

General Urology

A Novel Use of Tisseel in the Setting of Uncontrolled Bleeding in a Thrombocytopenic Patient With Idiopathic Thrombocytopenia



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ABSTRACT

We present a case of an 87-year-old female who was evaluated for an 8.5 cm left sided renal mass concerning for malignancy. The patient was transiently thrombocytopenic over the previous 4 months with platelet counts ranging from 50,000 to 125,000 plt/mcL and experienced diffuse hemorrhage during radical nephrectomy with failure to achieve mechanical hemostasis or fulguration. Following Surgicel (Ethicon; Somerville, New Jersey) application, we applied Tisseel (Baxter; Deerfield, IL) to the nephrectomy bed with complete hemostasis of bleeding foci. Tisseel saved this thrombocytopenic patient with uncontrolled bleeding and should have this clinical utility recognized.

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Introduction

Preoperative thrombocytopenia typically can be managed with careful surgical technique and meticulous hemostasis. There is a paucity of information on how such surgery and potential bleeding should be managed in patients with an underlying thrombocytopenia and/or coagulopathy.¹ In the case of a patient with chronic thrombocytopenia, fibrin sealants may provide superior cessation of oozing at the surgical bed in radical organ resection.

Case presentation

An 87-year-old female presented to the urology clinic with an incidental 8.5 cm renal mass on MRI imaging (Fig. 1). There were no signs of local extension outside of the kidney, renal vessel involvement or signs of metastases. The patient was subsequently counseled and consented for radical nephrectomy. Routine blood analysis was performed and revealed a persistent thrombocytopenia with a platelet count of 84,000 (150,000–350,000 plt/mcL). The patient's thrombocytopenia was suspected to be chronic and she was worked up by a hematologist who ordered a bone marrow biopsy. This showed no sign of myelodysplasia and normal trilineage hematopoiesis, cytogenetics, and flow cytometry. Following

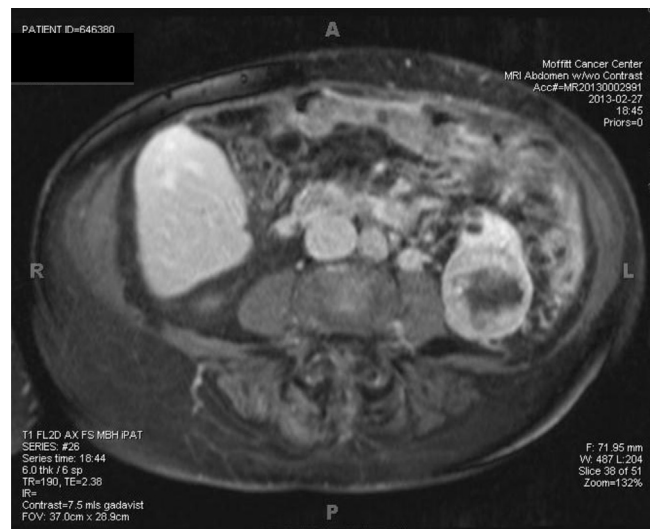


Figure 1. T1 MRI cross section showing a necrotic heterogeneously enhancing exophytic mass in the lower pole of the left kidney measures approximately 5.1 cm AP × 4.5 cm TR × 5.1 cm CC, consistent with renal cell carcinoma.

workup, she was cleared for surgery by the hematologist, anesthesiologist, and primary surgical team. The morning of the nephrectomy our patient's platelet count was 57,000 (150,000–350,000 plt/mcL) at 6:15 am. We ensured she was a properly typed

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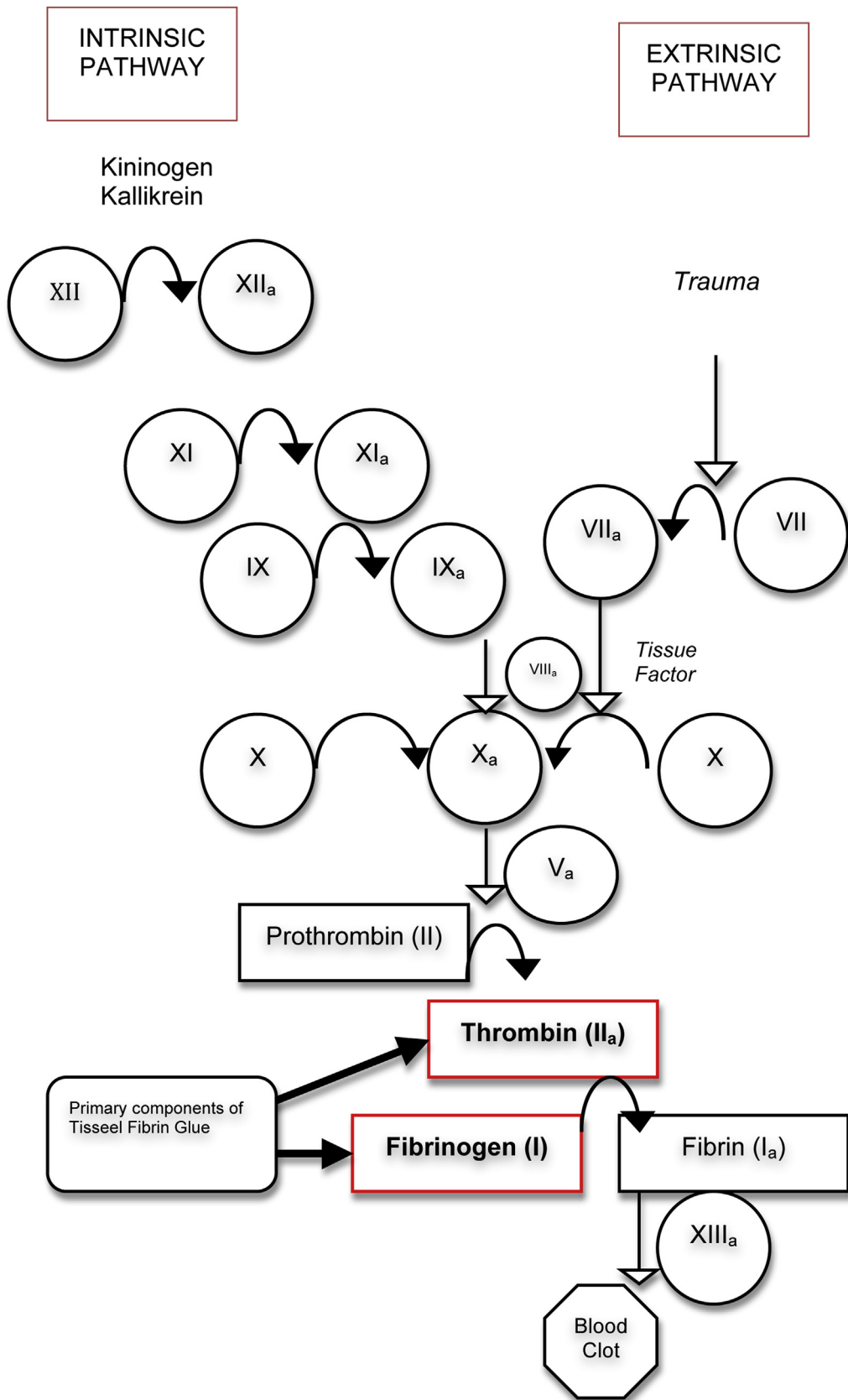


Figure 2. The role of Tissueeal in the clotting cascade.

and cross-matched for blood product in the event she would require transfusion.

We approached our patient using a modified flank approach with a laparoscopic hand-assisted technique. The entire kidney was mobilized after necessary exposure was undertaken and suitable surgical planes were developed. The renal vascular hilum was skeletonized consisting of single renal artery and vein, which were controlled with the endovascular stapler in a standard procedure. The left adrenal gland was also removed en bloc with the specimen due to concerns for invasion. At this point, numerous small but diffuse areas from the surgical bed started oozing blood. These areas were difficult to control to standard surgical techniques. Floseal (Baxter; Deerfield, IL) and Surgicel were utilized before proceeding with further mobilization of the renal hilum. The kidney was easily removed from the hand-assist port site, which was followed by some persistent bothersome diffuse oozing. It was at this time that we elected to convert to an open approach.

Once we converted to open, persistent diffuse oozing was present throughout the retroperitoneal surgical bed, more than expected for this procedure. Intraoperative blood serology including coagulation parameters were sent. We decided to administer a platelet transfusion as a precaution given her known thrombocytopenia. Her intraoperative platelet count was 64,000 at 11:39 am. Due to persistent bleeding, Tisseel was used and was quite effective in achieving fairly instantaneous hemostasis. Following completion of the surgery the patient was determined to be hemodynamically stable and was extubated by anesthesia without incident.

Estimated blood loss of the operation was 900 cc and the patient received 580 cc platelets, 550 cc packed red blood cells, 350 cc fresh frozen plasma, 1100 cc of Plasma-lyte, and 500 cc Voluven 6:1 normal saline. A total of 580 cc of platelets were transfused, which ultimately brought the patient's post-operative platelet count to 117,000. Repeat analyses revealed her platelet count returned to near baseline levels of 69,000 at 23:18 pm. On post-operative day 1, the platelets remained stable at 69,000. Despite a return to her baseline chronic thrombocytopenia, she remained hemodynamically stable throughout her hospitalization until discharge. She was discharged 6 days later as she began ambulating, regained bowel function with regular diet.

Discussion

Despite use of fibrinogen for adhesion in the early 1900s, FDA approval in the United States of fibrin sealants was delayed until 1998. Tisseel is a two-component fibrin sealant made from pooled human plasma that has been indicated for use in patients when traditional methods of attaining hemostasis fail to control bleeding. This agent acts on the final step in the clotting cascade, shown in (Fig. 2), with the components of fibrin and thrombin serving as the main components of this sealant to promote fibrin cross linking and thrombus formation over the platelet plug. One factor in thrombus formation involves the amplification of platelets into so-called "coated platelets".² The stickiness of the platelet surface increases when covered with fibrin, thrombospondin-1, VWF, and Factor Va.² The patient in question may have improved her bleeding control due to the influx of fibrin and thrombin to the clot site in the setting

of limited platelet availability. Clots formed by Tisseel offered total resistance to proteolysis at 4 days, while other fibrin sealants were totally solubilized in 2 days or less. In a patient with stable and persistent thrombocytopenia, we believe Tisseel would be the safest option to offer the greatest uninterrupted healing time in a high-risk patient before dissolution of the developed clot. Fibrin glue has also been used as a hemostatic agent in patients with coagulation disorders and in many cases of surgical hemostatic control for deep and superficial renal parenchymal bleeding.³ These fibrin products do not depend on adequacy of platelet or clotting factors suggesting that Tisseel may be used for thrombocytopenia due to the fibrin component.

Tisseel's properties led to a number of trials for its use for other surgical procedures. A study by Campanelli et al showed benefits in pain, numbness, and discomfort when Tisseel was used as opposed to sutures in mesh fixation for Lichtenstein inguinal hernia repair.⁴ These studies indicated functional hemostasis and control with focal use of the fibrin sealant in this surgery despite the setting of increased tissue tension. In large cases such as groin dissection, however, Tisseel did not reduce morbidity.⁵ Thus, radical nephrectomy in the setting of patients with known bleeding coagulopathies may now be another indication.

Conclusion

For thrombocytopenics, Tisseel should be made available for difficult and coagulopathic bleeding.

Consent

Written informed consent was obtained from the patient for publication of this Case Report and all accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Disclosure

The authors of this manuscript have no conflicts of interest to report.

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