Perioperative Management of a Parturient with Antithrombin Deficiency and the Role of Thromboelastography

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Antithrombin (AT, formerly AT-III) is a serine protease inhibitor that plays an essential role in hemostasis. Its mechanism of action is to inactivate thrombin and coagulation factors IXa, Xa, Xla, and XIIa (1). Hereditary AT deficiency is a rare autosomal dominant coagulopathy that significantly increases the risk of thromboembolic phenomenon, especially during pregnancy and the puerperium. In the absence of anticoagulation, the risk of thrombosis is as high as 70%(2).

There is a paucity of literature regarding the use of thromboelastography (TEG) to guide anesthetic management in patients with AT deficiency. Previous case reports describe the use of anticoagulation and nonpharmacologic techniques for pain management during labor and vaginal delivery (3). One case describes the use of an epidural for cesarean delivery as the patient reported an adverse reaction to general anesthetic medications (4). Our patient was placed on low molecular weight heparin (LMWH) throughout pregnancy to prevent thrombotic complications at a dose of 1.5 mg/Kg. LMWH was stopped 24 hours prior to scheduled cesarean delivery for breech presentation, and she was placed on Thrombate III (purified human AT concentrate) as replacement. Thrombate III was recommended by her hematologist to reduce intra and post-operative thrombotic complications by raising the AT level to 80-100% of normal. The use of this drug has been associated with hematoma formation and increased bleeding risk (5).

The patient desired a regional anesthetic for her operative delivery. We were uncertain as to the effects of Thrombate III on coagulation and therefore decided to utilize TEG to aid in management. Baseline TEG and platelet mapping were performed which revealed normal clot strength, adequate platelet number and no platelet inhibition. Thrombate III was then given and a repeat TEG was performed. The patient was hypercoagulable (K= 1.2; G=15.1; Alpha =73.7) despite excessively high levels of antithrombin 3 (>200%). It is possible that she also had Protein C or S deficiency that was unknown. The patient was counseled about the risks of thrombosis versus bleeding and spinal hematoma formation. The patient then requested general endotracheal anesthesia which was performed without complication. A baby with APGARS of 9 and 9 was delivered by cesarean. Blood loss intra-operatively was minimal. A TEG was performed 24 hours post-operatively and the patient was still hypercoagulable.

Hematology work-up in the postpartum period was negative for new findings. This case highlights the potential challenges of managing parturients with rare disorders of coagulation and the use of TEG and platelet mapping to guide anesthetic decisions.