Abnormal fibrin clot structure in women who experienced postpartum hemorrhage

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Introduction: In most women who experienced postpartum hemorrhage (PPH), a major cause of maternal death, no coagulation disorder can be identified. Abnormal structure of fibrin clots may contribute to bleeding, as fibrin clot structure is directly related to clot stability, including mechanical properties and susceptibility to fibrinolysis. We hypothesize that fibrin clot structure can, partly, explain bleeding in these women.

Methods: We included 10 women with severe PPH (blood loss ≥2000mL), analyzed ≥3 months postpartum at our department in 2016 for a bleeding disorder, and 5 controls. Fibrin clots were formed from platelet free plasma and clot structure was studied by scanning electron microscopy. Fibers, from eight randomly selected images per subject, were counted, measured and analyzed using ImageJ software.

Results: There was no difference between total number of fibers and median fiber diameter between women with PPH and controls (651 versus 643 fibers, p=n.s.; 0.130μm versus 0.123μm, p=n.s.). Women with PPH had more thick fibers (≥0.100μm) and fewer thin fibers (<0.100μm) compared to controls (441 versus 394 fibers≥0.100μm, p=0.04; 166 versus 206 fibers<0.100μm, p=n.s.). When images were analyzed separately, women with PPH had more thick fibers (54 versus 50 fibers≥0.100μm/image, p=0.004), fewer thin fibers (19 versus 24 fibers<0.100μm/image, p=0.009) and a larger mean fiber diameter (0.136μm versus 0.127μm/image, p=0.006). Fibrinogen levels were similar in both groups.

Conclusion: In women with PPH, fibrin clot structure shows significantly more thick and fewer thin fibers compared to controls, indicating a less dense fiber network, possible causing a clot that is less stable mechanically and more susceptible to fibrinolysis.

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Statement: I hereby also would like to apply for an Outstanding Abstract Award.