Hemostatic differences between the portal and systemic circulation

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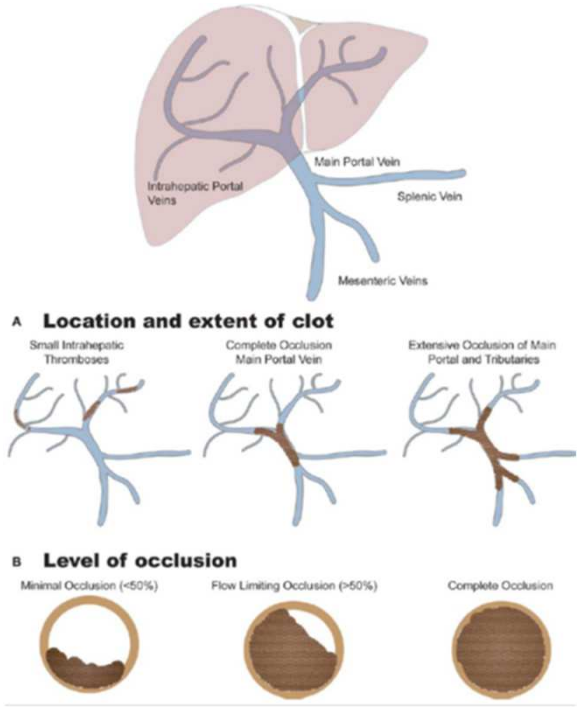
Changing insights in the pathogenesis of portal vein thrombosis



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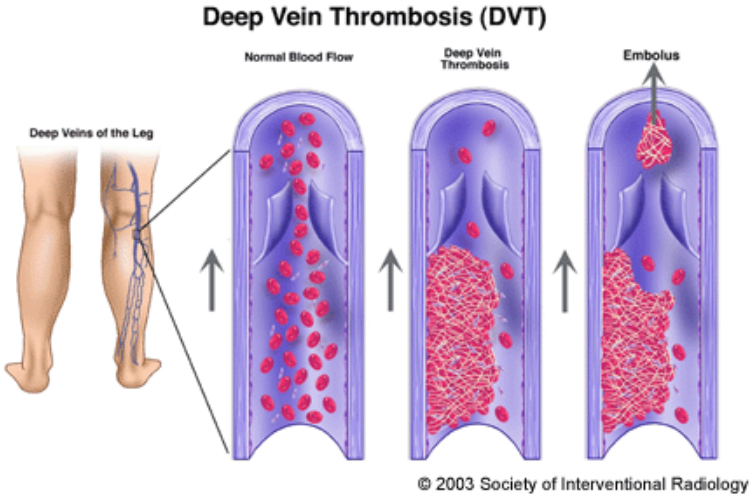
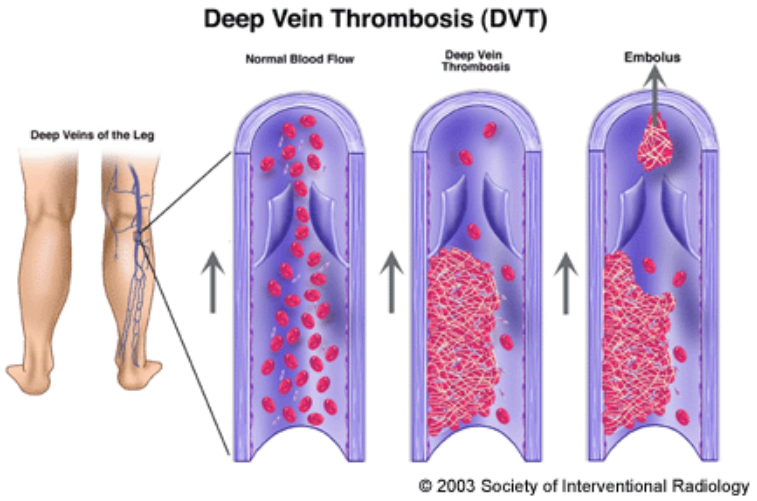


Unique characteristics of the portal vein

The portal vein drains blood to the liver

The portal vein lacks venous valves



Hypercoagulability and DVT

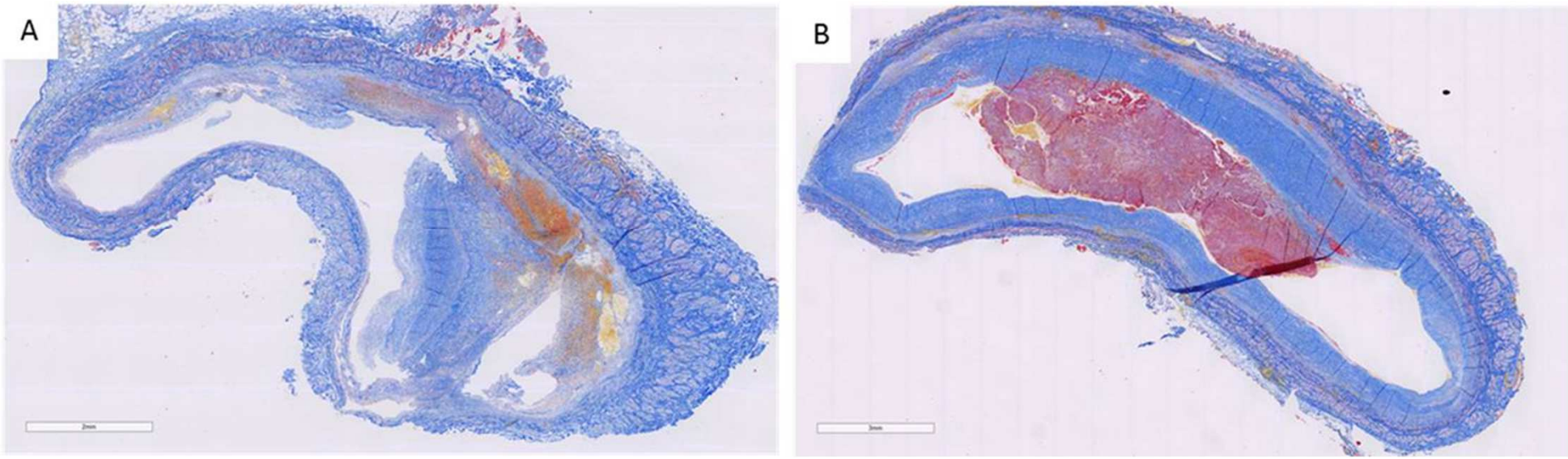
Hypercoagulability is a well-established risk factor for development of DVT

- Acquired & hereditary hypercoagulable states
  - Blood type
  - FVleiden, prothrombin G20210A, AT deficiency…..
  - High levels of coagulation factors
  - Hypofibrinolysis
  - ……

Hypercoagulability and PVT

- The role of hypercoagulability in the development of PVT is unclear and challenged in a recent prospective study *(J Hepatol. 2021 Dec;75(6):1367-1376)*
- Contradictory data on FVleiden and prothrombin G20210A
- Blood type is not a risk factor for PVT development *(Liver Int. 2020;40(6):1415-1426)*

Is PVT really a thrombotic phenomenon?



MSB-stained sections. Collagen – blue; RBC's – yellow; fibrin – orange/red

Hepatology 2022; 75(4):898-911

Gut, 1961, **2**, 310

Changes in the portal and splenic veins in portal hypertension and their relation to splenomegaly[1]

JOHN B. WILSON

From the Department of Pathology, University of Edinburgh

SYNOPSIS This paper is a pathological study on the portal veins demonstrating that the changes in the portal circulation and in the spleen reflect the degree or duration of portal hypertension.

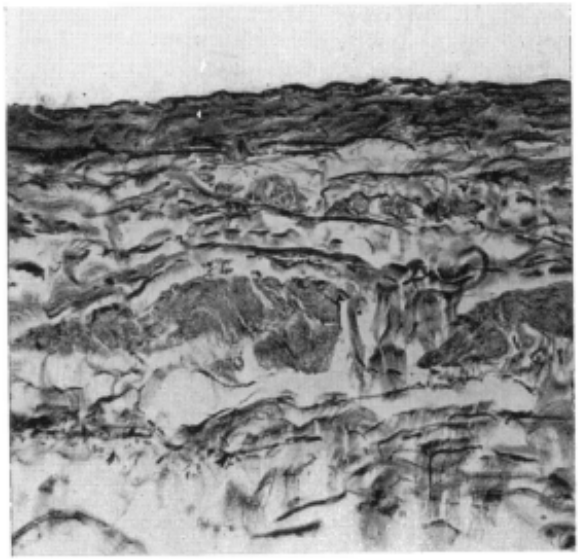


FIG. 1. *A normal portal vein. (Weigert and van Gieson. × 220.)*

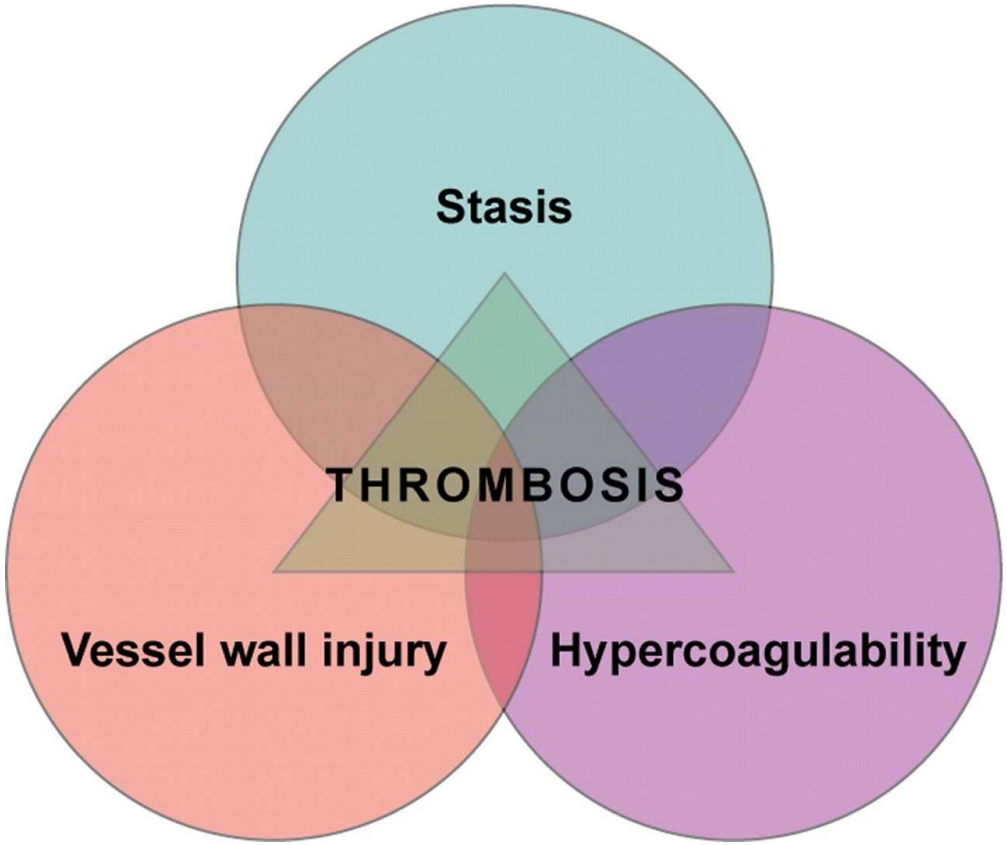
FIG. 3

FIG. 4

FIG. 3. *Portal vein, group III, with more marked hypertrophy of the muscular coats and definite, usually diffuse, intimal thickening. (Weigert and van Gieson. × 80.)*

FIG. 4. *Portal vein, group IV, showing well-marked intimal thrombosis superimposed on the changes noted in group III. (Weigert and van Gieson. × 15.)*

Does a hypercoagulable environment in the portal vein contribute to PVT development?



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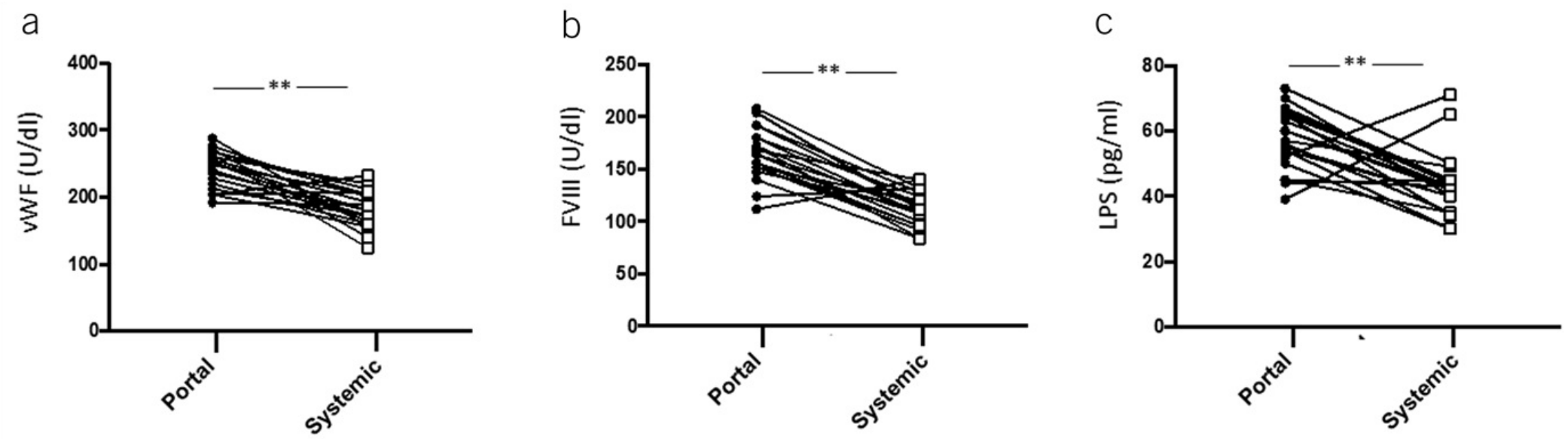


Clin Transl Gastroenterol. 2020;11(2):e00123

Comparative study of coagulation and thrombin generation in the portal and jugular plasma of patients with cirrhosis

Bénédicte Delahousse[1]*; Valérie Labat-Debelleix[2]*; Loic Decalonne[1]; Louis d'Alteroche[2]; Jean-Marc Perarnau[2]; Yves Gruel[1,3]

[1]Department of Haematology-Haemostasis, University Hospital of Tours, France; [2]Department of Gastroenterology and Hepatology, University Hospital of Tours, France; [3]U618 Inserm "Proteases et vectorisation pulmonaires", University François Rabelais, Tours, France

Endothelial Damage of the Portal Vein is Associated with Heparin-Like Effect in Advanced Stages of Cirrhosis

Sarah Shalaby[1,*] Paolo Simioni[2,*] Elena Campello[2] Luca Spiezia[2] Sabrina Gavasso[2] Debora Bizzaro[1] Romilda Cardin[1] Francesco D'Amico[3] Enrico Gringeri[3] Umberto Cillo[3] Giulio Barbiero[4] Michele Battistel[4] Alberto Zanetto[1] Alessandro Ruzzarin[1] Patrizia Burra[1] Marco Senzolo[1]

Ongoing Prothrombotic State in the Portal Circulation of Cirrhotic Patients

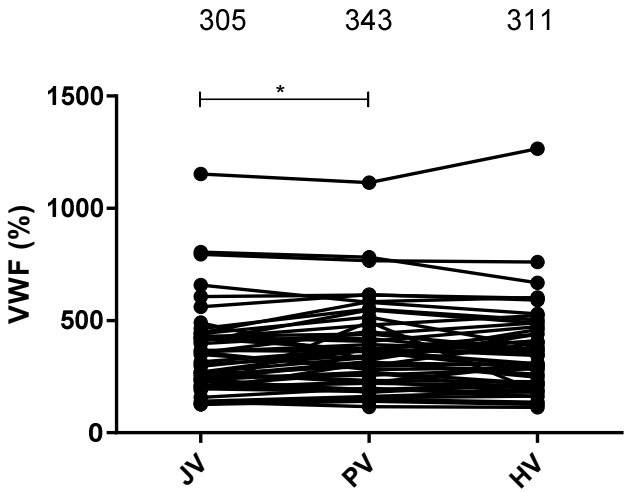
Francesco Violi[1], Domenico Ferro[1], Stefania Basili[1], Raffaella Lionetti[2], Elisabetta Rossi[1], Manuela Merli[2], Oliviero Riggio[2], Mario Bezzi[3], Livio Capocaccia[2]

From the [1]Istituto I Clinica Medica, [2]II Cattedra di Gastroenterologia, [3]Istituto di Radiologia, Università "La Sapienza", Rome, Italy

Since the liver clears markers of hypercoagulability, sampling sites may be relevant

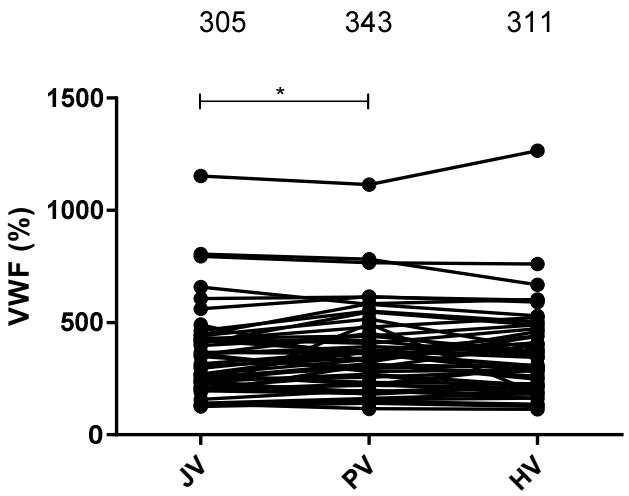
- 51 patients with cirrhosis undergoing TIPS at Hospital Clinic Barcelona
    - Portal vein
    - Hepatic vein
    - Jugular vein

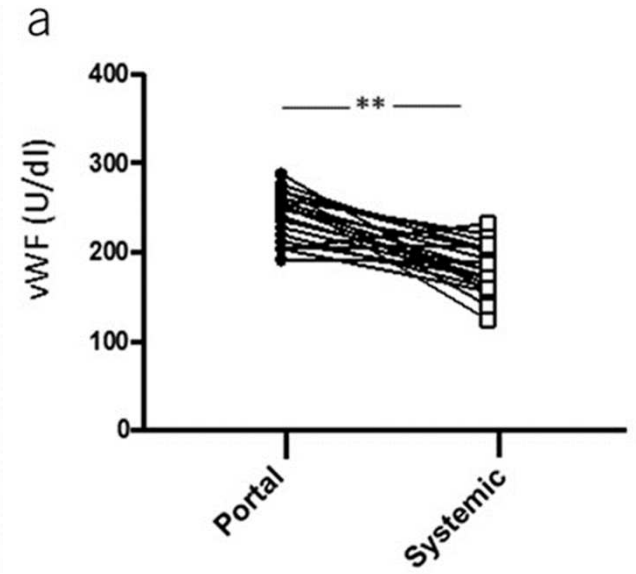
VWF in the portal circulation



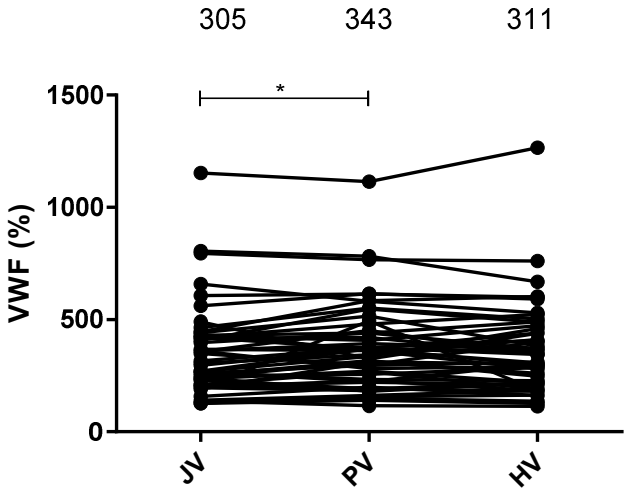
J Thromb Haemost. 2022;20(9):2075-2082

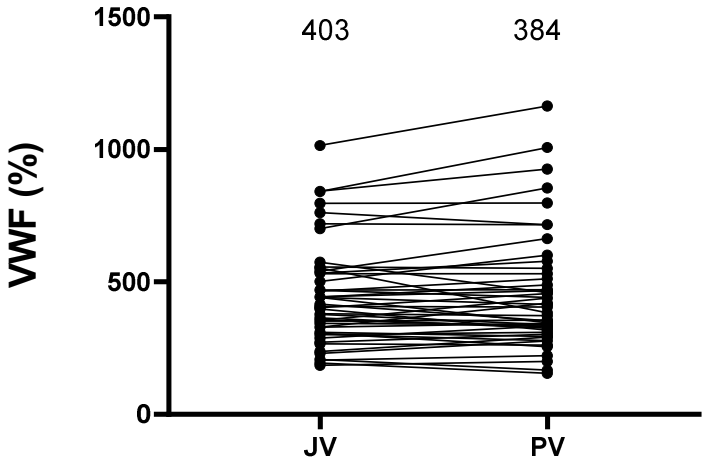
VWF in the portal circulation



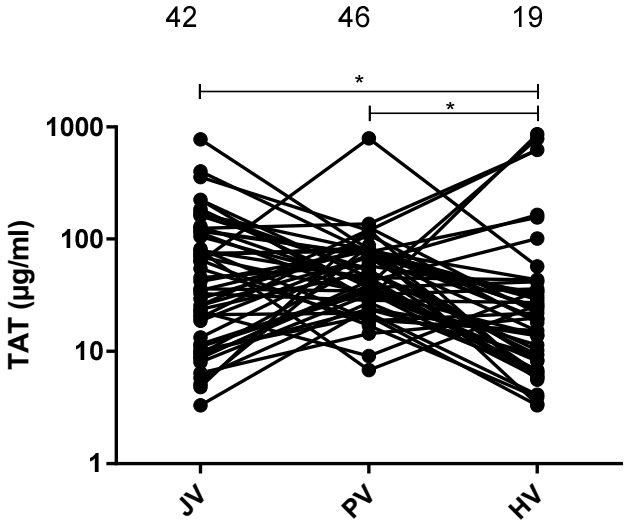


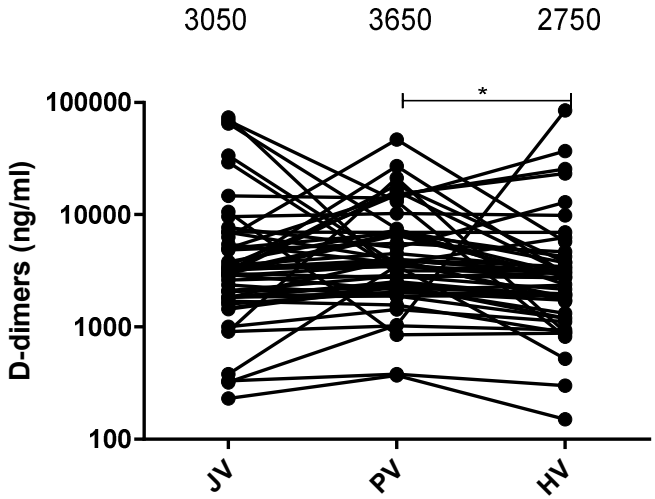
Confirmation in independent 47 patient cohort





Thrombin generation and fibrin breakdown in the portal circulation





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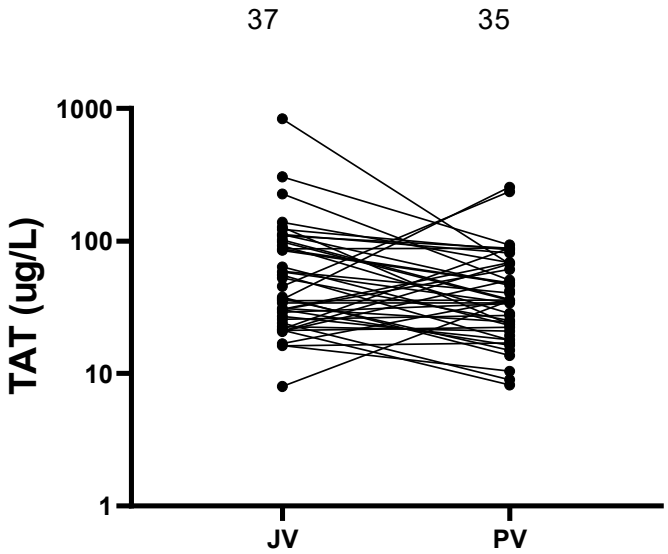
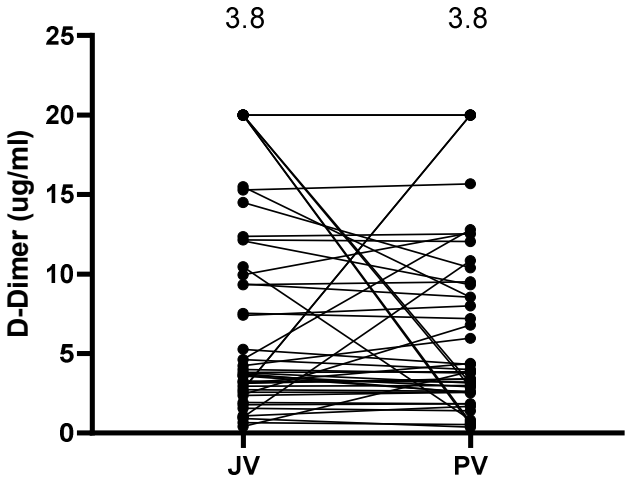
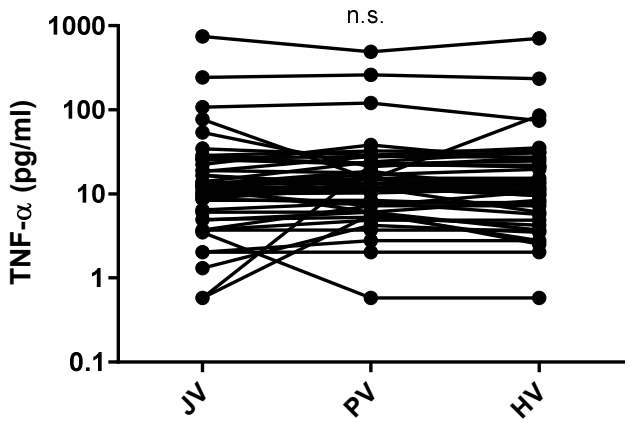
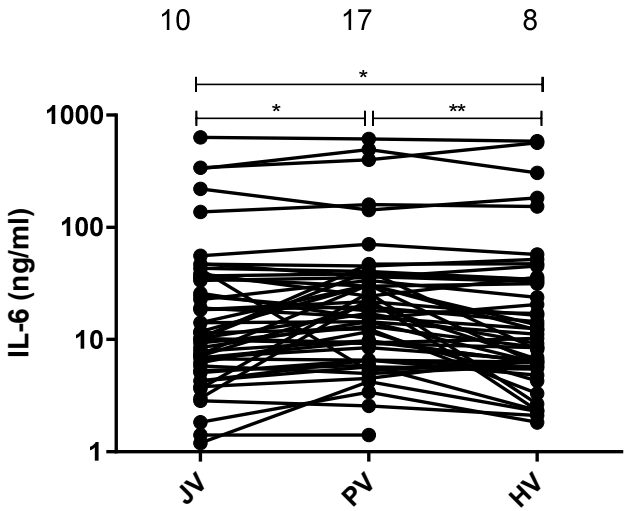
Confirmation in independent cohort





Inflammation in the portal circulation





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Conclusions

- In contrast to previously published data, we find no clear hypercoagulable phenotype in the portal vein

- Confirmed in an independent cohort (unpublished)

- The differences between our results and those of others may relate to
  - Patient characteristics (including etiology of disease and clinical status)
  - Blood sampling techniques
  - The timing of sampling during the TIPS procedure

Acknowledgements

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