

Hemostatic Matrix Application After Open Synovectomy in a Hemophilic Patient

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Abstract

Recurrent, spontaneous bleeding is common in patients with hemophilia. The joints are commonly and repeatedly affected, and this can result in chronic synovitis and joint damage. Synoviorthesis or synovectomy are indicated after failure of appropriate medical management. Hemostasis in the perioperative period is paramount in these patients. We report a case study of a patient with hemophilia A inhibitors undergoing open synovectomy complicated by postoperative bleeding. In addition to an infusion of bypassing agents due to the presence of inhibitors, a topical hemostatic agent, FLOSEAL, and absorbable Gelfoam were applied. Hemostasis was achieved rapidly. The patient recovered without complications.

A common complication of hemophilia is recurrent and often spontaneous bleeding in the joints.¹ These bleeding episodes result in synovitis and ultimately can cause articular damage and joint degeneration.² Medical management options are available for prophylaxis and control of synovitis.³ For patients who do not respond to medical management, surgical intervention includes synoviorthesis or synovectomy.⁴

Orthopedic surgery is elective for hemophilia patients without inhibitors.^{5,6} In general, patients with active inhibitors are not candidates for elective surgery, but the use of immune tolerance induction (ie, frequent and regular infusion of clotting factor) or bypassing agents has enabled surgery in these patients.⁶⁻⁸

There are many blood-sparing techniques that can be

used in perioperative blood management of patients.⁹ Patients with hemophilia are screened for the presence of inhibitors during the preoperative period. A clotting factor is typically administered at a dose calculated to attain 100% of normal levels prior to surgery and is maintained at levels of 60% after surgery until discharge.¹⁰ During surgery, there are standard hemostasis tools such as sutures, clamps, tourniquets, and cautery devices used by the surgeon. The most recent addition to the surgeon's armamentarium is topical hemostasis agents.

FLOSEAL Hemostatic Matrix (Baxter, Deerfield, Illinois) is a combination of cross-linked gelatin granules and topical human thrombin. Studies have reported the effectiveness of FLOSEAL in different types of surgery.¹¹⁻¹⁵ However, there have been few reports of use of FLOSEAL in orthopedic surgery, particularly among hemophilic patients,¹⁶ and no reports of FLOSEAL use in hemophilic patients with postoperative bleeding.

In this case report, we discuss the use of FLOSEAL and absorbable gelatin foam, Gelfoam (Pharmacia & Upjohn, New York, New York), for postoperative intractable bleeding after open synovectomy in a patient with hemophilia A. The patient provided written informed consent for the publication of the case report.

CASE REPORT

A 15-year-old male patient with hemophilia A diagnosed at 2 months had multiple bleeding episodes at the right knee joint requiring hospitalization. Treatment included daily infusion of an anti-inhibitor coagulant complex, FEIBA, (Baxter, Deerfield, Illinois) when bleeding episodes occurred. The patient developed hemophilic arthroplasty of the right knee and an open total synovectomy was scheduled. The patient was admitted to our institution 1 week prior to surgery for infusion of bypassing agents as well as optimization of hemoglobin level up to 13.1 g/dL. The patient underwent surgery without complications.

In the days following surgery, continuous bleeding through the surgical wound was observed. Local compressive dressings were applied to the wound, and treatment with multiple doses of bypassing agents, including activated prothrombin complex activates (FEIBA) and recombinant factor VII (NovoSeven Novo Nordisk Inc, Princeton, New Jersey), were given without adequate response. After several days of irregular bleeding epi-

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Figure 1. Application area of the hemostatic matrix gel in the knee joint. The purple sites represent the gel placement at the suprapatellar, medial and lateral compartments and gutters, and intercondylar notch.

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sodes, 11 units of fresh frozen plasma and 21 units of packed red blood cells units were transfused, as the hemoglobin level had decreased to 3.9 g/dL at day 7 postoperatively. The patient was taken to the operating room for exploration of the right knee joint. The joint cavity was exposed and multiple oozing sites were cauterized. FLOSEAL was applied (4 vials, each 10 mL) inside the joint cavity (Figures 1 and 2) and packed with Gelfoam. Within minutes, the bleeding had stopped and the wound was closed. Postoperatively, the patient was treated with recombinant factor VII infusion (NovoSeven) and activated prothrombin complex activates (FEIBA). On day 13 postoperatively, the patient continued to receive recombinant factor VII infusion, but not the activated prothrombin complex activates. Recombinant factor VII infusion was administered until day 21 postoperatively. The patient's vitals were stabilized and he recovered fully.

DISCUSSION

This case study indicates that FLOSEAL, in conjunction with Gelfoam, was effective in treating oozing in patients with hemophilia following orthopedic surgery.

FLOSEAL contains gelatin and thrombin, and therefore, works at the beginning and end of the clotting cascade. The cross-linked gelatin granules of FLOSEAL enable high concentrations of thrombin to react with the patient's fibrinogen and form a clot.^{17,18} Once hemostasis is achieved, gentle irrigation of any excess product not incorporated in the clot is recommended.¹⁷

FLOSEAL has been used successfully in many different types of surgery, including vascular, cardiac, and spinal surgery.^{12,13,15} Additionally, FLOSEAL has been reported to provide more effective hemostasis than Gelfoam.^{12,15} However, there is limited published data on the use of FLOSEAL in orthopedic surgery, particularly in patients with hemophilia. Preliminary results of a study using FLOSEAL to control intra-operative bleeding in total knee arthroplasty in hemophilia patients had reported a smaller reduction in hemoglobin levels, and a 25% reduction in both the amount of allogenic blood transfused and postoperative drainage.¹⁶ In this case study, Gelfoam was used following the application of FLOSEAL. FLOSEAL has been reported to stop bleeding 97% of the time, therefore, the additional use of Gelfoam may not be required in most patients.¹⁷

Our study highlights the challenges of surgery in patients with hemophilia. Chronic synovitis is the result of recurrent bleeding, thus, aggressive management of early bleeding and use prophylactic treatment to reduce the progression to chronic synovitis and joint arthropathy would avoid or delay the need for surgery in these patients. Indeed, there may be a role for FLOSEAL in the earlier management of bleeding in these patients, which would provide potential cost savings such as reduced hospital time, blood product, and recombinant factor VII use.

This case study indicates that despite the medical and surgical complexities of hemophilic patients, orthopedic procedures are possible, and FLOSEAL may provide a useful addition in the management of hemostasis.

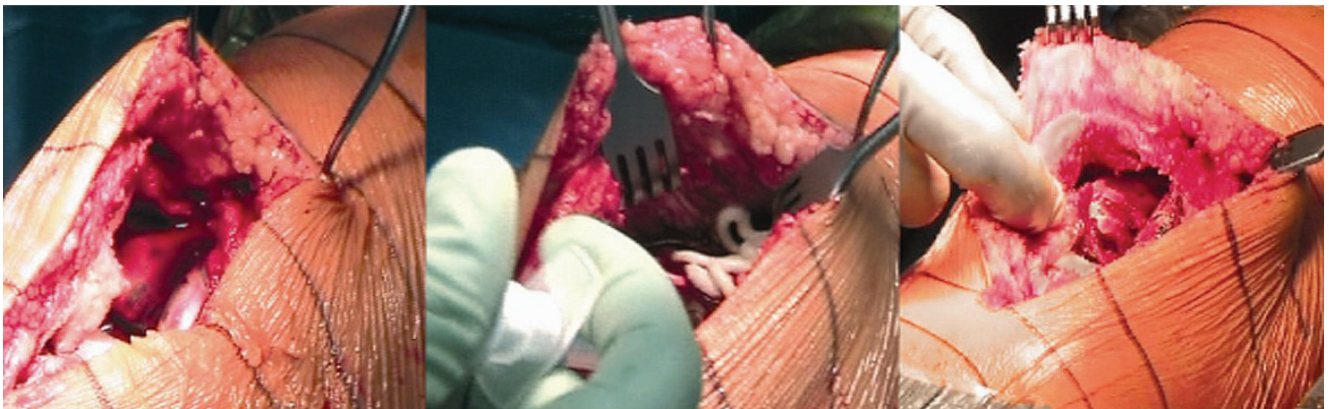


Figure 2. Representative image of intra-articular application of the hemostatic matrix gel in the knee joint.

AUTHORS' DISCLOSURE STATEMENT

Dr. Guerra has received speaker fees from Baxter. The rest of the authors have no actual or potential conflict of interest in relation to this article.

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