Life-threatening Spontaneous Extraperitoneal Haemorrhage Secondary to Anticoagulant Therapy and its Management with Transcatheter Embolisation

MKW Yang, JYH Hui, WC Fan, JCS Chan

Department of Diagnostic Radiology and Organ Imaging, United Christian Hospital, Hong Kong

ABSTRACT
This report is of 2 patients with unstable spontaneous extraperitoneal haemorrhage secondary to anticoagulant therapy. Active contrast extravasations were demonstrated on spiral computed tomography and angiograms, which is possibly a predictive factor for failure of conservative treatment. One patient had a rectus sheath haematoma due to ruptured inferior epigastric artery while taking warfarin for sick sinus syndrome and atrial fibrillation. Another patient was receiving low-molecular weight heparin for acute myocardial infarction and had extensive acute left iliopsoas haematoma due to multiple small bleeding vessels from the iliolumbar artery. Both patients were haemodynamically unstable despite fluid resuscitation, blood transfusion, and discontinuation of anticoagulant therapy. Embolisation was performed for immediate bleeding control. The role of computed tomography and embolisation in the management of this condition is discussed.

Key Words: Anticoagulants; Haemorrhage; Therapeutic embolization

INTRODUCTION
Spontaneous extraperitoneal haemorrhage (SEH) is a well recognised but uncommon complication of anticoagulant therapy. The incidence of retroperitoneal haemorrhage with oral anticoagulation is approximately 0.6%, and is even rarer for low-molecular weight heparin (LMWH). However, the bleeding risk may increase with increasing age and dose. Liberal use of LMWH can be associated with life-threatening complications. Bleeding can occur at any site during the therapy. Intramuscular haematomas are frequent, typically involving the rectus sheath or psoas muscles. Local signs may be absent but hypovolaemia and anaemia are common. An unexplained fall in haemoglobin, haematocrit, or blood pressure should lead to a search for a bleeding site. Ultrasound or computed tomography (CT) is often required to confirm a diagnosis. Management of SEH is traditionally conservative. The recent literature has highlighted the importance of active contrast extravasations on contrast CT scans suggesting significant arterial bleeding and predicts the need for early intervention to restore haemodynamic stability. There had been several published reports describing the successful use of angiography and arterial embolisation for this condition.

CASE REPORTS

Patient 1
An 83-year-old man with a known history of hypertension, diabetes mellitus, and chronic obstructive airways disease was admitted to the United Christian Hospital, Hong Kong, in 2005 with shortness of breath. He was diagnosed with silent myocardial infarction with increased troponin. He was treated with aspirin and LMWH (enoxaparin). On day 5, he complained of left loin and hip pain with increasing numbness of the left leg. Physical examination showed left loin tenderness and left femoral neuropathy. He also developed profound shock with a transient response to fluid resuscitation and blood transfusion. His haemoglobin level decreased from 112 g/L to 59 g/L (normal range, 140-175 g/L) and his haematocrit level decreased from 0.30 to 0.17 (normal range, 0.41-0.50). Emergency enhanced...
Patient 2
A 77-year-old woman with a history of multiple cerebral infarcts, renal impairment, atrial fibrillation, and sick sinus syndrome was given long-term prophylactic warfarin. She was admitted to the United Christian Hospital, Hong Kong, in 2005 with left lower quadrant

CT scan (slice thickness, 7 mm; table speed, 10 mm; pitch, 1.5; intravenous administration of contrast medium, 150 mL at 2 mL/second) showed a large acute left iliopsoas haematoma and evidence of active extravasations, probably from the branches of the left iliolumbar artery (Figure 1). LMWH was discontinued and transfemoral angiogram was done. A 4 F Cobra catheter (Cook, Bjaeverskov, Denmark) was used and selective angiogram of the posterior trunk of the left internal iliac artery was performed, confirming that there were several small bleeding vessels from the distal left iliolumbar artery (Figure 2). Haemostasis was achieved by gelfoam (Spongostan; Ferrosan, Copenhagen, Denmark) embolisation. Further catheterisation of the left lumbar arteries revealed no other sites of extravasations. The patient recovered well and the left femoral neuropathy caused by compression by the left iliopsoas haematoma gradually improved. He was later transferred to a convalescent hospital for further management of his cardiac disease.

Figure 1. Enhanced axial computed tomography scan showing (a) a large acute left iliopsoas haematoma; and (b) active contrast extravasations, suggesting active bleeding from the left iliolumbar artery (arrow).

Figure 2. (a and b) Left internal iliac artery angiogram confirmed small bleeding vessels (arrows) from the distal left iliolumbar artery; and (c) haemostasis was achieved by gelfoam embolisation.
pain for 2 days. Physical examination showed a tender 10-cm mass at the left lower abdomen. Bedside ultrasound showed a large heterogenic hypoechoic mass within the left rectus sheath muscle (Figure 3). A left rectus sheath haematoma was suspected. Her international normalised ratio (INR) was 2.6 and she was haemodynamically stable initially. She had no history of trauma. Conservative treatment was planned, but on day 2, her haemoglobin suddenly decreased from 101 to 75 g/L (normal range, 120-150 g/L) and her haematocrit decreased from 0.30 to 0.22 (normal range, 0.35-0.45). Urgent non-enhanced CT scan (slice thickness, 10 mm; table speed, 15 mm; pitch, 1.5) confirmed a 10- x 7- x 10-cm left rectus sheath haematoma with a fluid-debris interface, indicating a liquefied haematoma (Figure 4). Emergency angiogram and embolisation was performed. The ipsilateral left femoral retrograde approach was chosen. A 5 F Rosch Inferior Mesenteric catheter (Cook, Bjaeverskov, Denmark) was used and left external iliac artery angiogram revealed at least 2 sites of extravasation from branches of the left inferior epigastric artery (Figure 5). Selective cannulation by a coaxial microcatheter (3 F Radiofocus SP catheter; Terumo, Tokyo, Japan) was performed and successful haemostasis was attained by gelfoam injection. The patient tolerated the procedure well. She was discharged home on day 9 and warfarin was stopped.

**DISCUSSION**

Anticoagulants play an important role in the prophylaxis and treatment of thromboembolic disorders and acute coronary artery syndrome, and have been widely accepted and used globally. The bleeding risks are well known, although they are uncommon. More liberal use has led to increasing reports of haemorrhagic complications in the literature. There have been concerns regarding haemorrhagic complications from therapeutic doses of anticoagulant, in particular for elderly patients. Even when standard regimens of anticoagulants are followed and the INR kept within a satisfactory range, life-threatening bleeding could still occur without obvious provoking factors.

Bleeding due to anticoagulants can occur anywhere and major bleeding events include intracranial bleeding. Unlike intracranial bleeding, extraperitoneal haemorrhage has been less commonly reported. SEH is the term used to describe bleeding without known inciting trauma or underlying abnormality, and is usually seen in the setting of anticoagulation, coagulopathy, or haemodialysis. SEH is commonly diagnosed late and anticoagulation has usually been continued until haemodynamic collapse or profound anaemia occurs. Ultrasound, CT, or angiograms are often required to confirm a diagnosis. The iliopsoas and rectus sheath muscles represent the most common sites of this kind of extraperitoneal bleeding. These haematomas are thought to originate from tearing of the muscle fibres and are rarely bilateral. Heparin-induced immune microangiography may or may not have a role in the pathogenesis. There have been few reports of SEH due to LMWH used for acute myocardial infarction and all were successfully treated by transcatheter arterial embolisation.

In a haemodynamically stable patient, the usual management is conservative with cessation of the anticoagulant, correction of the anticoagulant state, volume...
resuscitation, and supportive measures. However, for a
haemodynamically unstable patient, prompt surgical and
angiographic interventions are increasingly accepted as
an option in the presence of an enlarging haematoma.
Review of the recent literature has shown that early
intervention, either embolisation or surgery, may be
beneficial for certain patients. A recent trauma review
stated that a lack of response to initial resuscitation and
contrast extravasation on a CT scan are the most reli-
able indicators of significant arterial bleeding. The
presence of the extravasation of contrast materials on
a contrast-enhanced CT scan is highly predictive of
arterial bleeding that requires angiographic emboli-
sation and has been found to be a reliable indicator of
arterial haemorrhage, with a sensitivity of 66% to 90%,
a specificity of 85% to 98%, and accuracy of 87% to
98%. Poor outcomes were observed for delay in em-
bolisation owing to multi-organ failure and systemic
coagulopathy due to prolonged bleeding and shock.
Contrast CT study will therefore not only confirm and
locate the acute haematoma but also potentially
identify patients who might benefit from angiographic
embolisation. This could reduce blood loss, prevent
late complications of blood transfusion, and improve
outcomes. Furthermore, interventional radiologists can
use the location of the contrast material extravasation
to facilitate selective identification of the offending
artery. This can lead to more rapid and effective trans-
catheter embolisation of bleeding arteries and reduce
the procedure time, complications, morbidity, and
mortality. Contrast-enhanced CT scan is generally per-
formed for most bleeding situations but exceptions do
occur and this was not performed for patient 2 because
of renal impairment. However, non-enhanced study still
has a role. The site of acute haematoma could help to
predict the bleeding vessel and guide the angiographic
study and embolisation. As shown in patient 2, an acute
left lower rectus sheath haematoma was suspected
due to bleeding from the left inferior epigastric artery;
this was subsequently confirmed by the angiograms.

Selective embolisation is now an established treatment
option for bleeding from a variety of sources in the ab-
domen and pelvis. Effectiveness of surgery is limited
by the difficulty in localizing the bleeding vessel
selectively. Although percutaneous aspiration of a psoas
haematoma has been reported to successfully relieve
nerve decompression due to the haematoma, its role in
bleeding control remains limited.

The purpose of this report is to raise the awareness of
SEH that may complicate anticoagulant treatment. The

Figure 5. (a) Left external iliac artery angiogram revealed at least 2 sites of extravasation from branches of the left inferior epigastric artery; and (b) haemostasis was achieved by gelfoam embolisation.
importance of contrast CT scan is highlighted, not only to confirm and locate the haematoma but also to potentially predict the failure of conservative treatment by demonstrating arterial bleeding by active extravasations. Selective transcatheter embolisation is an accepted life-saving option for haemodynamically unstable patients. This experience is similar to that reported in the literature.

REFERENCES