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Case Report

Delayed epidural hematoma after spinal cord stimulator implantation in a patient with von Willebrand disease: Illustration

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ABSTRACT

Background: A patient with von Willebrand disease developed a delayed epidural hematoma originating from the tunneling tract and gluteal generator pocket following the placement of a thoracic spinal cord stimulator (SCS).

Case Description: A 43-year-old male with von Willebrand disease underwent thoracic SCS placement to treat chronic bilateral lower extremity pain with paresthesias in 2024. The patient had previously experienced a post-operative hematoma in 2010. At the time of the thoracic SCS placement, he received 7 days of prophylactic antihemophilic factor/von Willebrand factor complex therapy. One month following placement of the thoracic SCS, the patient noted significant swelling localized to the thoracic and buttock incisions. Exploratory surgery documented an additional hematoma tracking from the tunneling tract and gluteal generator pocket all the way into the epidural space; it was promptly removed. At the 6-month follow-up, he exhibited no further wounds or neurological issues.

Conclusion: Patients with coagulopathies, and critically, von Willebrand disease, undergoing SCS placement are at increased risk for postoperative hematomas.

Keywords: Coagulopathy, Spinal cord stimulation, Von Willebrand disease

INTRODUCTION

More spinal cord stimulators (SCSs) are being placed for treating various thoraco-lumbar pain syndromes.[8,10] Meticulous preoperative and perioperative planning is critical to mitigate complications, particularly in patients with von Willebrand disease.[2,12] Here, a 43-year-old male with von Willebrand disease developed both an acute and delayed epidural hematoma following elective placement of a thoracic SCS.

CASE DESCRIPTION

A 43-year-old male with von Willebrand disease type 2M originally presented with cervical myelopathy managed with multiple cervical procedures (i.e., anterior cervical discectomy/fusions

at C6-C7 in 2010, C3-C5 in 2022, and C5-T1 in 2022). Following the original anterior cervical discectomy and fusion in 2010, he suddenly developed increased paraparesis attributed to acute postoperative hematoma within 24 h of surgery. The clot was removed, and he required 4 units of packed red blood cells in transfusion. Notably, in 2022, he required a T3-T9 laminectomy for thoracic myelopathy for residual pain. In 2024, he underwent elective placement of a thoracic SCS. Before this SCS surgery, his International Society on Thrombosis and Hemostasis bleeding assessment tool score was 7 (a score >5 is abnormal): his most recent von Willebrand factor activity level was 45% (reference range is 50–166% preferred), and factor VIII activity was 69% (reference range 50–150% is preferred). Preoperative platelet aggregation studies indicated prolonged closure time with collagen/adenosine diphosphate stimulation.

Pain management placed a percutaneous SCS trial that significantly improved his lower extremity (60–70%) and (20–30%) back pain; the permanent SCS was placed in October 2024. Prophylactically, he received antihemophilic factor/von Willebrand factor complex (50 units/kg twice daily for 3 days, followed by 50 units/kg daily for 4 days) to maintain von Willebrand factor ristocetin cofactor (VWF: Rco) and factor VIII (FVIII) trough levels above 50 units/dL, without exceeding 200 units/dL for VWF: Rco or 250 units/dL for FVIII.

Postoperative management

Following thoracic SCS implantation, he was given oral tranexamic acid (1.3 g 3 times daily) for 7 days. One month later, however, the patient developed significant increased swelling attributed to a postoperative hematoma at the thoracic and buttock incision sites; interestingly, he remained neurologically intact. Before repeated surgery for clot removal, he received an antihemophilic factor/von Willebrand factor complex infusion and tranexamic acid. At surgery, a large, coagulated hematoma originated from the tunneling tract of the gluteal pulse generator that extended into the epidural space, but paddle lead/anchoring sites remained intact. Examination of the gluteal incision revealed a coagulated hematoma without active hemorrhage. Postoperatively, the patient received an additional 7 days of antihemophilic factor/von Willebrand factor complex therapy. He was later discharged postoperative on day 3 without any residual hematoma and/or other adverse events.

DISCUSSION

This case highlights the risk of hemorrhage at sites beyond the epidural space, including the tunneling tract and implantable pulse generator pockets for patients with von Willebrand disease. Despite multidisciplinary perioperative optimization of the patient's von Willebrand disease, delayed hematomas may occur. To avoid postoperative hematomas, patients with von Willebrand disease should preoperatively receive liberal administration of clotting factors and tranexamic acid along with vigilant monitoring for delayed hematomas.

Postoperative hematomas for SCS placement due to congenital bleeding disorders, including von Willebrand disease, hemophilia a and c

Other case reports demonstrate uncomplicated postoperative courses in patients with congenital bleeding (i.e., hemophilia A, C, or von Willebrand disease) disorders receiving SCS, where appropriate preoperative prophylaxis has been used [Table 1].[3-5] Previous studies have explored the role of pharmacologic agents in the management of these patients, including antihemophilic factor/von Willebrand factor

Table 1: Literature review summary.

Study	Number of patients	Age	Bleeding disorder	Preprocedure disease activity	Medical optimization	Major bleeding episode
Singla and Kohan[9]	1	52	VWD Type I	VWF activity assay 71% (ref: 47–196)	rVWF <1 h to procedure	None
Masson and Sikorsky[6]	1	76	VWD Type II	NR	rVWF <1 h to procedure	None
Woo *et al.*[11]	1	39	Hemophilia A	Factor VIII activity: 15% of normal values	Recombinant Factor VIII <1 day to procedure and >2 days following procedure	None
Current Study	1	43	VWD Type II	VWF activity assay 45% (ref: 50–166%)	rVWF on the day of surgery, followed by oral tranexamic acid for a week after the procedure	Postoperative hematoma 1 month later

VWD: Von Willebrand disease, rVWF: Recombinant von Willebrand factor

complex, which enhances the levels of von Willebrand factor and factor VIII.[1] Another is tranexamic acid, used as a spinal surgery adjunct to reduce blood loss and wound complications. Other studies have also demonstrated the efficacy of tranexamic acid in reducing postoperative blood loss and complications/hematomas in spinal surgeries (i.e., reduction in wound oozing, infection rates, and significant compressive hematomas).[7,9,11]

CONCLUSION

Multidisciplinary teams should be involved when treating patients with von Willebrand disease undergoing SCS implants to avoid bleeding complications. When they occur, vigilant management protocols should be followed preoperatively, intraoperatively, and long-term postoperatively.

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