Reduced contraction of venous thrombi may increase their obstructiveness and emboloegenicity

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Contraction of blood clots is driven by activated platelets pulling on the fibrin meshwork. Fibrin plays a vital role in the contraction process by propagating the contractile force through the clot volume, resulting in the volume shrinkage of the clot. The aim of this work was to reveal the pathogenic importance of contraction in venous thromboembolism (VTE). We investigated the kinetics of clot contraction in clots made from the blood of 55 patients with VTE not receiving antiplatelet and anticoagulant medications. We studied the ultrastructure of ex vivo venous thrombi, and the morphology/functionality of isolated platelets. Thrombi from VTE patients contained compressed polyhedral-erythrocytes, a marker for clot contraction in vivo. The extent and rate of contraction were reduced 2-fold in VTE patients compared to healthy controls. The contraction of clots from patients with pulmonary embolism was significantly impaired compared with isolated venous thrombosis, suggesting less compacted thrombi may be prone to embolization. Reduced contraction correlated with continuous platelet activation followed by partial refractoriness to stimulation. Morphologically, 75\% of platelets from VTE patients were spontaneously partially activated, compared to 21\% from healthy controls. Platelets from VTE patients showed a 1.4-fold reduction in activation markers following stimulation compared to platelets from healthy individuals. The dysfunctional platelets likely exert less force on the fibrin meshwork, which results in the less compacted, more obstructive clots observed in the patient population. These results collectively suggest that impaired contraction of thrombi is an underappreciated pathogenic mechanism in VTE that may regulate the obstructiveness and emboloegenicity of venous thrombi.

I would like to be considered for the Outstanding Abstract Award

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