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ENOXAPARIN-INDUCED BLEEDING RESULTING IN COMPARTMENT SYNDROME OF THE THIGH: A CASE REPORT

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□ **Abstract—Background: Enoxaparin-related bleeding has usually been described as excess minor bleeding. Objectives: To describe a case of major bleeding with a compartment syndrome secondary to enoxaparin. The utility of bedside emergency department ultrasonography as a diagnostic tool is evident. Case Report: A 62-year-old patient presented with swelling and pain in the left thigh with no history of trauma. Examination revealed a swollen extremity with a tense muscle compartment. A bedside ultrasound by the emergency physician was performed, showing a large pocket of fluid accumulation. Upon aspiration, the fluid was found to be blood. Computed tomography imaging was performed, which revealed a large hematoma, with active bleeding. Subsequent angiography showed several extravasations from the profunda artery. The patient was then taken for embolization of the bleeding, and then an anterolateral fasciotomy. The patient had an increased partial thromboplastin time, and final diagnosis was compartment syndrome due to spontaneous bleeding from enoxaparin. Conclusions: Enoxaparin can spontaneously cause serious bleeding with associated compartment syndrome.** © 2011 Elsevier Inc.

□ **Keywords—enoxaparin; compartment syndrome; spontaneous bleeding**

INTRODUCTION

Low-molecular-weight heparins (LMWHs), such as enoxaparin (Lovenox®; Sanofi-Aventis, Bridgewater, NJ), are considered the first line for both the prophylaxis and treatment of deep venous thrombosis (DVT) (1). The use of these agents has grown tremendously due to the decreased need for laboratory monitoring and their suitability for home administration (1). Although many studies have touted the increased safety and efficacy of the LMWHs over the unfractionated heparins, these drugs are still associated with bleeding complications (1). Due to decreased monitoring costs and ability to move to the outpatient setting, the LMWHs have become widely prescribed. In patients treated with enoxaparin, the incidence of major bleeding is 4.7%, and of transfusion is 7.2% (2). Many studies have indicated that minor bleeding is more common than major bleeding complications. A spontaneous bleed that causes a compartment syndrome is a rare and serious complication of LMWH.

CASE REPORT

A 62-year-old man presented to the Emergency Department (ED) with a complaint of left thigh swelling and 9/10 pain starting about 9 h before arrival. The patient reported that the swelling began shortly after injecting insulin into the thigh. He denied any recent trauma to the leg. Vital signs were 37°C (98.8°F), pulse 60 beats/min, blood pressure 161/95 mm Hg, and respiratory rate 16 breaths/min. The past medical history was remarkable for diabetes, hypertension, and a recent DVT in the left leg. The patient's medications included insulin, lansoprazole, benazepril, daily enoxaparin (Lovenox®) injec-

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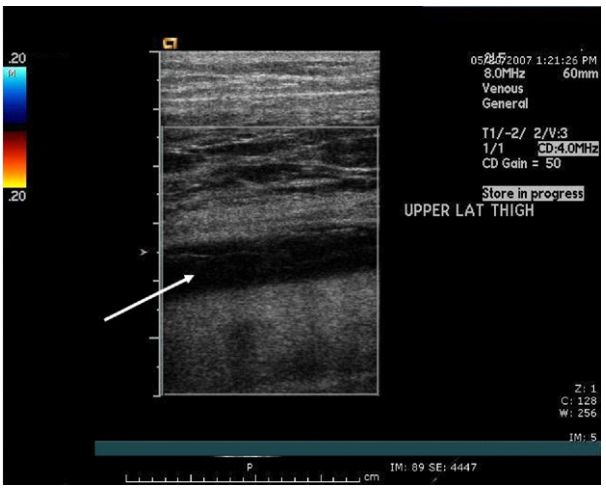


Figure 1. Emergency physician bedside ultrasound of the left thigh showing a large fluid collection (arrow).

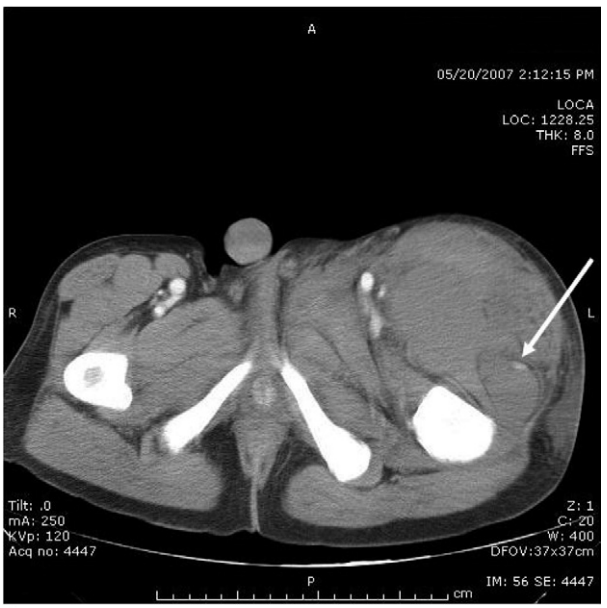
tions, and hydroxyurea. The patient had been receiving daily enoxaparin injections for the previous 3 months.

The initial physical examination revealed a well-developed man in obvious pain. His left thigh was tense, warm, and pale. Pulses were 2+ at both the dorsalis pedis and the popliteal arteries. Neurological examination revealed decreased sensation over the lateral aspect of the calf, but motor function was intact, and the patient was able to move all toes. Due to the severity of his pain, x-ray studies were taken of the left leg, which revealed soft tissue swelling but no fractures.

A bedside ultrasound performed by the emergency physician showed a large collection of fluid, about 3 cm below the skin extending up and down the thigh. Needle aspiration was performed using ultrasound guidance, and about 300 cc of blood was removed. It was noted that as the blood was removed, the thigh became softer, and the patient reported relief of pain. After draining the blood from the thigh, a compression dressing was applied to the leg to prevent further accumulation of fluid in the space.

Approximately 1 h later, despite the compressive dressing, the patient began complaining of increased pain in the thigh, and physical examination showed that the thigh was swollen, tense, and hard again. At this point, the surgery team was consulted to evaluate the patient. On arrival, the surgery team performed a repeat bedside ultrasound, which once again showed a large pocket of fluid in the thigh (Figure 1). Also noted was the close proximity of a vessel. The patient was taken to get a computed tomography (CT) scan of the abdomen, pelvis, and leg by the surgery team. The CT scan showed a 12.3 × 5.0 × 36.2 cm hematoma in the left thigh with active extravasation (Figure 2, A and B). Laboratory results in the ED revealed: a hemoglobin drop from 10.6 to 9.2; platelets of 454,000; a partial thromboplastin time of 44.5, and creatinine clearance of 64.

Based on the clinical progression and the CT results, an angiogram was performed immediately. The surgical team felt that delay for pressure tonometer confirmation of elevated pressures would not change their management, and that angiographic control of bleeding and subsequent fasciotomy were indicated. The angiogram showed multiple extravasation sites with blush, indicating active bleeding



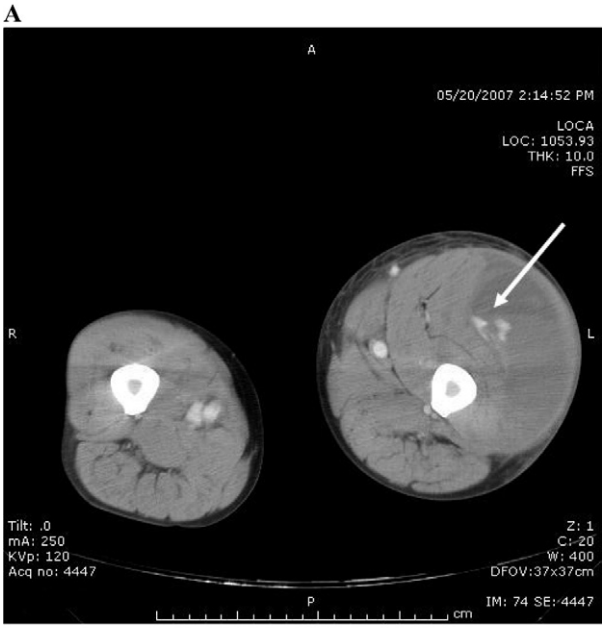


Figure 2. (A, B) Computed tomography scan showing the large hematoma in the left thigh, with active extravasation (arrows).