Oral Presentation 8 - Title: Spatiotemporal Characterization of Arterial and Venous Thrombi: Insights into Composition and Remodeling

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Background: Thrombosis contributes significantly to global morbidity and mortality, yet direct comparative studies of arterial and venous thrombi remain limited. The underlying differences in thrombus composition, vessel wall properties, and hemodynamic conditions substantially influence clinical outcomes and response to treatments. This study introduces an innovative rat model enabling concurrent induction and temporal comparison of arterial and venous thrombi, facilitating a detailed examination of their cellular and molecular components.

Methods/Research Design. Our novel rat model was established by simultaneously inducing arterial thrombosis via ligation of the femoral artery in the left leg and venous thrombosis via ligation of the femoral vein in the right leg of Sprague-Dawley rats. Thrombi were allowed to evolve and harvested at acute (day 2), sub-acute (day 4), and chronic (day 8) stages. Thrombi composition was assessed histologically using immunohistochemistry to identify fibrin, platelets, fibroblasts, erythrocytes, leukocytes, neutrophil extracellular traps (NETs), and collagen. Structural analysis was performed using scanning electron microscopy (SEM).

Results (or Preliminary Results, as applicable for a project in progress): Venous thrombi consistently showed higher fibrin content compared to arterial thrombi, particularly evident in chronic stages (day 8: venous 95%, arterial 49%). Collagen appeared early (acute phase), increasing significantly over time and showing greater accumulation in venous thrombi by day 4 (34% vs. 8.8% arterial). Fibroblast infiltration increased markedly from acute to chronic stages, with arterial thrombi displaying peak fibroblast presence at day 8. Additional immunohistochemistry was conducted to distinguish the differences of the two thrombi.

Conclusion (or Preliminary Conclusion, as applicable for a project in progress): Simultaneous analysis reveals significant compositional, and structural differences between arterial and venous thrombi, offering potential targets for tailored therapeutic strategies.

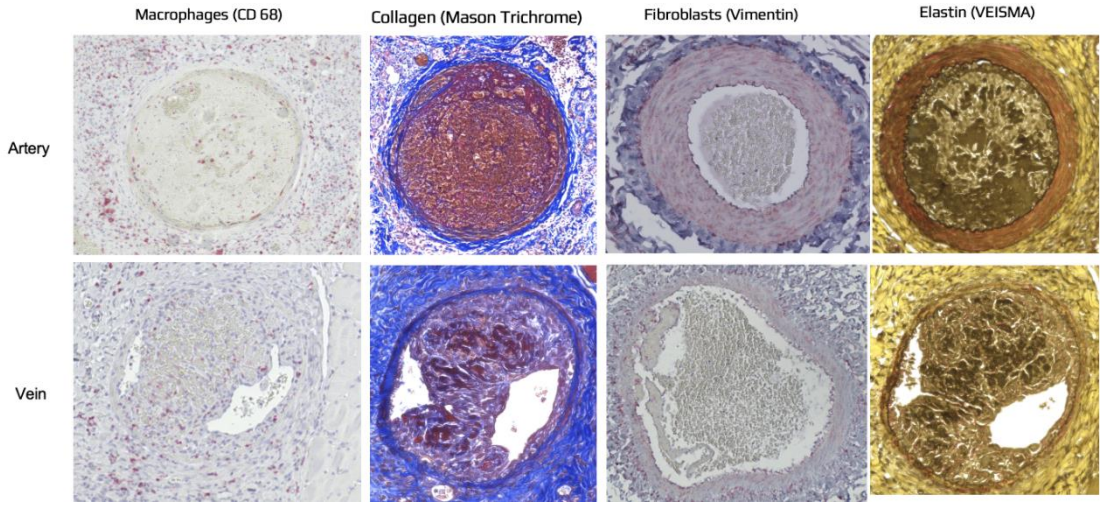

Figure 1. Preliminary histological comparison of arterial and venous thrombi highlighting variations in collagen and fibrin composition at Day 4. These initial findings demonstrate that collagen and fibrin concentrations differ between arterial and venous thrombi and evolve dynamically as the thrombus ages, suggesting distinct mechanisms influencing thrombus stability and resolution