Successful Treatment of Acute Allergic Reaction to Tranexamic Acid During Total Knee Arthroplasty

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Overview: A 64 y/o female with a PMH of peptic ulcer disease, osteoarthritis of both knees, and no known allergies presented for right total knee arthroplasty. Intraoperative tranexamic acid resulted in an acute allergic reaction; hypotension, airway edema and obstruction which required intubation and hemodynamic support. The wide differential for potential causes of hypersensitivity necessitates vigilance for prompt identification and aggressive treatment.

Case: The patient underwent regional anesthesia via a sciatic nerve block with 30mL of 0.5% ropivacaine injected after negative aspiration of blood and an ultrasound guided femoral nerve catheter for continuous nerve block using 30mL of 2% lidocaine with 1:200,000 epinephrine. Intraoperatively, the patient was managed with IV propofol infusion for sedation. Prior to the release of the tourniquet, 15mg/kg of tranexamic acid was administered at a total dose of 765mg. After a negative test dose and a total of 2mL were infused, the patient became hypotensive with a blood pressure drop from 122/74 to 74/42 mmHg. End tidal CO2 and SpO2 subsequently dropped (SpO2: 100% → 82% → 52%). She was ventilated by mask and an LMA was placed. Despite SpO2 increasing from 58% → 90%, tidal volumes were still inadequate necessitating intubation of the patient’s edematous airway. Hydrocortisone 100mg and Benadryl 25mg were injected and ephedrine 10mg was used to maintain cardiac output through the surgery. Vitals stabilized to a BP of 125/76 and a HR of 90. A rash and periorbital edema then developed. The patient was extubated in the OR with no sequelae noted at the end of the case and no complications were noted on postoperative follow-up 6 hours later.

Discussion: Tranexamic acid is a synthetic analogue of lysine, the amino acid involved in IgE binding in many allergens. It is therefore not surprising that it is reported to present with a wide range of hypersensitivity reactions characterized by different pathogenetic mechanisms, both immunologic (type I hypersensitivity) and also non-immunologic. These include toxic epidermal necrolysis, peri-orbital angioedema, pruritis, urticaria and erythematous maculopapular rash. Nonetheless the risk of immunogenic and severe allergic reactions to tranexamic acid is significantly lower than those associated with other drugs. Interestingly, tranexamic acid is used for perioperative angioedema prophylaxis in patients with C1 esterase inhibitor deficiency. It is also used for management of moderate angioedema attacks. Its use has also been documented in managing or reversing intraoperative anaphylaxis presenting with fibrinolysis. Etamsylate, is a well tolerated alternative in patients with a known tranexamic hypersensitivity.

Conclusion: This patient had a rare but life threatening reaction to the antifibrinolytic tranexamic acid. As seen with this case, hypersensitivity reactions can come from a variety of unexpected
sources. It is important for the anesthesiologist to remain vigilant to quickly identify and treat aggressively allergic reactions with appropriate resuscitative measures.

References: