

Bladder perforation secondary to rectus sheath hematoma after enoxaparin injection

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ABSTRACT

الورم الدموي في عضلة غمد المستقيم هو عبارة عن تجمع الدم في غمد عضلة المستقيم البطنية بسبب إصابة أحد الأوعية الشرسوفية أو العضلات بحد ذاتها. وهي حالة نادرة يمكن أن يكون سببها استخدام الحقن المضادة للتخثر. نحن نبلغ عن سيدة عمرها 60 عاما تلقت حقنة إينوكسابارين في أسفل البطن. وفي وقت لاحق ظهر لديها ثقب في المثانة بسبب الورم الدموي في عضلة غمد المستقيم وتم تشخيصه باستخدام التصوير المقطعي للأوعية الدموية. تم إجراء فتح البطن الاستكشافي وتمت السيطرة على النزيف مع إصلاح جدار المثانة. المريضة أصيبت بفشل عدة أعضاء. بعد ثلاثة أيام، توفيت المريضة. الورم الدموي في عضلة غمد المستقيم هو حالة نادرة وغالبا ما ترتبط مع استخدام الحقن المضادة للتخثر. يجب على مقدمي الرعاية الصحية أن يكونوا على بينة من هذه المضاعفات لأجل للوقاية والتشخيص المبكر.

Rectus sheath hematoma is a collection of blood in the sheath of rectus abdominis muscle due to an injury of one of the epigastric vessels or the muscle itself. It is a rare condition that could be caused by the use of anticoagulant injections. We report a 60-year-old lady who received enoxaparin injection on the lower abdomen. Subsequently, she developed bladder perforation secondary to rectus sheath hematoma and was diagnosed using CT angiography scan. Exploratory laparotomy was performed and bleeding was controlled with bladder wall repair. Patient developed multi-organ failure. Three days later, the patient died. Rectus sheath hematoma is a rare condition and it is often associated with the use of anticoagulant injection. Healthcare providers should be aware of such complication for prevention and early diagnosis.

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Rectus sheath hematoma (RSH) is a collection of the blood in the rectus abdominis muscle sheath due to injury of one of the epigastric vessels or the muscle itself.¹ Rectus sheath hematoma has many causes but commonly caused by trauma, abdominal surgeries, subcutaneous drugs injection, hematological diseases, hypertension, pregnancy, and physical activity. However, it rarely happens spontaneously.^{1,2} It is a rare condition that has been reported to occur with anticoagulant injection.³⁻⁵ Rectus sheath hematoma can mimic other acute abdominal conditions, early recognition of such cases can save a patient's life. The aim of this paper is to draw the attention of the healthcare providers regarding this condition to minimize its occurrence and improve early diagnosis.

Case Report. Patient information. A 60-year-old lady was presented to the emergency department with 2 attacks of syncope. She was known to have hypertension, atrial fibrillation, and ischemic heart disease. Four years earlier, she underwent percutaneous mitral balloon valvuloplasty in Yemen. She was on warfarin, furosemide, and bisoprolol. She had not consulted any cardiologist since her last intervention.

Clinical findings. Upon assessment, she was asymptomatic. Examination revealed hemodynamic stability with basal lung crepitation only. Her body mass index was 18.9.

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Diagnostic assessment. Laboratory workup revealed hemoglobin 106 g/L and international normalized ratio was 1.39. Other laboratory workups were normal. Computed tomography scan of the brain showed multiple low attenuation areas in the right occipital lobe and right basal ganglia, suggestive of acute brain ischemic insult. Echocardiogram revealed severe mitral stenosis with severe biatrial enlargement, moderate tricuspid regurgitation, and moderate pulmonary hypertension. She was diagnosed with severe mitral valve stenosis and acute stroke. She was admitted for further management and workup.

Therapeutic intervention. She was assessed by a cardiac surgeon who recommended mitral valve replacement. Warfarin was stopped and replaced with enoxaparin. On day 12 post admission, she was injected with enoxaparin (Clexane®) on her lower abdomen. Few hours later, she started to develop lower abdominal pain with lower abdominal tenderness. A Foley catheter was inserted and drained concentrated urine. Over the next 6 hours from injection, the pain increased and she started to develop lower abdominal swelling. Her blood pressure became 73/56 mm Hg and pulse rate, 116 beats/min. Laboratory workup revealed hemoglobin drop from 98 to 85 g/L, creatinine level increase from 103 to 158 mmol/L, and lactic acid level 9.5 mmol/L. Working diagnosis was ischemic bowel, perforated viscus, or abdominal bleeding. The patient and family refused surgery. She was resuscitated and transferred to the intensive care unit. She became stable after resuscitation. Computed tomography angiography result showed large retroperitoneal hematoma with active bleeding and intact major vessels (Figures 1-3).

Ten to 12 hours post injection, the Foley catheter

suddenly started to drain a large amount of fresh blood and her condition deteriorated rapidly. Transfusion of large amounts of blood products was carried out. A high dosage of inotrope support was started. She was brought to the operating room. Exploratory laparotomy showed large retroperitoneal hematoma with bleeding from the rectus sheath. In addition, there was perforation in the upper part of the posterior bladder wall. There was no other source of bleeding other than the one from the rectus sheath, which was controlled. Bladder wall was repaired.

Follow up and outcomes. She was transferred back to the ICU. She developed multi-organ failure. Three days postoperatively, she coded and died (Table 1).

Discussion. Rectus abdominis muscle is supplied by the superior epigastric artery (SEA) and the inferior

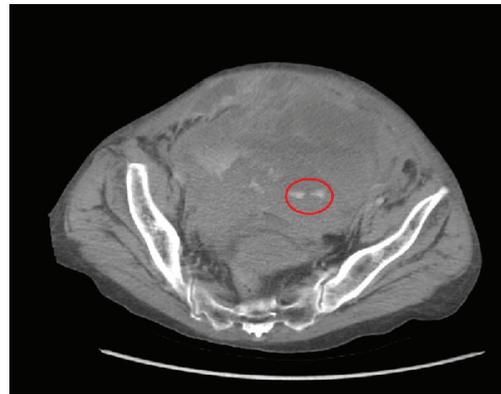


Figure 2 - Axial CT scan of abdomen shows large retroperitoneal hematoma with area of active bleeding (circle).

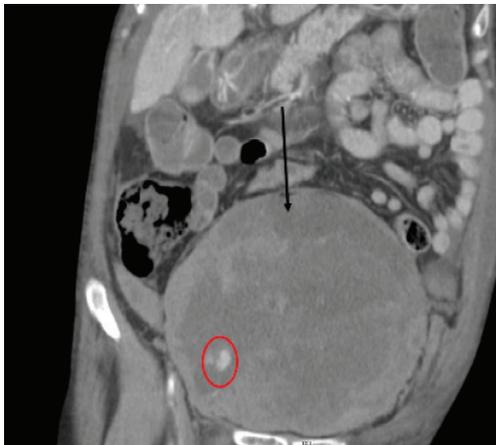


Figure 1 - Coronal CT scan of abdomen and pelvis large retroperitoneal hematoma (arrow) with area of active bleeding (circle).



Figure 3 - Sagittal CT scan of abdomen and pelvis shows large retroperitoneal hematoma with hyperdense area (circle). Foley catheter inside the bladder (yellow arrow).

Dates	Relevant past medical history and interventions		
19/09/2015	A 60 year old, Yemeni female known to have HTN, AF and IHD. Four years earlier, she underwent percutaneous mitral balloon valvuloplasty in Yemen. She was on warfarin, furosemide, and bisoprolol. She had not consulted any cardiologist since her last intervention.		
Dates	Summaries from initial visit and admission follow up	Diagnostic testing	Interventions
19/09/2015	Presented to ER with two attacks of syncope and Upon assessment, patient was asymptomatic. Examination revealed hemodynamic stability with basal lung crepitation only. Based on diagnostic testing, the patient diagnosed with severe mitral valve stenosis and acute stroke.	Hemoglobin was 106 g/L and INR 1.39. Other lab work were normal. Chest x-ray was normal. ECG revealed severe mitral stenosis with severe biatrial enlargement, moderate tricuspid regurgitation, and moderate pulmonary hypertension. CT of brain showed multiple low attenuation areas in the right occipital lobe and right basal ganglia.	The patient admitted: 1) Warfarin was stopped and replaced with enoxaparin. 2) Assessed by cardiac surgeon who recommended mitral valve replacement.
01/10/2015	The patient received enoxaparin injection on the lower abdomen few hours later she developed lower abdominal pain with lower abdominal tenderness which progress with time to lower abdominal swelling and intense pain. The initial differential diagnoses was ischemic bowel, perforated viscus, or abdominal bleeding.	BP= 73/56 mmHg HR = 116 beats min Hemoglobin= 85g/L Creatinine =158 mmol/L Lactic acid = 9.5 mmol/L Foley drained hematuria CT angiography showed large retroperitoneal hematoma with active bleeding.	Patient was resuscitated and transferred to the intensive care unit. The family refused surgery.
01/10/2015	10-12 hous post injection: Foley catheter suddenly started to drain a large amount of fresh blood. The patient's condition deteriorated rapidly.		Transfusion of large amounts of blood products Inotrope Exploratory laparotomy were carried out, bleeding from rectus sheath controlled and bladder wall repair was applied
04/10/2015	The patient developed multi-organ failure		Patient coded resuscitation effort has been applied but unfortunately the patient died.

HTN - hypertension, AF - atrial fibrillation, IHD - ischemic heart disease

epigastric artery (IEA). Rectus sheath hematoma is commonly from IEA injury due to 2 reasons. First, the location of IEA at the perforating muscle branches. Second, absence of posterior rectus sheath below the arcuate line. These known facts explains why RSH is more common in the lower abdomen and more prone to pelvic extension.⁶ Rectus sheath hematoma with anticoagulant injection is frequently reported worldwide. Most of the reported cases occurred in patients who are female, elderly and having low BMI.^{4,5} Bladder perforation secondary to space occupying pelvic collection is rarely reported.^{7,8} Multiple studies have shown that low BMI, female gender and advanced age are risk factors for bladder perforation during endoscopic bladder tumor resection. This has been attributed to thin wall thickness of the bladder in these patients.^{9,10}

Patient perspective. Our patient was elderly, female, and with low BMI. These are considered risk factors for RSH and thin bladder wall.

The sequence of events started from enoxaparin injection, which led to vascular injury. The bleeding was retroperitoneal which created a tamponade because of the limited space. This contributed to the stability of the patient initially. As the hematoma became larger, the bladder wall was stretched over the Foley catheter which caused perforation of the bladder. The hematoma was drained through the catheter and lost its tamponade effect. This contributed to the rapid hemodynamic deterioration of the patient. This complication could be prevented if high risk patients are injected in different location. Patient who have low BMI, female gender, and elderly should be injected with enoxaparin in the upper part of the abdomen instead of the lower abdomen.

The aim of this case report was to emphasize 2 facts. First, simple procedures if not carried out properly can lead to drastic events. Second, hematoma is the result of injury to the epigastric vessels and not due to potentiated drug effect as stated in some reports.

In conclusion, a healthcare provider administering subcutaneous anticoagulant should be aware of such complications. Prevention can be achieved through good training and knowledge of the basic anatomy to avoid vessel or muscle injury. Rectus sheath hematoma should be suspected in the differential diagnosis of any patient complaining of abdominal pain post subcutaneous lower abdominal injection.

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