AVB.

PO-1-4-YI

## The peculiarities of the management of a patient with ischemic stroke in Rendu-Osler-Weber disease

Antonina Antonenko<sup>1</sup>, Kateryna Antonenko<sup>2</sup>

<sup>1</sup>*Bogomolets National Medical University, Department of Internal Medicine 3, Kyiv, Ukraine,*

<sup>2</sup>*Bogomolets National Medical University, Neurology Department, Kyiv, Ukraine*

Email: [antoninaantonenko2@gmail.com](mailto:antoninaantonenko2@gmail.com)

**Background and aims:** Rendu-Osler-Weber disease is a genetic disorder with autosomal dominant inheritance, characterized by widespread cutaneous, mucosal and visceral teleangiectasias.

The aim of this study was to present the genetically confirmed case of Rendu-Osler-Weber disease of 54-year-old woman with ischemic stroke manifestation and to discuss the management of the patient.

**Method:** The patient was admitted to the Neurological department with fluctuating speech disorders and loss of consciousness. From anamnesis: the patient was suffering from epistaxis since childhood, 10 years ago a patient was admitted to the gastroenterological department due to melena. The clinical diagnosis of hereditary hemorrhagic teleangiectasia (HHT) was based on the Curacao criteria and genetic analysis-HHT2 genotype.

**Results:** MRI of the brain revealed multiple ischemic lesions and multiple arteriovenous vascular malformations (VMs). The neurological examination has shown anterograde memory problems. Doppler ultrasound of the liver revealed the dilation of hepatic artery (HA), peak flow velocity (PFV)-84 cm/sec. Echocardiographic evaluation of cardiac function diagnosed systolic dysfunction and pulmonary hypertension. ECG has shown atrial fibrillation, pulse 100-120/min. Among medications we prescribed beta blockers, digoxin, spironolactone. For the management of VMs in the liver we recommended the transarterial embolization. For the secondary stroke prevention we prescribed novel oral anticoagulant-apixaban.

**Conclusion:** The presence of HHT along with the presence of ischemic stroke demands the multidisciplinary collaboration. Doppler ultrasound is the first line imaging for the diagnosis of liver VMs.



## PO-2-1-YI

### Assessment of liver stiffness measurement and ultrasound findings change during inotuzumab ozogamicin cycles for relapsed or refractory acute lymphoblastic leukaemia

Federico Ravaioli<sup>1</sup>, Giovanni Marconi<sup>2,3</sup>, Giovanni Martinelli<sup>3</sup>, Elton Dajti<sup>1</sup>, Chiara Sartor<sup>2</sup>, Maria Chiara Abbenante<sup>2</sup>, Luigina Vanessa Alemanni<sup>1</sup>, Jacopo Nanni<sup>4</sup>, Benedetta Rossini<sup>1</sup>, Sarah Parisi<sup>4</sup>, Luigi Colecchia<sup>1</sup>, Gianluca Cristiano<sup>4</sup>, Giovanni Marasco<sup>1</sup>, Amanda Vestito<sup>1</sup>, Stefania Paolini<sup>4</sup>, Francesca Bonifazi<sup>5</sup>, Antonio Curti<sup>4</sup>, Davide Festi<sup>1</sup>, Michele Cavo<sup>2,4</sup>, Cristina Papayannidis<sup>4</sup>, Antonio Colecchia<sup>6</sup>

<sup>1</sup>IRCCS Azienda Ospedaliero-Universitaria di Bologna Dipartimento di Scienze Mediche e Chirurgiche (DIMEC), Università di Bologna, Bologna, Italy, Italy, <sup>2</sup>IRCCS Azienda Ospedaliero-Universitaria di Bologna Istituto di Ematologia "Seràgnoli" Dipartimento di Medicina Specialistica, Diagnostica e Sperimentale, Università di Bologna, Bologna, Italy, <sup>3</sup>IRCCS Istituto Romagnolo per lo Studio dei Tumori (IRST) "Dino Amadori", Meldola, Italy, <sup>4</sup>IRCCS Azienda Ospedaliero-Universitaria di Bologna Istituto di Ematologia "Seràgnoli" Bologna, Italy, <sup>5</sup>Programma Dipartimentale di Terapie Cellulari Avanzate, IRCCS Azienda Ospedaliero-Universitaria di Bologna, Bologna, Italy, <sup>6</sup>Gastroenterology Unit, Borgo Trento University Hospital, Verona, Italy

Email: [f.ravaioli@unibo.it](mailto:f.ravaioli@unibo.it)

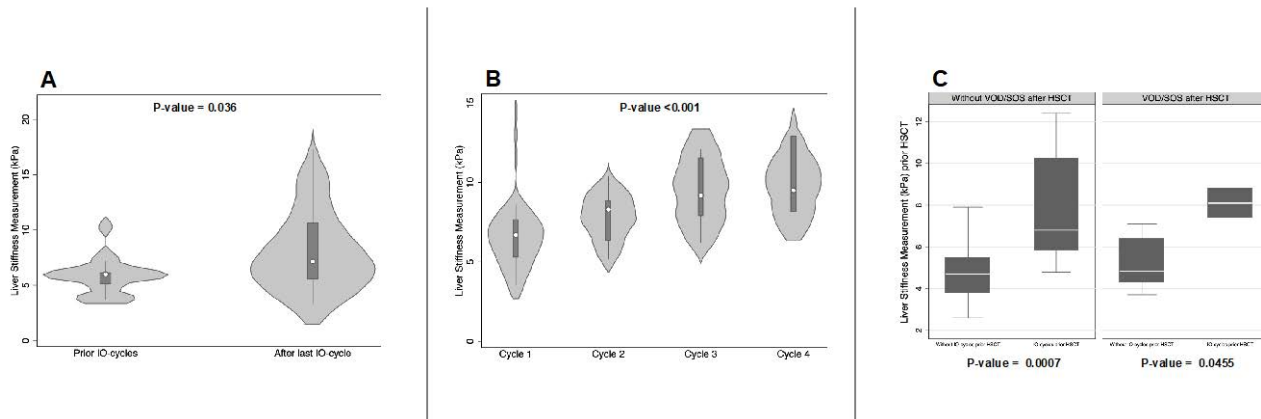
**Background and aims:** Inotuzumab Ozogamicin (IO) is an effective therapy for patients with relapsed or refractory (R/R) acute lymphoblastic leukemia (ALL). IO was linked to increased risk of veno-occlusive disease/sinusoid obstruction syndrome (VOD/SOS), liver injury, and various grade of liver-related complications during clinical trials and real-life settings; however, hepatologic monitoring protocol is not established in this population. Thus, we aimed to investigate the role of specialistic hepatic monitoring, including biochemical, LSM, and US findings, in a cohort of patients with ALL, to evaluate early hepatobiliary and PH-related complications during and after the IO therapy.

**Method:** In our institution, 21 patients who received IO (median of 6 doses of IO administered) for R/R ALL were prospectively followed for hepatologic surveillance, including clinical evaluation, ultrasonography, liver stiffness measurement (LSM), and biochemistry.

**Results:** After a median follow-up of 17.2 months, 2 SOS events were reported (both after allogeneic transplant) as IO potentially related clinically relevant adverse event. Mild alterations were reported in almost the totality of patients and moderate-severe liver biochemical CTC in a quarter of patients. Within biochemical value, AST and ALP showed an augment related to IO administration. LSM linearly augmented for each IO course administered. Baseline LSM was related to liver-related changes, especially with the severity of portal hypertension (PH)-related complications. Pre-transplant LSM was higher in patients receiving IO when compared with a control cohort. PH-related complications were discovered in nearly 77% of patients, with clinically significant PH occurrence and development of ascites in 38% and 14%, respectively.

**Conclusion:** This prospective experience constitutes the rationale to design a hepatologic monitoring program in patients receiving IO. LSM may be of pivotal importance in this program, constituting a rapid and effective screening that quantitatively correlates with liver alterations. We established useful intensive hepatology monitoring in patients treated with IO. Determinate a precise hepatological assessment will improve the safety and long-term outcome of this population. Safety concerns related to inotuzumab can be overwhelmed by careful patient evaluation using non-invasive methods.

**Figure:**



Violin-plot and boxplot of LSM kinetics A) before and after IO-therapy; B) during the IO-cycles; C) before HSCT and by the occurrence of VOD/SOS after HSCT

## PO-2-2

### A rare cause of acute liver failure associated with Acquired thrombophilia

ZANIL YOONUS NIZAR<sup>1</sup>, Jessiya Veliyankodan Parambil<sup>1</sup>

<sup>1</sup>Milton Keynes, Milton Keynes, United Kingdom

Email: [zaniz\\_86@yahoo.com](mailto:zaniz_86@yahoo.com)

**Background and aims:** Paroxysmal Nocturnal haemoglobinuria is a rare cause of thromboembolism due to deficiency of a cell membrane protein on RBC which leaves them prone to Complement system mediated intravascular hemolysis further leading to a hypercoagulable state.

**Method:** We would like to report the case of a 28-year old male who presented with Acute Liver Failure following a 4-day history of altered sensorium, bruising, cola-coloured hematuria, jaundice and abdominal pain.

**Results:** His initial blood results on presentation to the Medical Admissions unit revealed ALT1300, ALP840, Bil230, LDH1100, reticulocytosis, PT46seconds. CT abdomen showed hepatic vein thrombosis extending into IVC with hepatomegaly, splenomegaly and ascites. A diagnosis of Budd Chiari syndrome leading to Acute Liver Failure was established. On further diagnostic workup for thrombophilia and myeloproliferative malignancy, he was diagnosed with PNH as he had the classical triad of intravascular hemolysis, thrombosis and pancytopenia/bone marrow failure. He had workup for Liver transplant during which bone marrow examination and flow cytometry was performed. Bone marrow aspirate revealed hyper-cellular marrow with erythroid hyperplasia but no dysplasia. Flow cytometry analysis was performed using antibodies directed against GPI-anchoring proteins which confirmed a diagnosis of PNH.

**Conclusion:** The patient had initially received medical treatment in the form of anticoagulation therapy but due to worsening clinical and biochemical status he underwent TIPSS and was enlisted as a potential candidate for Liver transplant during which his PNH status came back positive and hence was planned for Eculizumab therapy.

## PO-2-3-YI

### Prediction of esophageal variceal rebleeding in cirrhosis using the P2/MS non-invasive index based on complete blood counts

Fatma Ben Farhat<sup>1</sup>, Mariem Sabbah<sup>1</sup>, Hedi Sellami<sup>1</sup>, Nawel Bellil<sup>1</sup>, Dorra Trad<sup>1</sup>, Norsaf Bibani<sup>1</sup>, Dalila Gargouri<sup>1</sup>

<sup>1</sup>*Habib Thameur Hospital, Gastroenterology, Tunisia*

Email: [fatmabf8@gmail.com](mailto:fatmabf8@gmail.com)

**Background and aims:** Upper gastrointestinal bleeding (UGB) caused by esophageal or gastric variceal rupture is the most dreaded complication of portal hypertension. It is associated with a high mortality rate in cirrhotic patients. The risk of rebleeding persists even after eradication of esophageal varices (EV). Our study aimed to assess the performance of a novel score based on complete blood counts in predicting bleeding recurrence.

**Method:** was performed. The sociodemographic, clinical, laboratory, endoscopic, therapeutic and evolutionary data were collected. We assessed the risk of hemorrhagic recurrence using the following simple P2/MS index:  $(\text{platelet count})^2 / [\text{monocyte fraction (\%)} \times \text{segmented neutrophil fraction (\%)}]$ . Data analysis was carried out by the software SPSS 22.0 (significant p value if  $<0.05$ ).

**Results:** Sixty patients were included in this study. The average age was 63.38 years, the sex ratio 0.8. Twenty-five percent (25%) of the patients had post hepatitis B or C virus cirrhosis. The cirrhosis was decompensated in twelve patients (20%). The gastrointestinal bleeding was inaugural in 35% of cases. EV were present in 93.3% and gastric varices in 40% of patients. Seventy-three percent underwent elastic band ligation with a good control of the bleeding in 75% of cases. Biological glue injection was performed on 10% of cases. A bleeding recurrence was recorded in 20 patients. Twelve of them had the recurrence after eradication of EV within an average of 18 months. To differentiate the risk for rebleeding, we divided the patients into two subgroups according to their P2/MS value (subgroup 1:  $P2/MS \geq 15$  and subgroup 2:  $P2/MS < 15$ ). The risk was significantly higher in subgroup 2 ( $p = 0.04$ ). The area under the curve for this score was 0.7, better than the Child Pugh (0.62) and the MeldNA (0.56).

**Conclusion:** According to our study, The P2/MS is a reliable predictor for the risk of EV rebleeding among patients with cirrhosis. According to risk stratification, a close monitoring should be considered for the subgroup with a  $P2/MS < 15$ .

## PO-2-4

### Shear stress influences the biological properties of pericytes-like cells

Giulia Bertani<sup>1</sup>, Fabiola Milosa<sup>1</sup>, Rosanna Di Tinco<sup>1</sup>, Alessandra Pisciotta<sup>1</sup>, Laura Bertoni<sup>1</sup>, Giulia Orlandi<sup>1</sup>, Jessika Bertacchini<sup>1</sup>, Michele Signore<sup>2</sup>, Gianluca Carnevale<sup>1</sup>, Erica Villa<sup>1</sup>

<sup>1</sup>University of Modena and Reggio Emilia, Department of Surgery, Medicine Dentistry and Morphological Sciences with Interest in Transplant, Modena, Italy, <sup>2</sup>Istituto Superiore di SANità, Rome, Italy

Email: [villa.eric@unimo.it](mailto:villa.eric@unimo.it)

**Background and aims:** The Angiopoietin-Tie signaling system is a vascular-specific receptor tyrosine kinase pathway, essential for normal vascular development. Endothelial Angiopoietin-2 is up-regulated in low flow conditions but down-regulated in high flow conditions and is critically shear stress-regulated, suggesting important functions of biomechanical forces in controlling the endothelial cells phenotype. We aimed to evaluate the effects of shear stress on the induction of Angiopoietin-Tie2 and other signalling pathways on pericytes-like dental pulp stem cells (DPSCs). We choose DPSCs for their histological localization in the perivascular niche and their ability to differentiate toward different cell lineages.

**Method:** STRO-1<sup>+</sup>/c-Kit<sup>+</sup> DPSCs were induced at angiogenic commitment throughout specific medium in static condition. Pro-inflammatory and neo-angiogenic markers, including VEGF, Tie2, Angiopoietin-1, Angiopoietin-2 and CD34, were evaluated in static conditions and after application of linear shear stress by Western blot, immunofluorescence analysis and tube formation assay. DPSCs were also co-cultured with pre-activated peripheral blood mononuclear cells (PBMCs) in static and linear shear stress conditions in order to confirm the pro-inflammatory phenotype. Reverse-Phase Protein microArrays (RPPA) analysis was carried out to evaluate the phosphorylation of the following markers implicated in DPSCs angiogenic phenotype and their inflammatory profile, such as VEGFR, PDFGR beta, NFkB, Stat3, Akt, FoxO, AMPK.

**Results:** The ability to differentiate toward the angiogenic commitment, evaluated at three different time points (i.e. 72 h, 5d, 7d), was shown to be time-dependent. Western blot and immunofluorescence analyses showed the increased expression of VEGF and Ang-2/Tie2 system in DPSCs already after 72 hours of induction. We found that laminar shear-stress also induced a pro-inflammatory phenotype which was confirmed after co-culture with pre-activated PBMCs under both static and laminar shear stress conditions.

**Conclusion:** Our results indicate that laminar shear stress induced a marked angiogenic and pro-inflammatory phenotype in DPSCs and was able to modulate their biological properties in the different culture conditions used, as in presence of a proinflammatory microenvironment. GB and FB; GC and EV equally contributed.

This work was funded by FAR AGAPI (to GC) and AIRC under IG 2020-ID. 24858 project (to EV).

## PO-2-5-YI

### Assessing the bleeding risk after liver biopsy using new clinical and biological tools: a prospective analysis of 306 procedures

julien bissonnette<sup>1</sup>, [alix riescher](#)<sup>2</sup>, elia gigante<sup>3</sup>, larbi Boudaoud<sup>2</sup>, heithem soliman<sup>4</sup>, francois durand<sup>2</sup>, Dominique Valla<sup>2</sup>, Valerie Vilgrain<sup>2</sup>, Deraucourt Emmanuelle<sup>2</sup>, Pierre-Emmanuel Rautou<sup>2</sup>

<sup>1</sup>CHUM, Montréal, Canada, <sup>2</sup>Hospital Beaujon AP-HP, Clichy, France, <sup>3</sup>Jean-Verdier Hospital Ap-Hp, Bondy, France, <sup>4</sup>Louis-Mourier Hospital, Colombes, France

Email: [perautou@yahoo.fr](mailto:perautou@yahoo.fr)

**Background and aims:** liver biopsy carries a small risk of bleeding complications. No validated clinical or laboratory tool helps prediction of liver biopsy related bleeding. Global assays of coagulation seem promising in this context.

**Method:** consecutive patients scheduled for liver biopsy with an overnight hospital stay were prospectively included. The transjugular approach was chosen when coagulopathy (platelet count <50 000/ $\mu$ L, INR >1.4 or activated partial thromboplastin time >1.3 normal value) was present or when hepatic venous pressure gradient testing was indicated. Antithrombotic drugs were withdrawn according to current guidelines, except for aspirin which was maintained in patients undergoing transjugular liver biopsy. Prior to liver biopsy, an extensive coagulation workup, including routine coagulation tests (Prothrombin Time, Activated Partial Prothrombin Time ratio, factors II, V, VII, IX, X and XI levels, fibrinogen, D-dimers, factor VIII and von Willebrand factor), PFA-100, thromboelastography, plasma clot lysis time, thrombin generation assay and a 5-point clinical questionnaire derived from those existing for primary hemostatic defects were performed. Bleeding episode was defined as the presence of a liver hematoma or new free fluid on a systematic ultrasound performed 24 hours after liver biopsy or a decrease in hemoglobin level of 2 g/dL or more.

**Results:** 306 patients were included: 174 underwent percutaneous and 132 transjugular liver biopsy. There were 22 bleeding episodes (7%); 19 based on ultrasonographic criteria, 2 based on laboratory criteria and 1 based on mixt criteria. None of the coagulation tests and no item of the clinical questionnaire was associated with liver biopsy related bleeding in the overall study group, nor in the percutaneous and transjugular liver biopsy groups analyzed separately, nor in patients with cirrhosis. A principal component analysis was also performed and failed to find any difference between the patients who had bled as compared with those who did not. The need for analgesics after the biopsy was associated with a higher frequency of liver biopsy related bleeding ( $p < 0.001$ ).

**Conclusion:** in this large prospective study, an extensive coagulation workup, including global assays of coagulation, did not improve prediction of liver biopsy related bleeding. Pain requiring analgesics after liver biopsy heralds procedure-related bleeding.

## PO-3-1

### Management of adult patients with extrahepatic portal vein obstruction

Evgeniy Kitsenko<sup>1</sup>, Eugeniy Fandeev<sup>1</sup>, E Kryzhanovskaya<sup>1</sup>, Yu Kamalov<sup>1</sup>, G Manukyan<sup>1</sup>, Viktor Lebezev<sup>1</sup>, Svetlana Zhigalova<sup>1</sup>, E Kosakevich<sup>1</sup>, A Shhukina<sup>1</sup>

<sup>1</sup>*Petrovsky National Research Centre of Surgery, Moscow, Russian Federation*

Email: [kitsenko-surgeon@mail.ru](mailto:kitsenko-surgeon@mail.ru)

**Background and aims:** Improvement of treatment and diagnostic strategy in adult patients with extrahepatic portal vein obstruction (EHPVO).

**Method:** An analysis of 142 patients (2009-2019) with EHPVO in whom the disease manifested in adulthood was performed ( $\geq 18$  years old, myeloproliferative disorders were excluded). 75 women (52.8%) and 67 men (47.2%), from 20 to 77 y.o. (median of age-37.4). The patient examination included the search for local and systemic prothrombotic risk factors. Selective portosystemic shunting was performed in 32 patients (22.5%) as secondary prophylaxis of variceal bleedings. In 110 patients (77.5%) total thrombosis of the portal system was diagnosed which was the main impediment for shunting surgery. Those patients underwent endoscopic band ligation-69 (48.6%) or direct ligation of gastric varices with gastric devascularisation-41 patients (28.9%) when the GOV2 varices diameter exceeded 15 mm. The latter was complemented by splenectomy in 20 patients. All patients received long-term anticoagulation. In 82 patients (57.7%) the spleen stiffness (SS) values were measured (ARFI-elastometry) before and after endoscopic and surgical interventions.

**Results:** Hereditary thrombophilia was found in 113 patients (79.5%). Local risk factors of EHPVO (abdominal inflammation, abdominal trauma, surgery) were presented in 53 patients (37.3%). There was no mortality in the postoperative period. A significant reliable decrease of SS was found in all patients after shunting ( $p < 0.01$ ), whereas there was no reliable difference between pre- and postoperative SS values in patients after endoscopic or direct ligation of varices ( $p > 0.05$ ).

**Conclusion:** Etiological factors must be considered in all patients with EHPVO when choosing a treatment strategy. The presence of thrombophilia increases the risk of recurrent thrombosis. SS can be considered as a valuable prognostic criterion for the large varices and for the efficient evaluation of the shunting surgery. Long-term anticoagulation decreases the frequency of recurrent thrombosis, progression of varices, and variceal (re)bleeding ( $p < 0.05$ ). Patients' anticoagulants refusal or failure of anticoagulant therapy reduces the effectiveness of surgery and significantly worsens the prognosis.

## PO-3-2

### Non-cirrhotic portal hypertension in people living with HIV infection: significant progression to end stage liver disease

Kate Childs<sup>1</sup>, Nisha Patel<sup>1</sup>, Rosa Miquel<sup>2</sup>, Mark Nelson<sup>3</sup>, Chris Taylor<sup>1</sup>, Kosh Agarwal<sup>2</sup>

<sup>1</sup>King's College Hospital NHS Foundation Trust, Dept of Sexual Health and HIV, London, <sup>2</sup>King's College Hospital NHS Foundation Trust, Institute of Liver Studies, London, <sup>3</sup>Department of HIV, Chelsea and Westminster Hospital, London, United Kingdom

Email: [kate.childs@nhs.net](mailto:kate.childs@nhs.net)

**Background and aims:** There are case series reporting the diagnosis of NCPH (non-cirrhotic portal hypertension) in the context of HIV infection. We describe the natural history and outcome in a cohort of patients managed at a single tertiary centre HIV/liver clinic.

**Method:** This is an observational cohort study. Demographics, laboratory, and histological data were gathered on all patients with HIV infection and a diagnosis of non-cirrhotic portal hypertension referred to our clinic. This was defined by portal hypertension and either a biopsy showing histological features of porto-sinusoidal vascular disease (PSVD) or elastography excluding cirrhosis.

**Results:** 29 patients were identified, 16 women and 13 men, 9 Caucasian, 18 African heritage. Median age at diagnosis was 44 years (36, 49), median follow-up time since diagnosis of NCPH was 13 (9.5, 14) years. 26/29 patients had received didanosine (DDI). 22/29 (76%) patients underwent biopsy displaying features of NRH/portal obliterative venopathy or non-specific, but no patient had greater than F2 fibrosis. Two patients were HBV SAg positive, alcohol was a cofactor in 1 patient; the majority had no other cause for liver disease. 15 patients presented with clinical symptoms, namely a variceal bleed or ascites, 14 with deranged LFTs or low platelets. 19/29 patients had a portal vein thrombosis, 17 are currently anticoagulated with no major bleeding events during follow-up. 6 patients were transplanted, a further two are currently being assessed for liver transplantation. Of these 8, the indication was encephalopathy in 4/8, recurrent ascites in 3/8 cases and synthetic failure in 1 case. 5 transplanted patients are in follow-up a median of 54 months later (45, 74). 1 patient died during the post-transplant period of gut ischaemia related to superior mesenteric vein thrombosis.

**Conclusion:** We report on an ethnically diverse cohort of male and female patients with a long duration of follow-up for HIV associated NCPH. The majority underwent biopsy as mandated by the new clinical definition of PSVD. This is a serious condition with 27% of patients having been assessed for or undergoing liver transplantation. The majority of patients were exposed to didanosine but not all were. Anticoagulation was safe in this group. As half of patients presented with subtle lab abnormalities, HIV care providers must maintain a clinical suspicion for this condition so patients can receive appropriate monitoring for complications of portal hypertension and joint care from both liver and HIV physicians.



## PO-3-3-YI

# Non-cirrhotic portal hypertension in a patient with protein C and S deficiency. A case report

Faisal Nawaz<sup>1</sup>, Faisal Ali<sup>1</sup>, Ammar Rafique<sup>1</sup>, Talha Rasheeq<sup>1</sup>, Nadeemullah Muhammad<sup>1</sup>, Hina Fatima<sup>1</sup>

<sup>1</sup>*Bakhtawar Amin Memorial Trust Hospital, Gastroenterology department, Multan, Pakistan*

Email: [dr.faisal2013@yahoo.com](mailto:dr.faisal2013@yahoo.com)

**Background and aims:** Non-cirrhotic portal hypertension is a rare disease characterized by intrahepatic portal hypertension in the absence of cirrhosis or other causes of liver disease and portal venous thrombosis. The aim of this case report is to develop awareness about this rare disease and its association with prothrombotic conditions.

**Method:** A 32 years old gentleman admitted with multiple episodes of hematemesis and malaena with severe pallor and massive splenomegaly and no other clinical stigmata of chronic liver disease. His baselines blood reports showed severe pancytopenia with hemoglobin of 4.4g/dl, Platelets  $49 \times 10^9$  and Leukocytes  $2.05 \times 10^9$ . His liver function tests were normal and hepatitis b and c screening negative. He was transfused 4 units of blood and an upper gastrointestinal endoscopy showed 2 columns of grade 2 and 2 columns of grade 3 esophageal varices and one GOV-1 fundal varix with a red sign. 6 bands were applied including on the GOV-1 varix. Ultrasound abdomen showed 240mm enlarged spleen with a normal liver. CT abdomen with contrast showed massively enlarged spleen multiple portosystemic collateral pathways at gastric, Para umbilical, anterior abdominal wall and spleen hilum, recanalization of left portal vein branch dilated main portal vein. He had multiple upper GI endoscopy sessions at 2 weekly period for banding of remainder varices. Detailed workup showed he had protein C and S deficiency.

**Results:** Because of recurrent pancytopenia due to hypersplenism and enlarged varices with recurrent variceal bleed because of non cirrhotic portal hypertension, he was referred for splenectomy and splenorenal shunt surgery.

**Conclusion:** Non cirrhotic portal hypertension is no doubt a rare entity and its presentation varies. Variceal bleed and pancytopenia are among two of its presentations. An in-depth knowledge about this disease, its presentation and its associations is required and a thorough workup is needed to rule out any underlying liver pathology and its association with prothrombotic states and to tailor further management.

Figure:



**Oesophageal Varices**



**Fundal varix**

PO-3-4-YI

## Red Cell Distribution Width as A Predictor of Outcome in Hospitalized Cirrhotic Patients

Eman Abdelsameea<sup>1</sup>, Mohamed Abdel-Samiee<sup>1</sup>, Mohammed Fathy Ragab<sup>2</sup>, Heba Samy Ghanem<sup>3</sup>, Ashraf Kamel AbouGabal<sup>1</sup>, Mohamed Ahmed Samy Kohla<sup>1</sup>

<sup>1</sup>National Liver Institute, Menoufia University, Hepatology and Gastroenterology, Shebin El-Kom, Egypt, <sup>2</sup>Ministry of Health, Egypt, <sup>3</sup>National Liver Institute, Menoufia University, Clinical and Chemical Pathology, Egypt

Email: [drmohammed100@yahoo.com](mailto:drmohammed100@yahoo.com)

**Background and aims:** Red cell distribution width (RCDW) is related to systemic inflammatory response syndrome (SIRS) producing pro-inflammatory signals directly act on hematopoietic stem cells in the bone marrow. This stimulation may provoke changes in RBC membrane with increased variability in size measured by RDW that has been associated with morbidity and mortality in variety of systemic illnesses. We aimed to evaluate RCDW as predictor of outcome in hospitalized cirrhotic patients.

**Method:** This prospective cross-sectional study was conducted on 1000 hospitalized patients. Outcome was assessed by days of hospitalization; mortality in hospitalized patient or during short follow-up (3 months) and rehospitalization during follow-up of 6 months.

**Results:** Male represented 69.6%. Mean age was  $57.67 \pm 13.07$  years old. Baseline co-morbidities were recorded as presence of diabetes mellitus (200 patients), hypertension (400 patients). Hepatitis C virus was the most common etiology of diseased liver (90%). Child Pugh classes A, B and C of studied patients represented (21.2%, 38.8% and 40% respectively). The survived patients during follow-up represented 63.3%. AUC for RCDW was 0.923 (95% CI 0.904-0.943), 0.910 for CRP (95% CI 0.890-0.930), 0.904 for Hb (95% CI 0.883-0.925) 0.903 for platelets (95% CI 0.882-0.924). Also, RCDW cut-off point at 21.35 for predicting survival had sensitivity 93%, specificity 91%, accuracy 92%, positive predictive value 85 and negative predictive value 96. Regression analysis revealed significant positive association between both RCDW and WBCs with mortality.

**Conclusion:** RCDW could provide useful information for predicting length of hospitalization and survival in hospitalized cirrhotic patients.

## PO-4-1-YI

### Prevalence and associated factors of ascitic decompensation in patients with acute variceal bleeding

Myriam Ayari<sup>1</sup>, Yosra Zaaimi<sup>1</sup>, Hammemi Sirine<sup>1</sup>, emna belhadjmabrouk<sup>1</sup>, shema ayadi<sup>1</sup>, Yosra Said<sup>1</sup>, Leila Mouelhi<sup>1</sup>, Radhouane Dabbeche<sup>1</sup>

<sup>1</sup>Charles Nicolle Hospital, Hepatology, Tunis, Tunisia

Email: [ayari.myriam@hotmail.fr](mailto:ayari.myriam@hotmail.fr)

**Background and aims:** Variceal bleeding is an acute event disturbing the course of cirrhosis and can trigger others complications. Ascitic decompensation is a frequent issue in variceal hemorrhage and may complicate the management of the patient. However, the associated factors are not well studied.

**Method:** The aim of our study was to determine the prevalence of decompensation in patients presenting with variceal bleeding and to investigate the associated factors. A retrospective, monocentric study was conducted including cirrhotic patient hospitalized for variceal bleeding over nine years (2010-2018). Patients with history of ascites or having non-cirrhotic portal hypertension were excluded. Clinical, biological, morphologic data and outcomes were collected. For each patient we have calculated the following non-invasive scores: Meld, Fib-4, APRI, King's score, platelet to spleen diameter and PALBI score. Patients who had developed ascites were compared to those without ascites.

**Results:** Sixty-six inpatients hospitalized for acute variceal bleeding were included. The mean age was  $55.23 \pm 14.30$  years with a sex ratio (M/F) of 0.9. The main etiologies of cirrhosis were: hepatitis C (27.3%), hepatitis B (16.7%), non-alcoholic steatopathy (10%). Mean Blatchford score was  $11.22 \pm 14.17$ . All patients were treated with endoscopic band ligation with successful primary hemostasis obtained in 95% of patients. Ascitic decompensation was observed by abdominal ultrasound in 26% (N = 24) of cases. Patients developing ascites had significantly higher APRI (mean 2.22 versus 1.34,  $p = 0.033$ ), Meld (mean 13.63 versus 10.22,  $p = 0.018$ ), King's score (mean 55.64 versus 31.26,  $p = 0.039$ ) and PALBI (mean -2.349 versus -1.973,  $p < 0.001$ ). Also, transfusion ( $p = 0.04$ ) and body mass index  $> 25 \text{ kg/m}^2$  ( $p = 0.05$ ) were significantly associated with the presence of ascites. On multivariate analysis, only PALBI was a predictor of decompensation ( $p = 0.002$ ), with an area under the ROC curve of 0.762 ( $p = 0.001$ , 95% CI: 0.634-0.890).

**Conclusion:** In our study, ascitic decompensation occurred in nearly one-quarter of patients with acute variceal bleeding. Abdominal ultrasound should be performed in patients with risk factors in order to detect timely any ascitic decompensation.

## PO-4-2-YI

### Liver fibrosis markers as predictors of recurrent variceal bleeding in cirrhosis

Fatma Ben Farhat<sup>1</sup>, Mariem Sabbah<sup>1</sup>, Hedi Sellami<sup>1</sup>, Nawel Bellil<sup>1</sup>, Dorra Trad<sup>1</sup>, Norsaf Bibani<sup>1</sup>, Dalila Gargouri<sup>1</sup>

<sup>1</sup>*Habib Thameur Hospital, Gastroenterology, Tunisia*

Email: [fatmabf8@gmail.com](mailto:fatmabf8@gmail.com)

**Background and aims:** Variceal bleeding (VB) remains the most common lethal complication of cirrhosis. Measures to prevent recurrent VB such as eradicating esophageal varices and improving liver function are important for reducing the risk of mortality. The place of liver fibrosis markers to assess the risk of VB is poorly studied.

The aim of our study was to assess “predictors” of recurrent variceal bleeding using non-invasive markers of liver fibrosis in patients diagnosed with liver cirrhosis.

**Method:** A retrospective study [2014-2019] including cirrhotic patients who presented upper gastrointestinal bleeding due to VB was performed. The following non-invasive markers were calculated for each patient: AST to platelet ratio index (APRI), fibrosis4-index (FIB-4), CDS, Guci score and LOK index.

The performance of scores was assessed by sensitivity and specificity values and area under the curve (AUC) using SPSS version 22.0 (p value  $\leq 0.05$  was considered as statistically significant).

**Results:** Sixty patients (mean age 63 years and gender/sex ratio = 0.78) were included. All patients received medical treatment (vasoactive and antibiotic prophylaxis). Upper endoscopy identified esophageal varices (93%), gastric varices (38.6%), hypertensive gastropathy (47.4%). Endoscopic ligation of esophageal varices and a biological glue injection were performed in 71.9% and 17.6%, respectively. One death and acute edema of the lung were noted during the bleeding episode. Bleeding recurrence was noted in 33.3% of patients. Average survival was 4.8 years [3.4-6.1].

In our study, FIB4, APRI and Guci score were the only significant predictors of rebleeding. APRI had the largest AUC (AUC = 0.62), followed by Guci score (AUC = 0.567) and FIB-4 (AUC = 0.55). A cut-off value of 5.7 for FIB-4 was a significant predictor, with a sensitivity of 63.2%, a specificity of 58% (p = 0.05). For APRI, the cut-off value was 1.3 with a sensitivity of 68%, a specificity of 64% (p = 0.04) and for Guci score, the cut-off value was 1.66 with a sensitivity of 63.2% and a specificity of 50% (p = 0.03).

**Conclusion:** Despite the low diagnostic accuracy, FIB-4, APRI and Guci scores are simple to calculate and can be used in routine practice to predict recurrent bleeding risk from esophageal varices in patients with cirrhosis.

## PO-4-3-YI

### Association of C-type lectin-like receptor 2 and galectin-1 with portal venous system thrombosis in liver cirrhosis

Shixue Xu<sup>1</sup>, Xiangbo Xu<sup>1</sup>, Yang An<sup>1</sup>, Le Wang<sup>1</sup>, Fangfang Yi<sup>1</sup>, Yiyang Zhang<sup>1</sup>, Xiaozhong Guo<sup>1</sup>, Xingshun Qi<sup>1</sup>

<sup>1</sup>*General Hospital of Northern Theater Command (formerly General Hospital of Shenyang Military Area), Department of Gastroenterology, Shenyang, China*

Email: [xingshunqi@126.com](mailto:xingshunqi@126.com)

**Background and aims:** C-type lectin-like receptor 2 (CLEC-2), which is expressed on the surface of platelets, is a receptor that participates in platelet activation and aggregation. Galectin-1, is a member of the galectin family, is expressed in human endothelial cells. Current studies have not explored whether CLEC-2 and galectin-1 are involved in the formation of portal venous system thrombosis (PVST) in cirrhotic patients.

**Method:** Patients with liver cirrhosis who underwent contrast-enhanced computed tomography/magnetic resonance imaging (CT/MRI) between November 2020 and May 2021 were considered. PVST were assessed based on contrast-enhanced CT/MRI. Serum CLEC-2 and galectin-1 concentrations were measured using enzyme-linked immunosorbent assay kits. The relationship of CLEC-2 and galectin-1 with PVST was evaluated. Mann-Whitney U test, Chi-square test, Spearman's rank correlation test, and Pearson correlation test were performed as appropriate.

**Results:** A total of 105 patients with liver cirrhosis were enrolled, of whom 26 had PVST, and 79 did not have PVST. PVST group had a significantly higher serum CLEC-2 concentration than non-PVST group in patients with MELD score >14 ( $p = 0.046$ ), but not in those with MELD score  $\leq 14$  ( $p = 0.608$ ). Serum CLEC-2 concentration significantly correlated with PVST in patients with MELD score >14 ( $p = 0.044$ ) and >15 ( $p = 0.028$ ), but not those with MELD score >13, >12, >11, >10, >9, >8, >7, or >6 ( $p = 0.087$ , 0.099, 0.182, 0.332, 0.596, 0.422, 0.536, and 0.529, respectively). Serum galectin-1 concentration did not significantly correlate with PVST in patients with MELD score >6, >7, >8, >9, >10, >11, >12, >13, >14, and >15 ( $p = 0.628$ , 0.606, 0.535, 0.622, 0.365, 0.152, 0.240, 0.189, 0.175, and 0.141, respectively). Serum CLEC-2 concentration significantly correlated with serum galectin-1 concentration regardless of MELD score.

**Conclusion:** In cirrhotic patients with poor liver function, CLEC-2 may be associated with the formation of PVST.

## PO-4-4-YI

### Performance of albumin, bilirubin and platelets criteria to predict the absence of high-risk esophageal varices

Nouha Trad<sup>1</sup>, Mohamed Ghanem<sup>1</sup>, sondes bizid<sup>1</sup>, ben slimen baha<sup>1</sup>, khouloud boughoula<sup>1</sup>, Ben abdallah hatem<sup>1</sup>, Riadh Bouali<sup>1</sup>, Nabil Abdelli<sup>1</sup>

<sup>1</sup>*military hospital of tunis, Tunisia*

Email: [nouha1med7@gmail.com](mailto:nouha1med7@gmail.com)

**Background and aims:** Esophageal varices are a serious complication of portal hypertension. The albumin, bilirubin, and platelet (ABP) criteria were recently developed by an Asian cohort and proposed to avoid screening endoscopy for detecting high-risk varices (HRV). Our objective was to evaluate the performance of ABP in predicting the absence of HRV.

**Method:** This was a retrospective study including consecutive cirrhotic patients followed in our department, between January 2010 and December 2019. Patients with a CHILD-pugh score  $\leq 7$  who had an upper gastrointestinal endoscopy and laboratory tests within less than 3 months were included. The ROC curve was established and the significance level was set at 5%.

**Results:** A total of 224 cirrhotic patients were collected. Ninety-two had a CHILD-Pugh score  $\leq 7$  (41.07%). The average age was  $61.47 \pm 12.26$  years and the sex ratio was 1.3. Viral infection was the most common etiology of cirrhosis (55.4%), followed by non-alcoholic steatohepatitis (23.9%). The ABP criteria were significantly associated with the absence of HRV ( $p < 0.001$ ). The area under the ROC curve of the ABP criteria in predicting the absence of HRV was AUROC = 0.696 [95% CI: 0.564-0.828]. The sensitivity, specificity of the ABP criteria in predicting the absence of HRV were 40.74% and 98, 46% respectively. The positive predictive value and the negative predictive value were 91.66% and 80% respectively.

**Conclusion:** The ABP criteria were a easy score based on simple laboratory tests that might be useful to avoid screening endoscopy for detecting high-risk varices (HRV).

## PO-4-5-YI

### Performance of bleeding risk scores in predicting mortality in acute variceal bleeding

Nouha Trad<sup>1</sup>, Mohamed Ghanem<sup>1</sup>, sondes bizid<sup>1</sup>, ben slimen baha<sup>1</sup>, khouloud boughoula<sup>1</sup>, Ben abdallah hatem<sup>1</sup>, Riadh Bouali<sup>1</sup>, Nabil Abdelli<sup>1</sup>

<sup>1</sup>*military hospital of tunis, gastroenterology*

Email: [nouha1med7@gmail.com](mailto:nouha1med7@gmail.com)

**Background and aims:** Acute variceal bleeding (AVB) is a potentially serious complication of portal hypertension which could compromise the prognosis of a cirrhotic patient. Our objective was to evaluate the performance of bleeding risk scores in predicting six-week mortality in cirrhotic patients with AVB.

**Method:** We performed a retrospective analysis of data from consecutive cirrhotic patients hospitalized for an AVB, recruited from January 2010 to December 2019. The following bleeding risk scores were calculated on admission: GB score, AIMS 65, and APASL.

**Results:** A total of 224 patients were included with a mean age of  $61, 02 \pm 13, 21$  years and a sex ratio of 1.60. Viral C infection was the most common etiology of cirrhosis (32.1%) followed by viral B infection (23.1%) and non-alcoholic steatohepatitis (21.3%). During follow-up, these patients were admitted 518 times to our department for decompensation of their disease. One hundred and forty-three admissions were related to AVB (27.6%). The six-week mortality rate was 25.7%. Bleeding risk scores were associated with six-week mortality: AIMS65 ( $p = 0.001$ ), APASL ( $p = 0.002$ ) and GB score ( $p < 0.001$ ). A statistically significant association was also noted between six-week mortality and the following scores: MELD ( $p < 0.001$ ), MELD-Na ( $p < 0.001$ ) and CHILD-Pugh ( $p < 0.001$ ). AIMS65 had the best area under the ROC curve (AUROC = 0.877 [95%CI: 0.761-0.993]) followed by APASL (AUROC = 0.847 [95%CI: 0.715-0.978]) and the GB score (AUROC = 0.747 [95%CI: 0.527-0.966]). At the threshold of 1.5, AIMS65 had a sensitivity and specificity of 99% and 70, 1% respectively in predicting six-week mortality.

**Conclusion:** In our study, Bleeding risk scores, especially AIMS65, had a good performance in predicting six-week mortality in the case of AVB, which would allow a better selection of vulnerable patients.



## PO-5-1-YI

# The efficacies and risks comparisons between direct oral anticoagulants and low molecular weight heparin or warfarin in both cirrhotic and non-cirrhotic portal vein thrombosis patients: systematic review and meta-analysis

Boby Pratama Putra<sup>1</sup>, Felix Nugraha Putra<sup>2</sup>

<sup>1</sup>Medical doctor, Blitar, Indonesia, <sup>2</sup>Universitas Airlangga, Faculty of Medicine, Surabaya, Indonesia

Email: [boby\\_pratama\\_putra@yahoo.co.id](mailto:boby_pratama_putra@yahoo.co.id)

**Background and aims:** The portal vein thrombosis (PVT) might occur in both cirrhotic and non-cirrhotic liver diseases patients that have been associated with worsening liver function and mortality. Guidelines for treating PVT preferred low molecular weight heparin (LMWH) or warfarin (VKA). However, recent studies suggested that direct oral anticoagulants (DOACs) have better inconclusive efficacies than LMWH or warfarin. This study aims to compare the efficacies and risks of DOACS compared with LMWH or VKA in cirrhotic and non-cirrhotic PVT patients.

**Method:** Comprehensive searching was performed through online databases to include all relevant literature from 2000 until 2021. This study was conducted according to the PRISMA guideline. The inclusion criteria are all trials that compare the efficacies and risks of DOACs compared with LMWH or VKA in PVT patients specifically. Bias risk was accessed by using the Cochrane Risk-of-bias (RoB 2) tool for randomized clinical trial (RCT) and Risk of Bias in Non-Randomized Studies-of Interventions (ROBINS-I) instrument for non-RCT. Analysis was performed to provide pooled risk ratio (RR) with 95% confidence interval (CI) using the fixed-effect heterogeneity test.

**Results:** We included 1 RCT and 5 cohort studies met the inclusion criteria. The DOACs significantly improve the cirrhotic PVT recanalization compared with VKA (pooled RR = 2.37, 95%CI 1.80-3.13,  $p < 0.00001$ ,  $I^2 = 0\%$ ). The DOACs also suggest significant recanalization in cirrhotic and non-cirrhotic PVT compared with LMWH and VKA (pooled RR = 2.00, 95%CI 1.63-2.44,  $p < 0.00001$ ,  $I^2 = 5\%$ ). The DOACs also significantly lower the cirrhotic PVT recurrence compared with VKA (pooled RR = 0.19, 95%CI 0.04-0.80,  $p = 0.02$ ,  $I^2 = 0\%$ ) and in addition of LMWH (pooled RR = 0.22, 95%CI 0.07-0.71,  $p = 0.01$ ,  $I^2 = 0\%$ ). The non-cirrhotic PVT patients receiving DOACS has significant lesser major bleeding events (pooled RR = 0.11, 95%CI 0.04-0.32,  $p < 0.0001$ ,  $I^2 = 0\%$ ), while the cirrhotic PVT has no significance (pooled RR = 0.79, 95%CI 0.34-1.83,  $p = 0.58$ ,  $I^2 = 0\%$ ). The DOACs suggest lower mortality (pooled RR = 0.59, 95%CI 0.15-2.36,  $p = 0.46$ ,  $I^2 = 53\%$ ) in cirrhotic PVT patients, even though not statistically significant.

**Conclusion:** The DOACs suggest potential efficacies and lower risks in both cirrhotic and non-cirrhotic PVT patients compared with LMWH or VKA. Nevertheless, further researches are warranted to establish the efficacies and risks of DOACs for PVT patients.

## PO-5-2-YI

### Improvement in portal vein thrombosis clot volume is associated with improved overall survival in cirrhosis patients with PVT: a justification for treatment?

Lauren Carlini<sup>1</sup>, Jennifer Miller<sup>1</sup>, Feng Su<sup>1</sup>, Prof. Patrick G. Northup, M.D.<sup>1</sup>

<sup>1</sup>University of Virginia, Gastroenterology and Hepatology, United States

Email: [le2pf@hscmail.mcc.virginia.edu](mailto:le2pf@hscmail.mcc.virginia.edu)

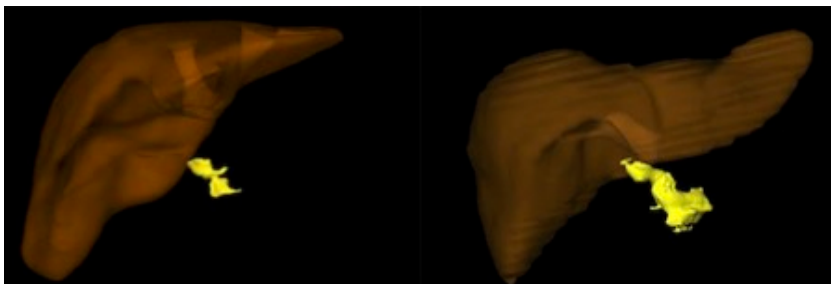
**Background and aims:** Recent practice guidance suggests treatment of persistent main trunk portal vein thrombosis (PVT) in cirrhosis patients. It is unknown whether resolution of PVT influences survival in this population independent of the severity of cirrhosis. It was the aim of this study to objectively quantify PVT clot volume and clot extent, as well as to correlate clot improvement with clinical outcomes.

**Method:** This study involves a cohort of 25 cirrhosis patients with new onset PVT that was persistent based on serial contrast enhanced, cross-sectional imaging. Clot volume and location, liver parenchymal volume, and portal vein (PV) patency diameter were calculated using specialized software. Clot and PV characteristics were analyzed and correlated with standardized definitions of clinical hepatic decompensation and all-cause mortality.

**Results:** The mean age of our cohort was 56 years ( $\pm 10$  SD) and the mean Child-Turcotte-Pugh (CTP) score was 8 ( $\pm 2$ ). The mean follow-up time after formation of PVT was 1, 118 days ( $\pm 861$ ). The mean liver parenchymal volume at the time of PVT diagnosis was 1372 ml ( $\pm 361$ ) and the mean clot volume was 3.4 ml ( $\pm 4.2$ ). 13 (52%) patients were placed on anticoagulation for treatment of PVT and those patients had more baseline clot burden than patients not started on anticoagulation (4.4 ml vs. 2.3 ml). Overall, 19 (76%) patients had improvement of clot volume over the follow-up period. After an average interval between clot formation and follow-up imaging of 156 days ( $\pm 96$ ), the mean change in clot volume was -1.75 ml ( $\pm 2.74$ ). There was no difference in time to decompensation between patients with clot improvement versus those without improvement ( $p = 0.32$ ). However, patients with a decrease in clot volume showed improved all-cause survival compared to those who had no clot improvement (mean 1849 days vs. 555 days,  $p = 0.01$ ). This improvement was independent of baseline severity of liver disease as measured by MELD score (MELD HR 1.23,  $p = 0.01$  and clot improvement HR 0.16,  $p = 0.05$ ).

**Conclusion:** In patients with cirrhosis and a new PVT, improvement in portal vein clot volume is associated with improved survival compared to those patients that have no clot improvement. This implies that measures aimed at improving PVT may offer survival benefit if clot resolves or improves. Prospective studies are needed.

#### Figure:



## PO-5-3-YI

### Impact of asymptomatic superior mesenteric vein thrombosis on the survival of patients with liver cirrhosis

Le Wang<sup>1</sup>, Xiaozhong Guo<sup>1</sup>, Shixue Xu<sup>1</sup>, Zhaohui Bai<sup>1</sup>, Yue Yin<sup>1</sup>, Xingshun Qi<sup>1</sup>

<sup>1</sup>General Hospital of Northern Theater Command, Department of Gastroenterology, Shenyang, China

Email: [xingshunqi@126.com](mailto:xingshunqi@126.com)

**Background and aims:** Asymptomatic superior mesenteric vein (SMV) thrombosis is usually diagnosed accidentally by abdominal imaging. There is no consensus regarding the management of asymptomatic SMV thrombosis among non-liver transplant (LT) candidates. The impact of asymptomatic and untreated SMV thrombosis on the survival of patients with liver cirrhosis remains unexplored.

**Method:** Consecutive cirrhotic patients admitted between December 2014 and May 2021 were screened from our prospective database. Patients who presented with acute abdominal pain and/or received anti-thrombotic therapy during hospitalization were excluded. The presence and grade of SMV thrombosis were evaluated by contrast-enhanced computer tomography or magnetic resonance imaging. The grade of SMV thrombosis included mural (thrombus occupying the lumen  $\leq 50\%$ ), partial (thrombus occupying the lumen 50%-80%), and complete (thrombus occupying the lumen  $\geq 80\%$ ). Patients were followed until death or LT. LT-free survival was the outcome of interest.

**Results:** Of the 486 eligible patients, 68 (14%) patients had SMV thrombosis (16 had mural thrombosis, 42 partial thrombosis, and 10 complete thrombosis). During follow-up, 1 patient was lost to follow-up, 8 underwent LT, and 108 died. The cumulative LT-free survival rate was not significantly different between patients with and without SMV thrombosis ( $p = 0.344$ ). Regardless of Child-Pugh class and decompensation events, the cumulative LT-free survival remained statistically similar between patients with and without SMV thrombosis. The cumulative LT-free survival rate was not significantly different between patients with partial/complete and those with mural/no SMV thrombosis ( $p = 0.328$ ). Regardless of Child-Pugh class and decompensation events, the cumulative LT-free survival remained statistically similar between patients with partial/complete and those with mural/no SMV thrombosis.

**Conclusion:** Asymptomatic SMV thrombosis might have no impact on the survival of patients with liver cirrhosis. Therefore, the timing of therapeutic intervention in such patients should be further explored. Additionally, an increase in the grade of asymptomatic SMV thrombosis might not deteriorate the outcomes.

## PO-5-4-YI

### Safety and efficacy of direct oral anticoagulants (DOACs) in Budd-Chiari Syndrome (BCS)-an Austrian multicenter study

Georg Semmler<sup>1</sup>, Lorenz Balcar<sup>1</sup>, Alexander Lindorfer<sup>2</sup>, Stefan Bartl<sup>3</sup>, Stephanie Hametner-Schreil<sup>2</sup>, Sophie Gensluckner<sup>4</sup>, Katharina Pomej<sup>1</sup>, David JM Bauer<sup>1</sup>, Benedikt Simbrunner<sup>1</sup>, Michael Trauner<sup>1</sup>, Harald Hofer<sup>3</sup>, Rainer Schöfl<sup>2</sup>, Elmar Aigner<sup>4</sup>, Christian Datz<sup>5</sup>, Mattias Mandorfer<sup>1</sup>, Thomas Reiberger<sup>1</sup>, Bernhard Scheiner<sup>1</sup>

<sup>1</sup>Medical University of Vienna, Division of Gastroenterology and Hepatology, Department of Internal Medicine III, Vienna, Austria, <sup>2</sup>Ordensklinikum Linz Barmherzige Schwestern, Department of Internal Medicine IV, Linz, Austria, <sup>3</sup>Klinikum Wels-Grieskirchen, Department of Internal Medicine I, Wels, Austria, <sup>4</sup>Paracelsus Medical University Salzburg, Department of Medicine I, Salzburg, Austria, <sup>5</sup>General Hospital Oberndorf, Teaching Hospital of the Paracelsus Medical University Salzburg, Department of Internal Medicine, Oberndorf, Austria

Email: [bernhard.scheiner@meduniwien.ac.at](mailto:bernhard.scheiner@meduniwien.ac.at)

**Background and aims:** In patients with Budd-Chiari Syndrome (BCS) long-term anticoagulation is recommended by current guidelines. Direct oral anticoagulants (DOACs) may simplify patient management due to lack of impact on INR/MELD and no need for monitoring such as with vitamin-K antagonists (VKAs). Here we report our experience with off-label use of DOACs for anticoagulation in BCS.

**Method:** Efficacy and safety data of DOAC vs. VKA anticoagulant treatment was retrospectively assessed in 40 BCS patients treated at 5 Austrian centers.

**Results:** 38/40 patients were followed from initial BCS diagnosis while 2 patients were followed-up after orthotopic liver transplantation. Mean age at BCS diagnosis was  $39.9 \pm 13.9$  years and median MELD 11 (9-17). Overall, 60.5% (23/38) had decompensated liver disease, and 84.2% (32/38) showed signs of clinically significant portal hypertension (CSPH; n = 20 splenomegaly, n = 23 portosystemic collaterals/varices, n = 22 ascites, n = 2 variceal bleeding). 28.9% (11/38) had splanchnic/portal vein thrombosis at initial presentation.

During a median follow-up of 53 (17-128) months, 20 patients (50%) received DOAC treatment (edoxaban:9, apixaban:4, rivaroxaban:4, dabigatran:2, sequential treatment:n = 1) for a median of 25 (7-45) months (history of decompensation: n = 15, clinical signs of CSPH: n = 17).

70% (14/20) patients were switched from LMWH (n = 8) or VKA (n = 6) to DOAC after disease stabilization/improvement, while 30% (6/20) of BCS patients were directly treated with DOAC.

Complete response (EASL criteria) was achieved or maintained in 13/20 (65%) patients (including 3 patients receiving TIPS prior to DOAC initiation), ongoing response in 4 patients while disease progressed in 3 patients (including 2 patients with HCC). Three major bleedings (15%) occurred during DOAC therapy (n = 2 upper-GI-bleeding, n = 1 HCC rupture), and 7 minor bleedings (n = 3 epistaxis, n = 2 oral cavity, n = 2 hypermenorrhea). Two deaths (n = 1 spontaneous bacterial peritonitis, n = 1 HCC) occurred while on DOAC therapy.

**Conclusion:** DOACs seem to be effective and safe for long-term anticoagulation in patients with BCS, but confirmation by larger prospective studies is needed.

## PO-5-5-YI

### Clinical significance of substantially elevated von Willebrand factor antigen levels in patients with advanced chronic liver disease

Katharina Pomej<sup>1 2</sup>, Bernhard Scheiner<sup>1 2</sup>, Lorenz Balcar<sup>1 2</sup>, Rosa Johanna Nußbaumer<sup>1</sup>, Johanna Weinzierl<sup>1</sup>, Rafael Paternostro<sup>1 2</sup>, Benedikt Simbrunner<sup>1 2</sup>, Lukas Hartl<sup>1 2</sup>, Mathias Jachs<sup>1 2</sup>, David JM Bauer<sup>1 2</sup>, Georg Semmler<sup>1 2</sup>, Albert Stättermayer<sup>1 2</sup>, Matthias Pinter<sup>1</sup>, Michael Trauner<sup>1 2</sup>, Prof. Peter Quehenberger, MD<sup>3</sup>, Thomas Reiberger<sup>1 2</sup>, Mattias Mandorfer<sup>1 2</sup>

<sup>1</sup>Division of Gastroenterology and Hepatology, Department of Internal Medicine III, Medical University of Vienna, Vienna, Austria, <sup>2</sup>Vienna Hepatic Hemodynamic Laboratory, Medical University of Vienna, Vienna, Austria, <sup>3</sup>Department of Laboratory Medicine, Medical University of Vienna, Vienna, Austria

Email: [mattias.mandorfer@meduniwien.ac.at](mailto:mattias.mandorfer@meduniwien.ac.at)

**Background and aims:** VWF is increasingly used as a non-invasive marker for clinically significant portal hypertension (HVPG $\geq$ 10mmHg) and also confers HVPG-independent prognostic information. While quantification of increased VWF levels is not relevant in the context of von Willebrand disease (i.e., the main indication for VWF testing), highly elevated VWF may be of clinical significance in ACLD. Thus, we have modified our analytical approach to quantify very high VWF levels (i.e., >420%) and investigated their prognostic value.

**Method:** Patients undergoing HVPG-measurement at the Vienna Hepatic Hemodynamic Lab with evidence of ACLD and information on VWF were considered. Clinical stages (CS) were defined as follows: Probable compensated ACLD (cACLD): LSM $\geq$ 10kPa and HVPG<6mmHg; 0:cACLD and 6-9mmHg; 1:cACLD and HVPG $\geq$ 10mmHg; 2:bleeding; 3:non-bleeding decompensation; 4: $\geq$ 2 decompensations.

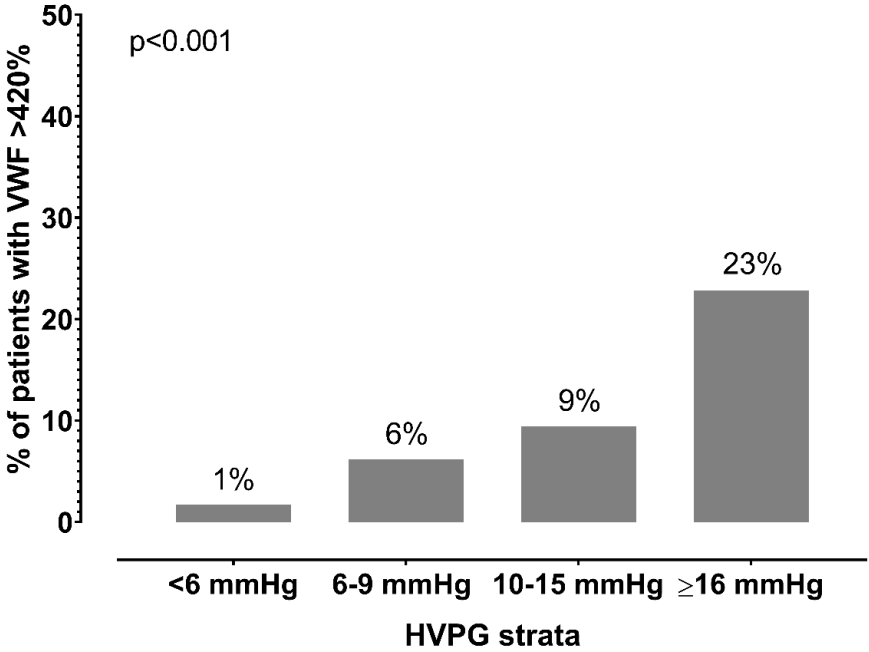
VWF was measured by an immuno-turbidimetric assay (STA LIATEST VWF:Ag) on a STA-R Evolution (both DIAGNOSTICA STAGO S.A.S., Asnières sur Seine, France) analyzer. In order to quantify values >420%, the respective samples were prediluted 1:20 with Owren-Koller buffer.

**Results:** 125 (16%) of 777 included patients had VWF>420%. The proportion of VWF>420% increased with disease severity (probable cACLD-0:5 (4%) vs. 1:22 (10%) vs. 2-4:98 (23%),  $p\leq$ 0.001) as well as across HVPG (Figure) and MELD (<10:17 (6%) vs. 10-14:27 (10%) vs.  $\geq$ 15:80 (35%),  $p\leq$ 0.001) strata. Moreover, patients with VWF>420% showed higher levels of CRP (0.9 (IQR:0.4-1.5) vs. 0.2 (0.1-0.6)mg/dL,  $p\leq$ 0.001) as a marker of systemic inflammation.

Median VWF was 532% (IQR:462-611) in the subgroup of patients with >420% and VWF was unrelated to HVPG (Spearman's  $\rho = 0.140$ ,  $p = 0.119$ ), but showed direct correlations of weak/moderate strength with MELD ( $\rho = 0.337$ ,  $p < 0.001$ ) and CRP ( $\rho = 0.291$ ,  $p = 0.001$ ). Among patients with VWF>420%, VWF was predictive of decompensation/liver-related mortality in univariate analysis (per 10%; HR:1.02 (95%CI:1.00-1.04),  $p = 0.025$ ), however, this association did not attain statistical significance after adjusting for MELD.

**Conclusion:** The proportion of patients with substantially elevated VWF values (i.e., >420%) steadily increases with disease progression and is particularly high in patients who have profound portal hypertension. While VWF is not reflective of HVPG in these patients, it is correlated with hepatic dysfunction and systemic inflammation. Although the quantification of these high values provides prognostic information (i.e., there was no evidence of a ceiling effect), the lack of an association with clinical outcomes in MELD-adjusted analysis questions their relevance.

Figure:



## PO-6-1-YI

### Upper gastrointestinal bleeding in cirrhosis: predictive factors of recurrence

Fatma Ben Farhat<sup>1</sup>, Mariem Sabbah<sup>1</sup>, Hedi Sellami<sup>1</sup>, Nawel Bellil<sup>1</sup>, Dorra Trad<sup>1</sup>, Norsaf Bibani<sup>2</sup>, Dalila Gargouri<sup>1</sup>

<sup>1</sup>Habib Thameur Hospital, Gastroenterology, Tunisia, <sup>2</sup>Habib Thameur Hospital, Tunisia

Email: [fatmabf8@gmail.com](mailto:fatmabf8@gmail.com)

**Background and aims:** Upper gastrointestinal bleeding (UGB) due to portal hypertension (PH) is a frequent and serious complication of hepatic cirrhosis. The risk of bleeding recurrence (BR) involves several factors related to the patient, the underlying pathology, taking into consideration endoscopic findings. Our study aimed to identify the predictive factors of hemorrhagic recurrence.

**Method:** This is a retrospective study gathering all the patients presenting with UGB between 2014 and 2019. The sociodemographic, clinical, laboratory, endoscopic, therapeutic and evolutionary data were collected. The patients were allocated to 2 groups: Group1 'Hemorrhagic recurrence', Group2 'No hemorrhagic recurrence'. An analytical study was performed to identify the predictive factors of hemorrhagic recurrence. Data analysis was carried out by the software SPSS 22.0 (significant p value if <0.05).

**Results:** Sixty patients were included in this study. The average age was 63.38 years, the sex ratio 0.8. Twenty-five percent (25%) of the patients had post hepatitis B or C virus cirrhosis and 5% had primary biliary cirrhosis (CBP). The cirrhosis was decompensated in twelve patients (20%). The gastrointestinal bleeding was inaugural in 35% of cases. Esophageal varices were present in 93.3% and gastric varices in 40% of patients. Seventy-three percent underwent elastic band ligation with a good control of the bleeding in 75% of cases. Biological glue injection was performed on 10% of cases. A hemorrhagic recurrence was recorded in 20 patients (Group1). We identified many predictive factors for hemorrhagic recurrence: a high PT ( $p = 0.027$ ), the absence of control of the bleeding ( $p = 0.029$ ), the etiology of cirrhosis (PBC vs post hepatitis virus cirrhosis) ( $p = 0.009$ ) and the decompensation of the underlying cirrhosis ( $p = 0.049$ ). The Child Pugh score ( $p = 0.179$ ), the presence of an active endoscopic bleeding ( $p = 0.45$ ), and the other lab values were not correlated to hemorrhagic recurrence in our study.

**Conclusion:** According to our study, certain factors (decompensated cirrhosis, etiology, high PT, the absence of hemorrhagic control) can predict hemorrhagic recurrence in cirrhotic patients. It would be wise to take them into consideration in the management of patients in order to enhance the prognosis.

## PO-6-2

# Thrombophilia profile in patients with extrahepatic portal vein obstruction (EHPVO)

Akash Shukla<sup>1</sup>, Suprabhat Giri<sup>1</sup>, Sidharth Harindranath<sup>1</sup>

<sup>1</sup>King Edward Memorial Hospital and Seth Gordhandas Sunderdas Medical College, Gastroenterology, Mumbai, India

Email: [drakashshukla@yahoo.com](mailto:drakashshukla@yahoo.com)

**Background and aims:** Extrahepatic portal vein obstruction (EHPVO) is a heterogenous disease with regards to etiology, pathogenesis, age, and geographical location. EHPVO is the second most common cause of portal hypertension in India after cirrhosis, responsible for 35-40% cases of variceal bleeding. Although umbilical vein catheterization or omphalitis are frequently reported causes in young children, causes in adults remain unknown in the absence of local factors. Hence, this study was aimed to estimate the prevalence of prothrombotic risk factors in patients with EHPVO.

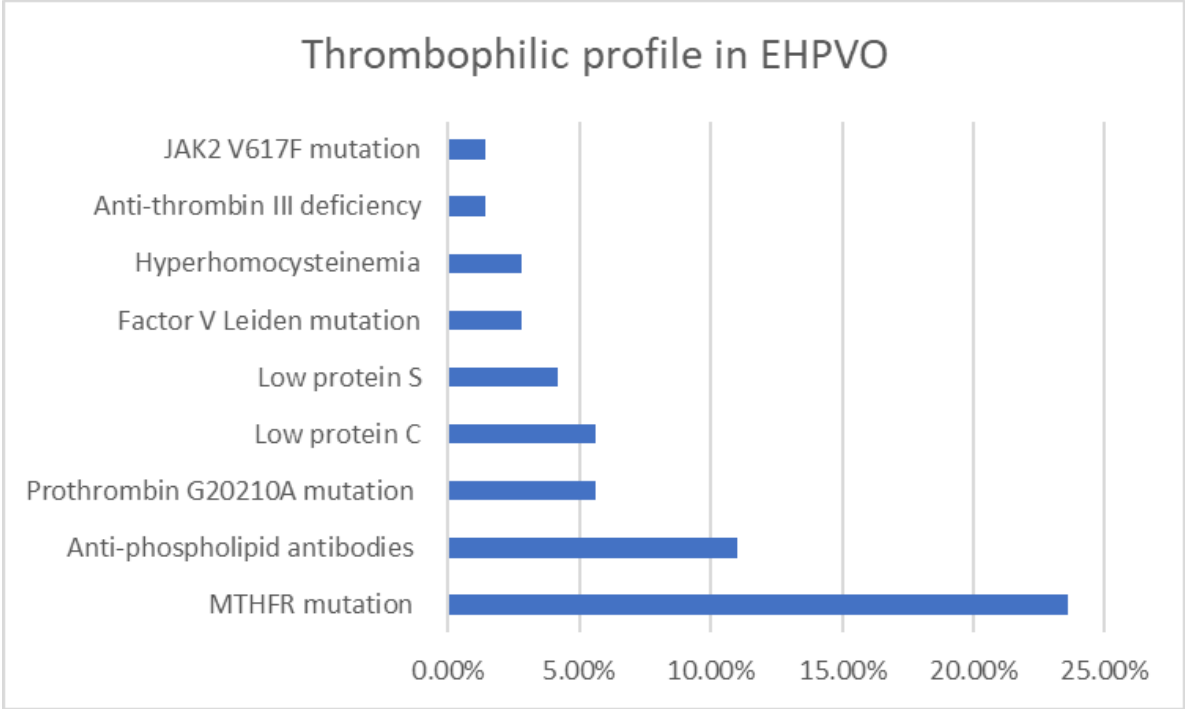
**Method:** It was a single center prospective study conducted over a period of 12 months. All patients presenting with features of portal hypertension were screened for EHPVO. Diagnosis of EHPVO was made by doppler ultrasound (US) or computed tomography (CT)/magnetic resonance (MR) venography with demonstration of a portal cavernoma (multiple tortuous small vessels replacing the portal vein) associated with splenomegaly and collaterals. Clinical, biochemical, and imaging findings were recorded. Thrombophilia profile was done in all patients which included analysis for MTHFR mutation, prothrombin gene mutation, factor V Leiden mutation, JAK2 mutation, estimation of level of homocysteine, Anti-thrombin III, protein C, protein S, APLA and ACLA antibody levels and flow cytometry for PNH.

**Results:** Majority of the patients were males (61%) with a median age of 28 years (12-72). Variceal bleeding was the most common presentation seen in 61% patients followed by pain abdomen (55.6%) and feeling of a lump in left upper quadrant (9.7%). Ascites was present in 5.6% cases which was transiently seen after an episode of variceal bleeding and resolved in all patients. Symptomatic portal cavernoma cholangiopathy was seen in 2.8% cases. Thirty-two patients (44.4%) had one or more thrombophilic state while 8/72 (11%) patients had two or more thrombophilic state. MTHFR mutation was the most common thrombophilic condition seen in 23.6% cases followed by anti-phospholipid antibodies (11%), prothrombin G20210A mutation (5.6%), low protein C (5.6%), low protein S (4.2%), Factor V Leiden mutation (2.8%), hyperhomocysteinemia (2.8%), anti-thrombin III deficiency (1.4%), and JAK2 mutation (1.4%).

**Conclusion:** Prothrombotic conditions are common in patients with EHPVO with approximately 45% patients having one or more and 11% patients having two or more thrombophilic factors. Hence, adult patients with EHPVO should undergo thrombophilic workup as presence of thrombophilic risk factor like anti-phospholipid antibodies and JAK2 mutation may require additional therapy.



Figure:



## PO-6-3-YI

### Impact of prothrombin and factor V leiden mutations on the progression of fibrosis in patients with chronic hepatitis C

Mary Naguib<sup>1</sup>, Wael Abdel-Razek<sup>2</sup>, Suzanne Estaphan<sup>3</sup>, Eman Abdelsameea<sup>2</sup>, Mohamed Abdel-Samiee<sup>2</sup>, Nevine F Shafik<sup>4</sup>

<sup>1</sup>National Liver Institute, Menoufia University, Clinical and Chemical Pathology, Shebin El-Kom, Egypt,

<sup>2</sup>National Liver Institute, Menoufia University, Hepatology and Gastroenterology, Shebin El-Kom, Egypt,

<sup>3</sup>Faculty of Medicine, Cairo University, Physiology, Egypt, <sup>4</sup>National Cancer Institute, Cairo University, Clinical and Chemical Pathology, Egypt

Email: [drmohammed100@yahoo.com](mailto:drmohammed100@yahoo.com)

**Background and aims:** The role of thrombotic factors in the pathogenesis and progression of liver fibrosis remains obscure. We aimed to study the relationship between prothrombin G20210A (PT20210) and factor V Leiden (FVL) mutations and the progression of fibrosis and liver function in chronic HCV patients.

**Method:** The study included 100 subjects, 88 patients with HCV-related cirrhosis (compensated: 38, decompensated: 50), and 12 controls. Relevant clinical data were collected and basic laboratory tests were performed. Liver fibrosis was assessed using APRI and FIB-4 scores. FVL and PT20210 mutations were analyzed.

**Results:** The control, compensated and decompensated groups had comparable gender distribution. Controls were significantly younger than the cirrhosis groups which had comparable age. FVL and PT20210 mutations were significantly higher in decompensated vs. compensated patients (32% vs. 5.3%,  $P = 0.001$ ; 20% vs. 5.3%, 0.043, respectively) and absent in controls. Both mutations significantly correlated to the duration of infection, platelet count and fibrosis scores. PT20210 mutation significantly correlated to serum albumin and INR. Both mutations significantly predicted fibrosis scores, especially PT20210 (AUROC: 0.833 for APRI and 0.895 for FIB-4). Both mutations have impact on fibrosis progression and liver functions and should be considered as markers predicting the need for early and different intervention.

**Conclusion:** Our study has demonstrated that factor V Leiden (G1691A) and prothrombin G20210 mutant polymorphisms are significantly correlated with the liver fibrosis, synthetic function. Notably, both mutations, especially PT20210 can significantly predict liver fibrosis. This could reflect the role of thrombotic mutations in the pathogenesis of fibrosis and could be the target of future antifibrotic therapies.

## PO-6-4

# Divergencies in macrophage activation markers soluble Cd163 and mannose receptor in patients with non-cirrhotic and cirrhotic portal hypertension

Nikolaj Ørntoft<sup>1</sup>, Michel Ble<sup>2</sup>, Anna Baiges<sup>2</sup>, José Ferrusquia<sup>2</sup>, Virginia Hernandez-Gea<sup>2</sup>, Fanny Turon<sup>2</sup>, Marta Magaz<sup>2</sup>, Søren Møller<sup>3</sup>, Holger Jon Møller<sup>4</sup>, Juan Carlos Garcia Pagan<sup>2</sup>, Henning Grønbaek<sup>1</sup>

<sup>1</sup>Aarhus University Hospital, Department of Hepatology and Gastroenterology, Denmark, <sup>2</sup>Barcelona Hepatic Hemodynamic Laboratory, Liver Unit, Hospital Clínic, Spain, <sup>3</sup>Copenhagen University Hospital Hvidovre, Center of Functional and Diagnostic Imaging and Research, Department of Clinical Physiology and Nuclear Medicine 260, Denmark, <sup>4</sup>Aarhus University Hospital, Department of Clinical Biochemistry, Denmark

Email: [henning.gronbaek@dadlnet.dk](mailto:henning.gronbaek@dadlnet.dk)

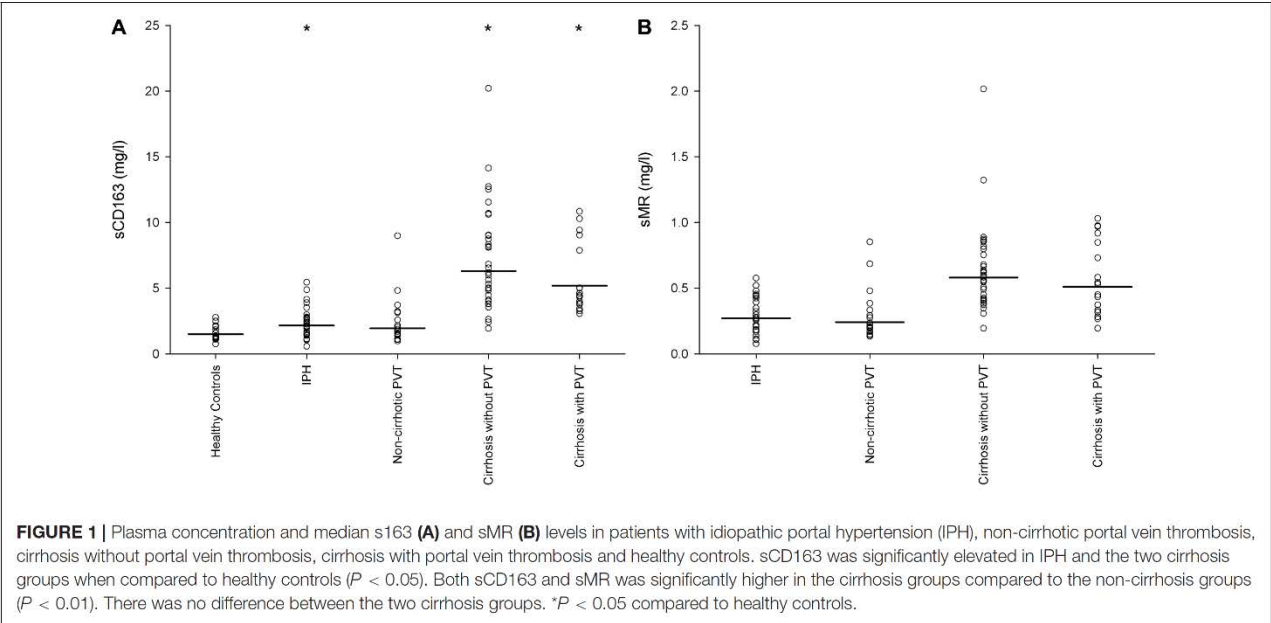
**Background and aims:** Macrophages are involved in development and progression of chronic liver disease and portal hypertension. The macrophage activation markers soluble (s)CD163 and soluble mannose receptor (sMR), are associated with portal hypertension in patient with liver cirrhosis but never investigated in patients with non-cirrhotic portal hypertension. We hypothesized higher levels in cirrhotic patients with portal hypertension than patients with non-cirrhotic portal hypertension. We investigated sCD163 and sMR levels in patients with portal hypertension due to idiopathic portal hypertension (IPH) and portal vein thrombosis (PVT) in patients with and without cirrhosis.

**Method:** We studied plasma sCD163 and sMR levels in patients with IPH (n = 26), non-cirrhotic PVT (n = 20), patients with cirrhosis without PVT (n = 31) and with PVT (n = 17), and healthy controls (n = 15).

**Results:** Median sCD163 concentration was 1.51 (95% CI: 1.24-1.83) mg/L in healthy controls, 1.96 (95% CI: 1.49-2.56) in patients with non-cirrhotic PVT and 2.16 (95% CI: 1.75-2.66) in patients with IPH. There was no difference between non-cirrhotic PVT patients and healthy controls, whereas IPH patients had significantly higher levels than controls (p <0.05). The median sCD163 was significantly higher in the cirrhotic groups compared to the other groups, with a median sCD163 of 6.31 (95% CI: 5.16-7.73) in cirrhotics without PVT and 5.19 (95% CI: 4.18-6.46) with PVT (p <0.01, all). Similar differences were observed for sMR.

**Conclusion:** Soluble CD163 and sMR levels are elevated in patients with IPH and patients with cirrhosis, but normal in patients with non-cirrhotic PVT. This suggests that hepatic macrophage activation is more driven by the underlying liver disease with cirrhosis than portal hypertension.

**Figure:**



## PO-7-1-YI

### Coagulopathy is not predictive of bleeding in patients with acute decompensation of cirrhosis and acute-on-chronic liver failure

Alberto Zanetto<sup>1</sup>, Elena Campello<sup>2</sup>, Cristiana Bulato<sup>2</sup>, Sara Maggiolo<sup>2</sup>, Luca Spiezia<sup>2</sup>, Francesco Paolo Russo<sup>1</sup>, Sabrina Gavasso<sup>2</sup>, Pierluigi Mazzeo<sup>2</sup>, Daniela Tormene<sup>2</sup>, Patrizia Burra<sup>1</sup>, Paolo Angeli<sup>3</sup>, Marco Senzolo<sup>1</sup>, Paolo Simioni<sup>2</sup>

<sup>1</sup>Gastroenterology and Multivisceral Transplant Unit, Surgery, Oncology, and Gastroenterology, Padova University Hospital, Padova, Italy, <sup>2</sup>Thrombotic and Hemorrhagic Diseases Unit, Padova University Hospital, Padova, Italy, General Internal Medicine, Padova, Italy, <sup>3</sup>5th Chair of Internal Medicine, Department of Medicine, Padova University Hospital, Italy

Email: [alberto.zanetto@yahoo.it](mailto:alberto.zanetto@yahoo.it)

**Background and aims:** Understanding factors responsible for the increased bleeding tendency in acute-on-chronic liver failure (ACLF) would improve the management of these complications. We investigated alterations of coagulation in ACLF, and assessed whether they were predictive of bleeding.

**Method:** Cirrhosis patients with ACLF (cases) and acute decompensation (AD, controls) were prospectively recruited and underwent an extensive hemostatic assessment including standard tests, pro and anticoagulant factors, thrombomodulin-modified thrombin generation (TG), and thromboelastometry (ROTEM). In study part 1 (case-control), we compared coagulation in ACLF vs. AD. In study part 2 (prospective), all patients were followed for bleeding and predictors of outcome were assessed.

**Results:** Ninety-one patients were included (51 with ACLF and 40 with AD). Infections and ascites/renal dysfunction were the most common precipitating and decompensating events in both groups. Platelet count was lower while INR and aPTT were longer in patients with ACLF than in those with AD. Regarding clotting factors, fibrinogen and factor VIII were comparable between groups while protein C and antithrombin were significantly reduced in ACLF. Endogenous thrombin potential as assessed by TG, however, was comparable between groups. Clotting formation time and clot stability by ROTEM were significantly lower in ACLF, indicative of a more hypocoagulable state. No alteration of hemostasis was able to discriminate between patients who had bleeding complications during hospitalization and those who did not.

**Conclusion:** We found coagulation changes in ACLF to largely overlap with that of AD, and evidence of preserved coagulation capacity in both groups. ROTEM alterations were indicative of a more pronounced hypocoagulable state in ACLF, however no correlation was found between such alterations and bleeding.

## PO-7-2-YI

### Natural history and clinical impact of non-neoplastic portal vein thrombosis in cirrhotics with hepatocellular carcinoma

Sarah Shalaby<sup>1</sup>, Marco Grasso<sup>1</sup>, Alessandro Vitale<sup>2</sup>, Enrico Pizzirani<sup>3</sup>, Alberto Zanetto<sup>1</sup>, Paolo Feltracco<sup>4</sup>, Patrizia Burra<sup>1</sup>, Umberto Cillo<sup>2</sup>, Marco Senzolo<sup>1</sup>

<sup>1</sup>Multivisceral Transplant Unit, Department of Surgery, Oncology and Gastroenterology, Padua University Hospital, Padua, Italy, <sup>2</sup>Hepatobiliary Surgery and Liver Transplantation Unit, Department of Surgery, Oncology and Gastroenterology, Padua University Hospital, Padua, Italy, <sup>3</sup>Institute of Radiology, Department of Medicine-DIMED, Padua, Italy, <sup>4</sup>Section of Anesthesiology and Intensive Care, Department of Medicine-DIMED, Padua, Italy

Email: [sarahshalaby18@gmail.com](mailto:sarahshalaby18@gmail.com)

**Background and aims:** Portal vein thrombosis (PVT) is a common thrombotic complication in cirrhosis; however, data on its epidemiology and prognostic role in patients with hepatocellular carcinoma (HCC) are still scarce.

**Method:** Cirrhotic patients with HCC undergoing laparoscopic microwave ablation and non-neoplastic PVT were consecutively enrolled over a period of 4 years. Non-neoplastic PVT extension for each portal branch and HCC total tumour volume (TTV) were calculated by a single-radiologist blinded to report in every patient, at baseline and for each follow-up interval. Characteristics of patients and HCC were correlated with presence of PVT and to its evolution. The role of PVT on survival was evaluated by Uni and multivariate Cox analyses.

**Results:** Among 900 consecutive patients 122 were excluded because of previous hepatic resection, 3 for previous portosystemic shunt creation and 25 due to neoplastic PVT. Seven hundreds-fifty patients were finally included, 88 with PVT. Fifty patients showed isolated PVT (18% complete); 33 showed portal and mesenteric vein involvement (22% complete); 5 had porto-spleno-mesenteric thrombosis (0% complete). At multivariate analysis, median pre-treatment TTV (OR 1.10, 95%CI 1.05-1.15,  $p < .0001$ ) and presence of clinically significant portal hypertension (OR 2.90, 95%CI 1.37-6.59,  $p = .0046$ ) were the only independent variables associated with PVT. Fifty-six patients with PVT were followed-up for >3 months (median follow-up 9 months) and 14 were treated with anticoagulation. PVT improved in 43% of anticoagulated patients vs only 9.5% of untreated patients ( $p = .002$ ). Anticoagulant therapy was independently associated with PVT improvement, together with HCC response to ablative treatment, while lack of HCC response to ablative treatment predicted PVT progression. Median survival in patients with complete or progressive PVT was 10.9 vs 47.2 months in other patients ( $p < .001$ ). The prognostic negative impact on survival of complete/progressive PVT persisted at multivariable analysis (HR 2.1, 95%CI 1.2-3.4,  $p = .007$ ), along with Child-Pugh score and TTV.

**Conclusion:** HCC TTV and recurrence after treatment are independent predictors of non-neoplastic PVT development and progression. Complete/progressive PVT is an independent factor associated with mortality, therefore thromboprophylaxis in patients with large HCC should be evaluated in future studies.

## PO-7-3-YI

### Invasive and non-invasive staging of Fontan-associated liver disease: The Valdig prospective Fonliver cohort

Tellez Luis<sup>1 2 3</sup>, Antonio Guerrero<sup>1</sup>, Diego Rincón Rodríguez<sup>4</sup>, Payance Audrey<sup>5</sup>, Anaïs Jaillais<sup>6</sup>, Pascal Lebray<sup>7</sup>, Ana Clemente<sup>4</sup>, Elvira Garrido-Lestache<sup>8</sup>, Valérie Paradis<sup>9</sup>, Raquel Prieto<sup>10</sup>, Magalie Ladouceur<sup>11</sup>, Bruno Lefort<sup>12</sup>, Laurence Iserin<sup>11</sup>, Maria Alvarez Fuente<sup>8</sup>, Elena Garrido<sup>1</sup>, Maria Toledano<sup>8</sup>, Cristian Perna<sup>13</sup>, Rautou PE<sup>5</sup>, Rafael Bañares<sup>4</sup>, Dra. María Jesús del Cerro<sup>8</sup>, Agustin Albillos<sup>1</sup>

<sup>1</sup>Hospital Ramón y Cajal, Hepatology, Madrid, Spain, <sup>2</sup>Instituto Ramón y Cajal de Investigación Sanitaria-IRYCIS, Madrid, Spain, <sup>3</sup>CIBER-Center for Biomedical Research Network, Madrid, Spain, <sup>4</sup>Gregorio Marañón Hospital, Hepatology, Madrid, Spain, <sup>5</sup>Hospital Beaujon AP-HP, Hepatology, Clichy, France, <sup>6</sup>Hôpital Tours, Hepatology, Tours, France, <sup>7</sup>University Hospitals Pitié Salpêtrière-Charles Foix, Hepatology, Paris, France, <sup>8</sup>Hospital Ramón y Cajal, Pediatric Cardiology, Madrid, Spain, <sup>9</sup>Hospital Beaujon AP-HP, Pathology, Clichy, France, <sup>10</sup>Gregorio Marañón Hospital, Cardiology, Madrid, Spain, <sup>11</sup>European Hospital Georges Pompidou, Cardiology, Paris, France, <sup>12</sup>Hôpital Tours, Service de Cardiologie Congénitale et Pédiatrique, Tours, France, <sup>13</sup>Hospital Ramón y Cajal, Pathology, Madrid, Spain

Email: [luistevilla@gmail.com](mailto:luistevilla@gmail.com)

**Background and aims:** Fontan-associated liver disease (FALD) is the term that encompasses all liver disturbances following Fontan surgery (FS). Liver biopsy (LB) remains the gold standard to stage liver disease. However, LB is risky, particularly in patients on anticoagulation. We aimed to estimate the prevalence of severe liver fibrosis and to evaluate the accuracy of non-invasive markers for staging fibrosis in FALD.

**Method:** Observational study, conducted at five European centres belonging to the VALDIG group. 125 consecutive patients with FS evaluated by LB, liver stiffness measurement (LSM) by transient elastography (Fibroscan®), hepatic hemodynamics, and blood tests were included. Unreliable tissue samples were excluded. Period: December 2015-September 2020.

**Results:** 92% showed some degree of fibrosis, being severe (Congestive hepatic fibrosis score [CHFS] 3-4) in 56.8% (95%, CI:48.0-65.1). Time from FS  $\geq 15$  was related to the risk of severe liver fibrosis (OR 3.5 [1.6-7.7],  $p = 0.01$ ). LSM was universally elevated (25.3[14.6] kPa), and directly related to liver fibrosis ( $\rho = 0.55$ ,  $p < 0.001$ ). Hepatic venous pressure gradient (HVPG) was within the normal range in all patients and was not related to liver fibrosis ( $\rho = 0.14$ ,  $p = 0.14$ ). In contrast, free and wedged hepatic pressures were significantly higher in patients with severe fibrosis (all,  $p < 0.05$ ). Radiological signs of severe fibrosis in US/MRI were also present in patients with mild fibrosis. LSM predicted severe liver fibrosis, independently of central venous pressure (OR 1.2 95% [CI: 1.1-1.2,  $p < 0.01$ ]), with an AUROC of 0.81 (95%, CI:0.73-0.88). The optimal cut-off value of LSM for ruling out severe liver fibrosis (at least 90% sensitivity) was 15.0 kPa. Compared to other serological diagnostic methods (APRI, Forns index, and FIB-4), LSM was the best predictor of severe liver fibrosis ( $p < 0.01$ ).

**Conclusion:** (1)Liver fibrosis is almost universally present after FS and its severity is related to the time elapsed from FS. (2)LSM is a reliable non-invasive method to rule out severe liver fibrosis in FALD.

Figure:

	Mild-moderate liver fibrosis N =54	Severe liver fibrosis N =71	Univariate analysis P (<0.05)
Number of patients	54	71	
Sex, male	35 (64.8%)	42 (59.2%)	0.58
Age, years	24.2 (7.9)	30.0 (10.5)	<b>&lt;0.01</b>
Time since FS, years	15.9 (6.1)	20.7 (8.6)	<b>&lt;0.01</b>
<b>Laboratory parameters</b>			
Number of patients	54	71	
AST, IU/L	29 (14)	30 (10)	0.73
ALT, IU/L	28 (15)	28 (11)	0.83
GGT, IU/L	81(60)	104 (63)	<b>0.04</b>
ALK, IU/L	103 (61)	107 (86)	0.79
Total bilirubin, mg/dL	1.3 (0.9)	1.6 (1.5)	0.10
Albumin, g/dL	4.6 (0.5)	4.4 (0.7)	0.09
Creatinine, mg/dL	0.7 (0.2)	0.8 (0.2)	0.32
Platelets*10 <sup>3</sup> /mm <sup>3</sup>	165 (55)	148 (47)	0.05
BNP, pg/mL (n=88)	83 (107)	122 (163)	0.19
<b>Hemodynamics</b>			
Number of patients	52	67	
Systemic venous pressure, mmHg	11 (4)	14 (5)	<b>0.02</b>
mPAP, mmHg	11 (4)	14 (5)	0.06
Cardiac index, L/min/m <sup>2</sup>	2.5 (0.9)	2.7 (1.2)	0.42
FHVP, mmHg	12 (5)	14 (5)	<b>0.01</b>
WHVP, mmHg	13 (5)	16 (5)	<b>&lt;0.01</b>
HVPG, mmHg	1.4 (0.8)	1.7 (1.3)	0.07
<b>Radiological features</b>			
Number of patients	54	71	
Nodular surface in US	20 (37.0%)	40 (56.3%)	<b>0.046</b>
Heterogeneity in US	23 (42.6%)	39 (54.9%)	0.21
Reticular enhancement	25 (46.3%)	42 (59.2%)	0.12
Liver nodules in MRI	24 (44.4%)	25 (35.2%)	0.36
Spleen diameter, cm	12.4 (2.4)	13.1 (2.9)	0.13
Portal vein diameter, mm	10.8 (2.2)	10.9 (2.5)	0.68
Portosystemic shunts	12 (22.2%)	21 (29.6%)	0.42
<b>Non-invasive methods</b>			
Number of patients	54	71	
LSM, kPa	17.2 (6.5)	31.1 (15.0)	<b>&lt;0.01</b>
FIB-4	0.86 (0.47)	1.40 (1.00)	<b>&lt;0.01</b>
Forns Index	4.16 (1.47)	5.24 (2.06)	<b>&lt;0.01</b>
APRI score	0.54 (0.34)	0.58 (0.29)	0.50
LSPS index	1.54 (1.16)	3.88 (4.22)	<b>&lt;0.01</b>



## PO-7-4

# High plasma thrombomodulin level indicated poor prognostic of liver cirrhosis: a prospective cohort study

Wei Xinhuan<sup>1</sup>, Du Xiaofei<sup>1</sup>, Zhang Jing<sup>1</sup>, Wu Jun<sup>2</sup>

<sup>1</sup>Beijing Youan Hospital, The Third Unit, Department of Hepatology, <sup>2</sup>Beijing Jishuitan Hospital, Department of Laboratory Medicine, China

Email: [zjyouan@ccmu.edu.cn](mailto:zjyouan@ccmu.edu.cn)

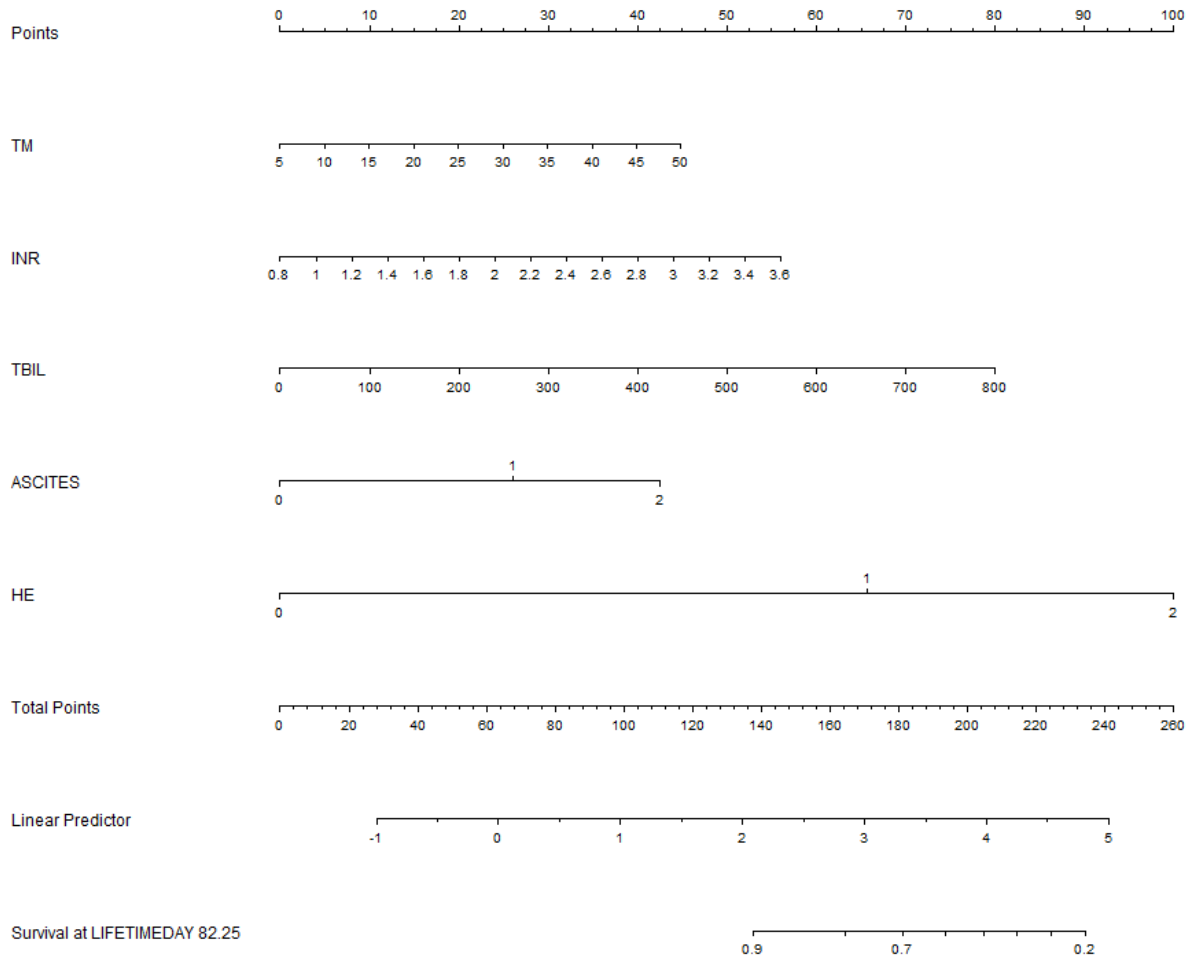
**Background and aims:** Hepatic sinusoidal endothelial injury is a prominent character of liver cirrhosis. Hepatic sinusoidal endothelial cell mainly regulates the liver microcirculation and participates in the development of hepatic fibrosis by mediating hepatic stiffness and hepatic angiogenesis. Thrombomodulin, as a glycoprotein on the surface of endothelial cells, can be released into the blood after pathological process such as inflammation or injury of endothelial cells. Plasma thrombomodulin is considered to be one of the most sensitive indicators of vascular endothelial injury. We determined plasma thrombomodulin levels in cirrhosis patients to evaluate its relationship with long-term prognosis.

**Method:** We prospectively recruited 399 hospitalized cirrhosis patients from our hospital. Demography data, liver function and complications of cirrhosis were recorded. The patients were followed up every three months for 4 years or to deaths. Baseline thrombomodulin were determined by chemiluminescent enzyme immunoassay.

**Results:** At baseline, 399 patients were recruited, 52.3% of which were hepatitis B virus and hepatitis C virus infections. Plasma thrombomodulin levels were much higher ( $16.4 \pm 6.3$  ng/ml) than healthy controls ( $8.6 \pm 2.0$  ng/ml,  $p = 0.0$ ), and increase parallel with Child-Pugh scores (Child-Pugh A:  $14.0 \pm 5.3$  ng/ml; Child-Pugh B:  $16.6 \pm 6.5$  ng/ml and Child-Pugh c:  $18.0 \pm 6.5$  ng/ml,  $p = 0.0$ ). In patients with moderate-severe ascites, higher plasma thrombomodulin levels were significantly higher ( $17.8 \pm 6.5$  ng/ml) than patients with no ascites ( $15.1 \pm 5.9$  ng/ml) or mild ascites ( $16.2 \pm 6.4$  ng/ml) ( $p = 0.0$ ). In patients with acute decompensation, plasma thrombomodulin levels was higher ( $17.3 \pm 6.4$  ng/ml vs  $15.1 \pm 6.1$  ng/ml,  $p = 0.0$ ). After adjusted by gender, age, prothrombin time (PT), active partial thromboplastin time (APTT), fibrinogen (FIB) and D-Dimer, multivariate regression demonstrated that each ng/ml elevation of plasma thrombomodulin results in an increase of 7% in mortality, and each standard deviation (SD) elevation of thrombomodulin leads to an increase of 58% in mortality. K-M analysis indicated that patients with thrombomodulin  $\geq 18.0$  ng/ml demonstrated an additional 1.5 times death risk (95%CI: 0.9-6.5,  $p = 0.0$ ) than that with thrombomodulin  $<18.0$  ng/ml. A formula combining thrombomodulin with international normalize ratio (INR), total bilirubin, ascites and hepatic encephalopathy was established. The area under curve (AUC) achieved 0.9 to predict the one-year survival of cirrhosis patients, which was much higher than that of model for end-stage liver diseases (MELD), MELD-Na and Child-Pugh Scores (AUC = 0.7, 0.8 and 0.8, separately).

**Conclusion:** Liver cirrhosis patients had significant higher plasma thrombomodulin in parallel with the severity of liver injury, and endothelial injury also indicated poor prognosis in liver cirrhosis.

**Figure:**



## PO-7-5-YI

# Impact of porto-systemic vein shunting on non-alcoholic liver disease and hepatocellular carcinoma development in a high fat diet mouse model

Andrea Peloso<sup>1</sup>, Quentin Gex<sup>2</sup>, Matthiew Tih<sup>3</sup>, Florence Slits<sup>2</sup>, Laura RUBBIA-BRANDT<sup>3</sup>, Graziano Oldani<sup>1</sup>, Stéphanie Lacotte<sup>2</sup>, Christian Toso<sup>1</sup>

<sup>1</sup>Hôpitaux Universitaires de Genève (HUG), Genève, Switzerland, <sup>2</sup>Hepatology and Transplantation Laboratory, University of Geneva, Geneva, Switzerland, <sup>3</sup>Division of Clinical Pathology, Diagnostic Department, Geneva University Hospital, Geneva, Switzerland

Email: [andrea.peloso@unige.ch](mailto:andrea.peloso@unige.ch)

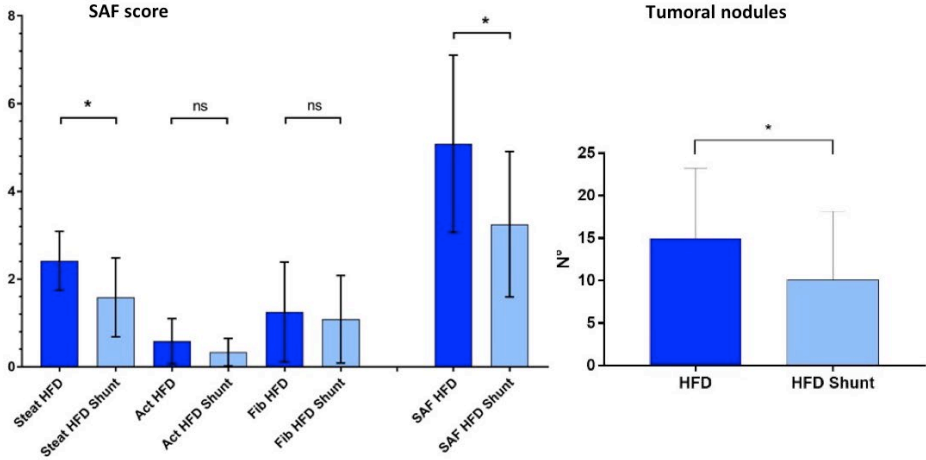
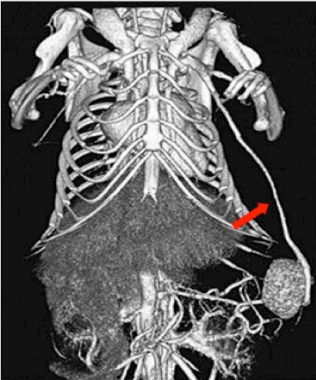
**Background and aims:** Non-alcoholic fatty liver disease (NAFLD) is an increasing disorder and one of the leading cause of hepatocellular carcinoma (HCC). It is associated with an elevated portal venous pressure, an altered intestinal barrier, and increased translocation of bacterial products, which all can further worsen the NAFLD state. We hypothesized that this vicious cycle can be interrupted by a modulation of portal pressure via surgical porto-systemic vein shunting. The aim of this study was to test whether porto-systemic shunts can prevent NAFLD, and HCC carcinogenesis and growth in a high-fat diet (HFD) mouse model.

**Method:** C57BL/6 mice were fed a HFD starting from 4 weeks of age, and porto-systemic shunts (or sham surgery) were created at 8 weeks via spleen transposition. Portal pressure, liver/spleen rheology, and hepatic histology were assessed at 40 weeks. Liver expression of fatty acid synthase (FASn) and serum adiponectin level were measured. Signs of portal hypertensive enteropathy (PHE) were also studied. In parallel experiments, HFD mice were injected with a diethylnitrosamine (DEN) at 2 weeks, and HCC tumor burden was assessed by MRI and histology. Tumor growth was estimated by repeated Ct-scan HCC volumetries.

**Results:** After spleen transposition, 75% of mice developed porto-systemic shunts. Shunted HFD mice presented decreased portal pressure (10 vs 15 mmHg, -33, 3%;  $p \leq 0.0001$ ) and liver volume (1.831 vs 2.487 cm<sup>3</sup>, -26, 3;  $p \leq 0.05$ ), less liver steatosis, and less histological features of NAFLD (SAF score,  $p \leq 0.05$ ). These observations were associated with a reduced expression of FASn and adiponectin compared to sham (0.5738 vs 0.9120, -37%;  $p \leq 0.05$ ). Shunting also reduced the hypertensive intestinal lymphatic inflammatory response in proximal small bowel (0.9625 vs 1.487, -35.3%;  $p \leq 0.05$ ). Moreover, shunted HFD mice showed a reduced carcinogenesis, with less HCC nodules than sham mice (median nodules 8 vs 14, -42.9%;  $p \leq 0.05$ ). However, their HCCs were larger (709.3 vs 197 mm<sup>3</sup>, +258, 6%;  $p \leq 0.05$ ), and with a higher growth rate (0.9287 vs 0.2646 mm<sup>3</sup>/week, +250, 98%;  $p \leq 0.05$ ), potentially linked to the hyper-arterialization of the liver.

**Conclusion:** Based on a HFD mouse model, porto-systemic shunting can prevent NAFLD and HCC carcinogenesis. However, it is associated with an increased HCC growth rate.

Figure:



## PO-8-1-YI

### A non-invasive diagnosis of oesophageal varices in patients with compensated liver cirrhosis

El-Sayed Tharwa<sup>1</sup>, Khalid Gamil<sup>1</sup>, Osama El-Abd<sup>2</sup>, Elhamy Abd-Almonem<sup>3</sup>, Mohamed Abdel-Samiee<sup>1</sup>  
Abdel Ghani Badran<sup>4</sup>

<sup>1</sup>National Liver Institute, Menoufia University, Hepatology and Gastroenterology, Shebin El-Kom, Egypt, <sup>2</sup>National Liver Institute, Menoufia University, Radiology, Shebin El-Kom, Egypt, <sup>3</sup>National Liver Institute, Menoufia University, Clinical pathology, Shebin El-Kom, Egypt, <sup>4</sup>Ministry of Health and Population, Mansoura, Egypt

Email: [drmohammed100@yahoo.com](mailto:drmohammed100@yahoo.com)

**Background and aims:** Varices are present in 30-40 % of patients with compensated cirrhosis (Child-Pugh class A). Although screening endoscopy for esophageal varices (O.V.) is recommended to all patients with cirrhosis, this recommendation is not a result of evidence-based data. We studied the association of (platelet count/spleen diameter ratio, insulin resistance and splenoportal index) and the presence of O.V. in patients with compensated cirrhosis.

**Method:** 124 patients with compensated liver cirrhosis due to chronic hepatitis C virus were studied. After clinical, laboratory ultrasound examinations, all patients underwent screening endoscopy and O.V were reported as present or absent. According to presence or absence of varices; two groups were described: group I without varices and group II with varices.

**Results:** Among 124 patients with mean age of ( $51.81 \pm 12.94$ ), 2 groups were described: group I (30 patients) and group II (94 patients) with a male majority (20 patients in group I and 66 patients in group II). In group I and group II: the mean platelet count/spleen diameter ratio was ( $1022.6 \pm 73.36$ ,  $608.76 \pm 58.44$ ) respectively, the mean insulin resistance value was ( $2.426 \pm 0.618$ ,  $3.081 \pm 0.474$ ) respectively. The mean splenoportal index (SPI) value was ( $2.878 \pm 0.870$ ,  $6.349 \pm 0.514$ ) respectively. For platelet count/spleen diameter ratio and SPI, the sensitivity was (95.7%), specificity (83.3%) and accuracy (92.7%). For platelet count/spleen diameter ratio and insulin resistance (IR), the sensitivity was (70.2%), specificity (86.7%) and accuracy (74.1%). For IR and SPI, the sensitivity was (70.2%), specificity (76.7%) and accuracy (71.7%). For the three predictors combined, the sensitivity was (78.7%), specificity (82.2%) and accuracy (79.5%).

**Conclusion:** Low platelet count/spleen ratio and high SPI are very useful non-invasive predictors for the presence of O.V. that could be used either separately or combined to decrease the number of upper GIT endoscopies needed in cirrhotic patients management, However, IR as a non-invasive predictor is still in need for further evaluation.

**Figure:**

Table (1) shows the sensitivity, specificity, positive predictive value, negative predictive value and accuracy when we combine (Platelet count/spleen diameter ratio and Splenoportal index), (Platelet count/spleen diameter ratio and IR) and (IR and Splenoportal index).

	<b>Platelet count/spleen diameter ratio and Splenoportal index</b>	<b>Platelet count/spleen diameter ratio and IR</b>	<b>IRand Splenoportal index</b>	<b>Platelet count/spleen diameter ratio and IRand Splenoportal index</b>
Sensitivity (%)	95.7	70.2	70.2	78.7
Specificity (%)	83.3	86.7	76.7	82.2
Positive Predictive Value (%)	94.7	94.3	90.4	93.2
Negative Predictive Value (%)	86.2	48.1	45.1	55.2
Accuracy (%)	92.7	74.1	71.7	79.5

## PO-8-2-YI

# The associations among von willebrand factor, ADAMTS13, and factor VIII with non-malignant portal vein thrombosis incidence: systematic review and meta-analysis

Boby Pratama Putra<sup>1</sup>, Felix Nugraha Putra<sup>2</sup>

<sup>1</sup>Medical doctor, Blitar, Indonesia, <sup>2</sup>Universitas Airlangga, Faculty of Medicine, Surabaya, Indonesia

Email: [boby\\_pratama\\_putra@yahoo.co.id](mailto:boby_pratama_putra@yahoo.co.id)

**Background and aims:** The von Willebrand Factor (vWF), a disintegrin-like and metalloproteinase with thrombospondin type 1 motif, member 13 (ADAMTS13), and factor VIII (FVIII) are endothelial activation markers. Previous limited studies suggested inconclusive associations among the vWF, ADAMTS13, and FVIII with the portal vein thrombosis (PVT) incidence in non-malignant patients. This study aims to compare the level of vWF, ADAMTS13, and FVIII between PVT and non-PVT in non-malignant chronic liver diseases (CLD) patients.

**Method:** We did both comprehensive searching and hand-searching in online databases to include all relevant literature from 2000 until 2021, then followed the PRISMA guideline. We included all observational clinical studies that compare the level of vWF, ADAMTS13, and FVIII between PVT and non-PVT in both cirrhotic and non-cirrhotic CLD patients. The patients included neither have current or history of malignancy, thrombosis other than PVT, inherited or acquired thrombotic or bleeding disorders, nor currently or previously taking antiplatelet or anticoagulant. Bias risk was assessed by using The Newcastle-Ottawa Scale. Analysis was performed to provide standardized mean difference (SMD) with 95% confidence interval (CI) using random-effect heterogeneity test.

**Results:** We included 4 cross-sectional, 2 case-control, and 4 cohort studies matched the eligibility criteria. Increased FVIII is significantly associated with the PVT incidence in both cirrhotic (SMD = -0.34, 95%CI -0.67 to -0.01,  $p = 0.05$ ,  $I^2 = 46\%$ ) and non-cirrhotic patients (SMD = 0.68, 95%CI 0.35 to 1.02,  $p < 0.0001$ ,  $I^2 = 0\%$ ). The lower ADAMTS13 level in cirrhotic patients are associated with the PVT incidence although not statistically significant (SMD = -1.87, 95%CI -3.84 to 0.10,  $p = 0.06$ ,  $I^2 = 95\%$ ). Nevertheless, the overall analysis suggests that ADAMTS13 is significantly associated with the PVT incidence (SMD = -1.62, 95%CI -2.64 to -0.61,  $p = 0.002$ ,  $I^2 = 91\%$ ). Both incremental VWF antigen (SMD = 0.23, 95%CI -0.56 to 1.02,  $p = 0.57$ ,  $I^2 = 93\%$ ) and activity (SMD = 0.17, 95%CI -0.17 to 1.58,  $p = 0.11$ ,  $I^2 = 89\%$ ) show non-significance association with the PVT incidence. Multivariable regression analysis of 3 studies suggest that ADAMTS13 level and ADAMTS13/VWF<sub>act</sub> ratio are inversely associated with the PVT incidence.

**Conclusion:** The FVIII, vWF, and ADAMTS-13 are associated with the non-malignant PVT incidence. However, further more extensive cohort studies are warranted to establish the associations.

## PO-8-3

### The role of the cellular components of blood in platelet activation

Unwana Emagha<sup>1</sup>, Dermot Cox<sup>1</sup>

<sup>1</sup>RCSI University of Medicine and Health Sciences, School of Pharmacy and Biomolecular Sciences, Dublin, Ireland

Email: [unwanaemagha@rcsi.com](mailto:unwanaemagha@rcsi.com)

**Background and aims:** Thrombocytopenia is common in patients with liver disease and when undergoing surgery. This typically requires a transfusion of platelet-rich plasma or, if elective surgery, treatment with a thrombopoietin analogue. While a platelet transfusion increases the platelet count above the threshold for surgery, there is concern that this may not impact on the bleeding risk. One explanation for this is that the functionality of stored platelet concentrates may not be as expected and not as effective as those produced in response to thrombopoietin. In this study we investigate the functionality of stored platelets.

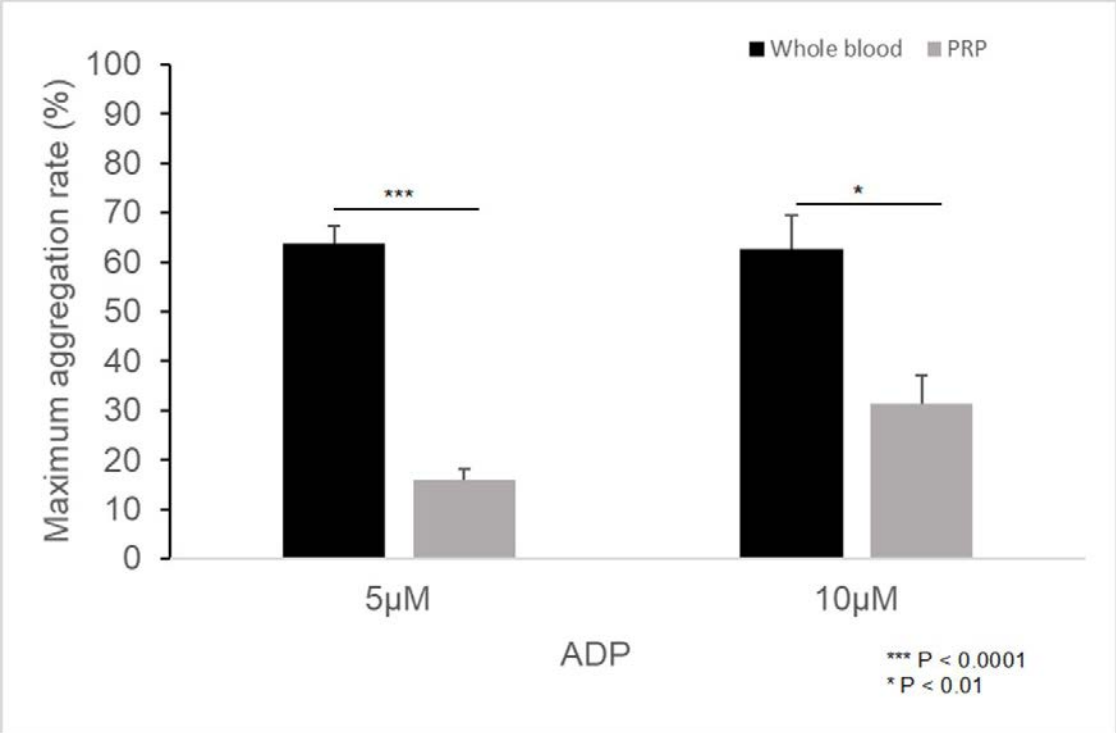
**Method:** Platelet aggregation was assessed using the PL-12 analyser. Percentage maximum aggregation rate was calculated for fixed doses of adenosine-'5'-diphosphate on healthy donor samples analysed.

**Results:** Platelets in whole blood were more sensitive to ADP stimulation than platelets in PRP. Mean maximum aggregation rate (MAR) to 5  $\mu$ M ADP for whole blood was  $63.8 \pm 3.5$  % vs  $15.9 \pm 2.3$  % for PRP ( $p < 0.0001$ ). Similar result was obtained for 10  $\mu$ M ADP-Mean MAR for whole blood  $62.5 \pm 7.0$  % vs  $26.9 \pm 5.8$  % for PRP. ( $p < 0.01$ ).

**Conclusion:** The PL-12 analyser is a sensitive device for monitoring platelet responsiveness in whole blood and PRP. It is clear that platelet function in PRP is greatly reduced compared to that in whole blood. Result obtained suggests that infusion of platelet-rich plasma may not be as effective as whole blood or of thrombopoietin-induced platelet production.



Figure:



## PO-8-4

### Portosinusoidal vascular disease and common variable immunodeficiency

Berta Bartrolí Alabau<sup>1</sup>, Irene García Amengual<sup>1</sup>, Maria Dolors Ramis Estelrich<sup>1</sup>, Ana Escarda Gelabert<sup>1</sup>, Margalida Vanrell Garau<sup>1</sup>, Lydia Sastre<sup>1</sup>, Jaime Pons De Ves<sup>2</sup>, Vanessa Daza<sup>2</sup>, Lucia Bonet<sup>1</sup>

<sup>1</sup>Son Espases Hospital, Hepatology, Palma, Mallorca, Spain, <sup>2</sup>Son Espases Hospital, Immunology, Palma, Mallorca, Spain

Email: [bertabartroli@gmail.com](mailto:bertabartroli@gmail.com)

**Background and aims:** Portosinusoidal vascular disease (PSVD) is a cause of non-cirrhotic portal hypertension that is associated, among other diseases, with Common Variable Immunodeficiency (CVID). Published studies are very heterogeneous, therefore prevalence and natural history of its association are not currently well known. The aim of our study was to describe the prevalence of PSVD in the CVID cohort of patients of our center as well as to describe and compare the features of patients with PSVD associated with CVID and those without CVID.

**Method:** Single-center retrospective study. After reviewing the registry of patients with PSVD (n = 23) and with CVID (n = 47) between 2013-2020, all patients with histological diagnosis of PSVD were included (n = 20). Epidemiological, clinical, analytical, ultrasound, endoscopic, hemodynamic, and non-invasive markers of fibrosis (hepatic Fibroscan®) variables were collected. Statistical analysis was performed using SPSS v26.

**Results:** Nine patients with PSVD were associated with CVID (45%) and seven with hematologic disorders (35%). The prevalence of PSVD in patients with CVID was 19%. The main initial manifestation was the presence of indirect signs of portal hypertension (n = 15), especially thrombocytopenia that was more severe in patients with CVID (mean  $58.2 \times 10^3$ ,  $p = 0.087$ ) and splenomegaly ( $p = 0.467$ ). Cholestasis was the prevailing blood liver abnormality in patients with CVID (GGT  $161.4 \pm 106.4$ ,  $p = 0.121$ ; FA 198 (141-227),  $p = 0.025$ ). Four cases of portal thrombosis were diagnosed in patients without CVID. Esophageal varices (EV) were detected in 13 cases. Patients with CVID had a lower incidence of EV (n = 4,  $p = 0.028$ ), being all of them small and without any bleeding complication. In contrast, patients without CVID had larger EV (n = 6) and variceal bleeding complications (n = 4). In most cases GPVH was <10 mmHg without differences between groups ( $p = 0.858$ ). Mean Fibroscan® value was higher in patients with CVID ( $12.7 \pm 7.2$ ,  $p = 0.092$ ). The most frequent complication during the follow-up in both groups was ascites and liver disease progressed to cirrhosis in one patient with CVID. Only one patient died due to infectious complications secondary to CVID.

**Conclusion:** The most frequent disease associated with PSVD in our center was CVID (19%). PSVD should be suspected in all patients with CVID that develop blood liver abnormalities and/or indirect signs of portal hypertension.

## PO-8-5

### Potential role of cellular component of blood in ADP induced platelet aggregation

Unwana Emagha<sup>1</sup>, Roy Bentley<sup>2</sup>, Stephen Marcella<sup>2</sup>, Stefano Verardi<sup>3</sup>, Janice O'Shaughnessy<sup>4</sup>, Philip Murphy<sup>4</sup>, Dermot Cox<sup>5</sup>

<sup>1</sup>RCSI University of Medicine and Health Sciences, School of Pharmacy and Biomolecular Sciences, Dublin, Ireland, <sup>2</sup>Shionogi Inc., New Jersey, United States, <sup>3</sup>Shionogi BV, London, United Kingdom, <sup>4</sup>Beaumont Hospital, Department of Haematology, Dublin, Ireland, <sup>5</sup>RCSI University of Medicine and Health Sciences, School of Pharmacy and Biomolecular Sciences, Dublin, Ireland

Email: [uemagha@gmail.com](mailto:uemagha@gmail.com)

**Background and aims:** Thrombocytopenia (TCP) is common in patients with liver disease and can pose a clinical risk when undergoing invasive procedures or surgery. Treatment of TCP prior to an emergent procedure or surgery requires a transfusion of platelet-rich plasma or, if a planned procedure or surgery, treatment with a thrombopoietin analogue. While a platelet transfusion may increase the platelet counts above the threshold prior to a given procedure or surgery, there is concern that this may not impact the bleeding risk. One explanation for this is that the functionality of stored platelet concentrates may not be as robust as expected and not as effective as those produced *in vivo* in response to thrombopoietin. In this study, the functionality of stored platelets is investigated.

**Method:** Whole blood was collected from healthy volunteers (n = 6) by venipuncture into tubes containing 3.8% trisodium citrate. Platelet aggregation was assessed using the Sinnowa PL-12 Platelet Analyser which utilises a sequential platelet counting method. Percentage of maximum aggregation rate was calculated for fixed doses of adenosine-5'-diphosphate (ADP).

**Results:** Platelets in whole blood were more sensitive to ADP stimulation than platelets in PRP. Mean maximum aggregation rate (MAR) to 5  $\mu$ M ADP for whole blood was  $63.8 \pm 3.5$  % vs  $15.9 \pm 2.3$  % for PRP ( $p < 0.0001$ ). Similar results were obtained for 10  $\mu$ M ADP-Mean MAR for whole blood  $62.5 \pm 7.0$  % vs  $26.9 \pm 5.8$  % for PRP ( $p < 0.01$ ). Conversely, results were comparable between whole blood and PRP at 20  $\mu$ M ADP-Mean MAR for whole blood  $49.2 \pm 6.7$ % vs  $62.4 \pm 5$ % for PRP ( $p = \text{NS}$ ).

**Conclusion:** Platelet function in PRP appears to be greatly reduced compared to that in whole blood and suggests that cellular components of whole blood play a role in ADP-induced platelet aggregation as measured by changes in single platelet count. This reduced functionality of platelets in PRP suggests that infusion of PRP may not be as effective as whole blood infusion.

Figure:

