Coagulation Restoration by Fibrinogen Concentrate after Platelet Reduction and Traumatic Hemorrhage in Pigs

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Introduction: After traumatic injury, fibrinogen and platelet are lost from hemorrhage, contributing to the development of coagulopathy. This study investigated the effects of fibrinogen concentrate on coagulation function after platelet reduction and hemorrhage in pigs.

Methods: 10 anesthetized pigs (40±5 kg) were intubated and catheterized with apheresis catheter in the femoral vein to reduce platelet counts using Haemonetics 9000. Afterwards, femur fracture was performed at each pig’s left leg, followed by hemorrhage of 35% total blood volume. Fibrinogen concentrate (Hemocomplettan) was administrated to each pig (250 mg/kg) as treatment. Blood samples were collected at baseline, apheresis, hemorrhage, and after fibrinogen treatment to assess changes in coagulation by PT, aPTT, MCF (clot strength) and alpha angle (clotting speed) using Rotem® thrombelastogram with Extem reagents.

Results: Platelet apheresis and traumatic hemorrhage decreased coagulation components and impaired coagulation function. Platelet counts were reduced from baseline 335±33 10⁹/L to 137±19 10⁹/L after apheresis and 125±17 10⁹/L after hemorrhage. Fibrinogen concentration was decreased from baseline 121±20 mg/dL to 99±21 mg/dL after apheresis and 99±24 mg/dL after hemorrhage (all p<0.05 vs baseline), but was increased to 432±58 mg/dL after fibrinogen treatment. Platelet apheresis and hemorrhage reduced MCF from baseline 69±2 mm to 55±7 mm and alpha angle from baseline 78±2 degrees to 68±5 degrees. Fibrinogen treatment restored MCF and alpha angle to baseline values. There were no changes in PT or aPTT during the experiment.

Conclusion: Administration of fibrinogen concentrate effectively restored coagulation function compromised by platelet apheresis and traumatic hemorrhage in pigs.

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