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Case report

Enoxaparin-induced skin necrosis at injection site after total knee arthroplasty

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ABSTRACT

Enoxaparin is a widely used low-molecular-weight heparin for perioperative thromboembolic prophylaxis. Enoxaparin-induced skin necrosis in the setting of arthroplasty has been rarely reported in the literature with varying outcomes and management decisions. Our patient developed skin necrosis at his injection site and thrombocytopenia 10 days following left total knee arthroplasty surgery and after receiving subcutaneous Lovenox injections postoperatively. The patient was started on an alternative anticoagulation based on a high suspicion for heparin-induced thrombocytopenia and the wound was monitored without surgical debridement. Our case highlights the key clinical management decisions when facing this potentially life-threatening adverse reaction.

Introduction

Lovenox (generic name: enoxaparin) is a low-molecular-weight heparin (LMWH) that prevents coagulation by primarily inhibiting factor Xa [1]. It is frequently given in the setting of knee and hip arthroplasty in preventing perioperative deep vein thrombosis (DVT) and venous thromboembolism. Along with bleeding risk, rare cutaneous side effects have been reported in the literature [2,3]. Enoxaparin-induced skin necrosis, as seen in our case, has been associated with grave consequences, including death [4,5].

The precise mechanism for this notable side effect is unknown but frequently occurs along with heparin-induced thrombocytopenia. Given the potential for severe morbidity, it is important for physicians using LMWH for DVT prophylaxis to recognize and appropriately manage this side effect. To our knowledge, 3 cases of Lovenox-induced skin necrosis following TKA have been reported with differing management and outcomes [4,6,7]. We hope our case highlights a successful management option when facing this rare and potentially life-threatening clinical problem.

Case history

The patient is a 60-year-old man with a history of a previous right total knee arthroplasty (TKA) who presented with left knee degenerative joint disease that led him to undergo a left TKA. He was discharged without complications on postoperative day (POD) 4 with 2 weeks of Lovenox 30 mg subcutaneous injections given twice per day. The patient had received the same dosing regimen during his first 3 days postoperatively prior to discharge with his first injection having been given preoperatively and then again 12 hours later.

On POD 10 the patient presented in clinic with a necrotic skin reaction over the abdominal Lovenox injection site measuring 5 cm × 3 cm × 1 cm. His Lovenox injections were discontinued and he was sent to the emergency department for concern about possible Lovenox-induced skin necrosis and heparin-induced thrombocytopenia.

On presentation to the emergency department, his complete blood count and basic metabolic panel were within normal limits except for a platelet count of 81. He was afebrile with an otherwise normal physical examination and without signs of systemic illness. A 4T score was calculated to be >6, indicating a high risk for heparin-induced thrombocytopenia (HIT) (Fig. 1). He was then started

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4Ts HIT Probability Testing (Pretest)	Score
Thrombocytopenia	
- 50% decrease in platelets AND nadir ≥ 20,000 AND no surgery within preceding 3 days	**2**
- > 50% decrease BUT surgery within preceding 3 days OR any combination of platelet decrease and nadir that does not fit the criteria for Score 2 or Score 0	**1**
- < 30% decrease OR platelet nadir < 10,000	**0**
Timing (from first day of most recent heparin/LMWH exposure)	
- Platelet drop day 5-10 after start of heparin OR within 1 day if previous exposure within the last 5-30 days	**2**
- Consistent with fall between days 5-10 but not clear OR within 1 day of start with exposure in past 31-100 days OR onset of thrombocytopenia after day 10	**1**
- Platelet fall is within 4 days of start without recent heparin exposure in the last 100 days	**0**
Thrombosis	
- New thrombosis, skin necrosis at injection sites, post-heparin acute systemic reaction, adrenal hemorrhage	**2**
- Progressive or recurrent thrombosis on therapeutic anticoagulant, suspected thrombosis not yet proven, OR erythematous skin lesions at heparin injection sites	**1**
- Thrombosis not suspected	**0**
Other Causes for Thrombocytopenia	
- No other cause for platelet count fall is evident	**2**
- Possible other cause is evident (e.g. sepsis without proven source, thrombocytopenia associated with initiation of ventilator, other)	**1**
- Probable other cause is present (e.g. within 72 hours of surgery, confirmed bacteremia/fungemia, chemotherapy/radiation within 20 days, DIC, post-transfusion purpura, nadir < 20 AND with other potential drug cause, non-necrotizing skin lesions at injection sites, other)	**0**
Pretest Probability Score: 6-8 = high 4-5 = intermediate 0-3 = low *Assessment and Action:* Score ≤ 2 – no presence of HIT or need to test for antibody Score of 3-4 – warrants additional consideration and potential need to request an antibody assay Score ≥ 5 – request antibody assay and consider initiating a alternative anticoagulant	**Total = ____** **(8 maximum)**

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Figure 1. Outline for calculating 4T scores.

on an intravenous bivalirudin (direct thrombin inhibitor) drip. On day 2 after admission his HIT assay returned back positive. His wound was monitored by a multidisciplinary team and felt not to require surgical debridement or biopsy. The patient had a lower extremity venous duplex that was negative for DVT bilaterally. On POD 14 the patient was discharged from the hospital on an oral anticoagulation schedule of dabigitran 150 mg given twice per day for 4 weeks with follow-up scheduled in 1 week at clinic.

The patient was followed at scheduled intervals for the coming months after discharge without complications as his abdominal wound healed. A picture of his abdominal wound at 2 weeks (Fig. 2) and 2 months (Fig. 3) postop is shown. By 4 months postop the patient had only minor scabbing and by 5 months the wound had completely healed. A picture of his wound at his 7-month follow-up is shown in Figure 4.

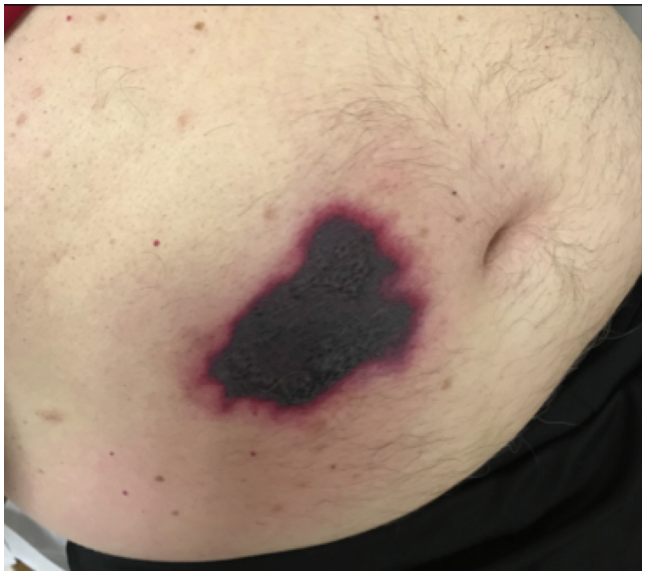

Figure 2. Injection site wound at 2 weeks postop.

Discussion

According to practice guidelines updated in 2011, the American Academy of Orthopedic Surgeons recommends the use of LMWH for venous thromboembolism prophylaxis in patients undergoing