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Unexpected outcome (positive or negative) including adverse drug reactions

Abdominal wall haematoma in cardioembolic stroke due to enoxaparine therapy: a report of two cases

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Abstract

Abdominal wall haematomas are uncommon and often misdiagnosed entities. Most of the time the haematoma is produced by rupture of the epigastric vessels, deep circumflex iliac artery or tear in the rectus or lateral oblique muscle. Predisposing factors such as arteriosclerosis of vessels, old age, straining while urinating and coughing and use of anticoagulant agents make bleeding more likely. Here, two uncommon cases who experienced cardioembolic stroke are described. The patients were given enoxaparin sodium urgently, administered to the stomach area subcutaneously. They presented with abdominal masses, periumbilical and inguinal ecchymosis. Their haemoglobin levels dropped. Abdominal CT scan and ultrasonography revealed rectus sheath and internal abdominal oblique muscle haematomas. The patients were treated conservatively. This report concerns this rare condition, often misdiagnosed in unconscious patients, that has not been reported as being due to cardiogenic brain embolism in the literature to date.

BACKGROUND

Rectus abdominis sheath haematoma (RSH) and lateral abdominal wall haematoma due to low molecular weight heparin (LMWH) therapy are uncommon.^{1,2} Haematoma develops upon rupture of the epigastric vessels, a tear in the rectus or lateral oblique muscle, or both of them.³⁻⁵ It is more commonly seen in older women (2.5/1), especially if they are under anticoagulant therapy for cardiovascular or cerebrovascular diseases.^{1,6-8} Other precipitating factors include haematological disorders, trauma, physical exercise, hypertension, recent surgery, injection procedure, or increased intra-abdominal pressure from coughing, sneezing, vomiting, straining while urinating or defecating or pregnancy.^{1,3,9,10}

Clinically, acute abdominal pain, palpable mass in the infraumbilical areas particularly in unconscious patients and ecchymosis in periumbilical region extending to inguinal area are features highly suggestive of abdominal wall haematoma.¹ It is often misdiagnosed, particularly in unconscious patients; therefore decreasing blood haemoglobin levels should alert doctors.^{1,3,11-13} The diagnostic tools used were CT and ultrasonography (USG) of the abdomen.^{4,8,9,14,15}

CASE PRESENTATION

Case 1

A 74-year-old man was admitted to our emergency department with unconsciousness and hemiparesis on the left side. Hypertension and coronary artery disease were remarkable on his past history. On physical examination, his body weight was 80 kg, his vital signs were as follows;

temperature: 36.5 °C; blood pressure: 130/85 mm Hg; pulse rate: 110 beats/min; respiratory rate: 12 breaths/min. There was atrial fibrillation (AF) on electrocardiography (ECG). Neurological evaluation revealed that the patient was confused and could not move his left side against gravitational force (+2/5 motor strength). An emergency CT scan without contrast demonstrated right posterior cerebral artery infarct. He was hospitalised and given enoxaparin sodium (160 mg/day total, twice a day subcutaneously, diltiazem HCl (120 mg/day, intravenously) and metoprolol succinate (50 mg/day, intravenously). The urinary catheter of the patient was removed because of a urinary tract infection and the patient was administered sulbactam sodium + cefepime sodium (2 g/day, intravenously). While his neurological condition was improving with this medication, his blood haemoglobin level decreased on the fifth day of admission. The haemoglobin level had dropped from 14.5 g/dl to 6.3 g/dl. He almost lost 2800 ml blood. Other laboratory monitoring was as follows: leukocytes: 26 900 cells/mm³; haematocrit: 21.4 %; platelets: 232.000 per mm³. Blood biochemical laboratory findings were normal, and the international normalised ratio (INR) was 1.19, prothrombin time (PTZ) 12.1 and activated partial thromboplastin time (aPTT) 26.1. Gastrointestinal tract bleeding was suspected. However, there was no melena or haematemesis. A faecal occult blood test was negative. He became hypotensive after blood loss and two masses which were infraumbilical, solid, and sensitive 2×2 cm on the right side and 5×5 cm on the left side developed, and an ecchymosis appeared in the lower abdominal area extending to the inguinal and scrotal areas.

Case 2

A 70-year-old woman presented with hemiparesis on the right side and unconscious state. There was rhonchus with auscultation in physical examination. On neurological evaluation, the patient could be roused with difficulty, her eyes were deviated to the left side, and there was slight right-sided hemiparesis. The patient had a history of hyperthyroidism, diabetes mellitus, coronary heart disease, chronic obstructive pulmonary disease and hypertension. On physical examination, her body weight was 70 kg, her blood pressure, temperature and respiratory rate were 190/100 mm Hg, 36.5 °C and 12 breaths/min, respectively. Her pulse was tachycardiac and arrhythmic that resembling high ventricular rate atrial fibrillation on electrocardiography. The cranial CT revealed parietotemporooccipital infarct on the left side. Her laboratory findings were as follows: haemoglobin: 11.8 g/dl, leukocytes: 11 100 cells/mm³; Hct: 35.5 %; platelets: 269 000 per mm³; glucose: 169 mg/dl; urea: 128 mg/dl; creatinine: 2.13mg/dl; alanine aminotransferase (ALT): 13 U/litre; aspartate aminotransferase (AST): 23 U/litre; PTZ: 13.4 s.; aPTT: 25.3 s.; and INR: 1.03. The patient was given enoxaparin sodium (120 mg/day total, twice a day subcutaneously), carvedilol (25 mg/ day, orally), ramipril + hydrochlorothiazide (5 mg + 12.5 mg/day, orally). We also gave the patient intravenous fluid due to acute renal failure and adjusted enoxaparin dose. The patient's renal functions returned nearly normal serum levels after intravenous hydration. She began to improve also neurologically on the 11th day of admission, her eyes were open, and she looked conscious. She was able to obey orders and complained of severe constant lower abdominal pain. A non-pulsatile, hard, tender 10×5 cm mass extending to the lateral abdominal wall was detected in the lower left quadrant of the abdomen with skin ecchymosis. Her blood haemoglobin level dropped from 11.8 mg/dl to 5.6 mg/dl. She lost nearly 2000 ml blood and she was also hypotensive (70/50 mm Hg). There was no sign of gastrointestinal tract bleeding.

INVESTIGATIONS

Case 1

Abdominal USG and CT were performed upon consultation with the general surgery department. USG revealed hypoechoic well defined 7.5×2.5 cm mass in the left lower quadrant of the abdomen wall. CT scan displayed bilateral RSH, which was 1.5×1.5 cm on the right side and 4×6 cm on the left side (fig 1).

Case 2

USG revealed a hypoechoic well defined 10 cm×8 cm mass extending to the midline in the left lower

quadrant of the abdomen. A lower abdominal CT scan obtained on the same day of USG demonstrated two masses which were 9.5×4.2×3.8 cm and 12×9.5×8 cm, of heterogeneous density, well defined, containing fluid fluid levels, compressing and impressing upon the intestine inferolaterally, located in the rectus sheath and internal oblique muscle, respectively (fig 2). Clot resorption leads to diminution of density and fluid fluid levels because of the haematocrit effect.

DIFFERENTIAL DIAGNOSIS

Decreasing blood haemoglobin level and abdominal mass with periumbilical and inguinal ecchymosis are the most important diagnostic findings for suspicion of RSH in an unconscious patient. Age, sex and past medical history are also important factors. However, other abdominal pathologies such as appendicitis, sigmoid diverticulitis, inferior myocardial infarction, perforated peptic ulcer, ovarian cyst torsion, intestinal obstruction, tumour and hernia should be kept in mind for differential diagnosis.

TREATMENT

Routinely bridging patients with cardioembolic stroke (CES) in the acute phase with enoxaparin or heparin until warfarin therapy begins to work is a widespread practice, but one that is not supported by the literature or current guidelines. We usually prefer enoxaparin therapy because it differs from non-fractionated heparin for presenting higher levels of anti-Xa activity, higher bioavailability in lower dosages, longer half-life, increased predictability to anticoagulant response when administered in fixed dosages, low side effects and easy administration not requiring laboratory control. We start treatment by giving enoxaparin 1 mg/kg² subcutaneously every 12 h and continue with warfarin until the INR has been reduced to >2. We do not administer treatment if the patient is over 150 kg and/or if the patient's creatinine clearance level (CrCL) <30 ml/min. A rare side effect of enoxaparin is RSH, and we experienced this in two patients. For management, anticoagulant therapies were stopped and 4 and 6 U of erythrocyte suspension and fresh frozen plasma were transfused for case 1 and case 2, respectively. Conservative treatment was effective, and no additional treatment was required.

OUTCOME AND FOLLOW-UP

Control abdominal CT obtained 21 days after the bleeding showed that the haematoma in both cases was almost completely resorbed. Eventually, the patients were discharged with neurological sequela.

DISCUSSION

Rectus sheath haematomas caused by the rupture of the epigastric arteries are well known entities. However, haematomas of the lateral abdominal wall are very rare.² To better understand the pathophysiology behind the formation of haematoma, a brief description of the abdominal muscle anatomy is necessary. The rectus abdominis muscle is a paired muscle running vertically on each side of the anterior wall of the human abdomen with midline band of connective tissue called the linea alba. It is contained by the rectus sheath. This sheath is formed anteriorly by the aponeurosis of the obliquus externus and internus abdominis muscles. Blood supply is by the superior and inferior epigastric arteries that lie mainly superiorly on the posterior surface of the rectus abdominis. The deep circumflex iliac artery arises from the lateral aspect of the external iliac artery nearly opposite the origin of the inferior epigastric artery and maintains more laterally.^{2,9,13,15-17}

RSHs most commonly occur in the lower abdomen for many reasons. The lower portion of the rectus muscle is the most powerful. Its length changes with contraction and stretch extensively. This may explain the higher incidence of haematomas in this area.¹ The haematoma results from rupture of the epigastric vessels and rarely deep circumflex iliac artery or tear of the fibres of the abdominal muscles. It may be caused by trauma, coagulation disorders, anticoagulant therapy, hypertension, abdominal surgical scars, obesity, pregnancy and increased intra-abdominal pressure from coughing, sneezing, vomiting, straining while urinating, or defecating.^{7,9,15-18} Predisposing factors are arteriosclerosis of blood vessels, old age and use of anticoagulants.^{9,13,15} Abdominal wall haematomas are well known consequences of anticoagulant therapy with heparin, warfarin sodium and antiplatelet drugs.^{8,19-21}

RSH is reported in many cases under anticoagulant therapy in angina or myocardial infarction, cardiac valve replacement, atrial fibrillation, deep vein thrombosis, pulmonary embolism and platelet disorders.^{6,8,14,16,19,20,22} In this article, a rare condition which can be easily misdiagnosed when consciousness is not preserved, presented in two unconscious patients due to cerebrovascular events. Enoxaparin is a low molecular weight heparin used to prevent and treat thrombosis or embolism. It has been an alternative to heparin therapy because of its favourable low side effect profile. It is easily administered subcutaneously and requires no laboratory monitoring.^{6,12} The well known side effects are mainly bleeding, dermal skin necrosis and thrombocytopenia.¹² RSH and internal abdominal oblique muscle haematoma were seen approximately 5 days after the admission. Spontaneous RSH, caused by the rupture of the inferior epigastric artery, are usual.^{2,13} However, haematomas of the internal abdominal oblique muscle are very rare.² Abdominal wall haematoma typically presents with acute abdominal pain and firm, palpable, painful lower abdominal mass.^{1,8,9,14,15} In our patients, particularly in the first case, it could not be determined whether pain was the leading symptom due to the unconscious state of the patients. Fothergill²³ has argued that decreasing blood haemoglobin level and abdominal mass, termed as the Fothergill sign, were the most important clinical diagnostic findings. In our patients, ecchymosis was detected, but this was a late sign and the average time between its presentation and onset of symptoms was 4 days, as reported in the literature.¹⁵

This condition may mimic different abdominal pathologies such as appendicitis, sigmoid diverticulitis, inferior myocardial infarction, perforated ulcer, ovarian cyst torsion, intestinal obstruction, tumour, or hernia.^{1,6,10,16} Thus, doctors should keep this rare condition in their mind especially while the patient is undergoing anticoagulant therapy. The USG and CT scan provide useful information for differential diagnosis. CT scan is more reliable and permits correct diagnosis, whereas USG findings are not specific.^{2,8,14} CT is an excellent guide in planning the treatment. Accurate diagnosis will prevent unnecessary surgical intervention.^{3,4,7,24} The treatment is essentially conservative with blood transfusions, ice application, bed rest, intravenous hydration and analgesia if mandatory. Any underlying coagulation disorders should be treated. In some cases, vitamin K₁ and fresh frozen plasma might be transfused for rapid reversal of anticoagulant therapy. Most haematomas resolve with time.^{1,11,15} If angiography is performed and extravasations from artery can be shown, embolisation might be performed.² Surgery is indicated for progressive and large painful haematomas. The prognosis of such haematomas with appropriate treatment is good.^{13,16,22} The mortality rate is between 8.7% and 25%.^{13,22} Death due to abdominal wall haematoma alone is a rare complication, and is usually related to frequently encountered associated diseases such as subsequent infection of the haematoma, acute myocardial infarction, acute renal failure, ileus, respiratory and circulatory disorders.^{13,16,22}

Based on the experience of the presented cases, abdominal wall haematomas located in the rectus sheath and internal oblique muscle should be considered in the differential diagnosis of acute abdominal mass in older patients who experience cardioembolic stroke and undergo enoxaparin therapy. The doctors should keep abdominal wall haematoma in their mind and should alert when the abdominal mass is developed in the lower quadrant of the abdomen with skin ecchymosis in unconscious state.

LEARNING POINTS

- A rare side effect of low molecular weight heparin (LMWH) therapy is rectus sheath haematoma, and it is important for differential diagnosis because management could be conservative or minimally invasive. Therefore, the doctors should keep abdominal wall haematoma in mind and should be alert when an abdominal mass develops in the lower quadrant of the abdomen with skin ecchymosis while the patient is in an unconscious state.
- Management and drug selection in cardioembolic stroke is vital.
- Administration of LMWH in the stomach area subcutaneously could trigger abdominal wall haematoma. Therefore, changing the site of injection (eg, triceps) could prevent developing of haematoma.
- Mucopolysaccharide polysulfate gel is very effective in the treatment of skin ecchymosis.

Footnotes

Competing interests: None.

Patient consent: Patient/guardian consent was obtained for publication.

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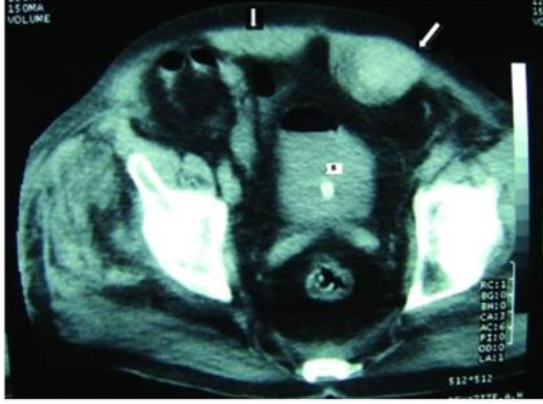
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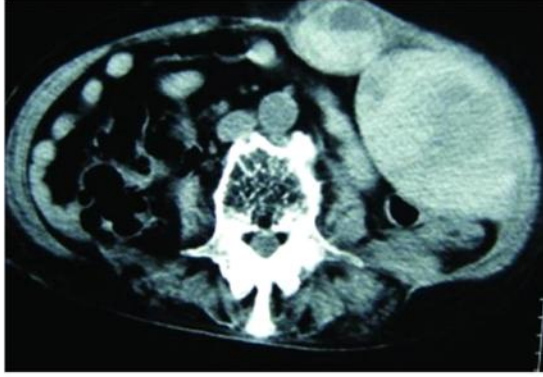
Figures and Tables

Figure 1



Abdominal CT scan without contrast demonstrated bilateral rectus abdominis sheath haematoma (RSH), which was 1.5×1.5 cm on the right side and 4×6 cm on the left side (arrows). B, bladder.

Figure 2



Abdominal CT scan demonstrated 9.5×4.2×3.8 cm and 12×9.5×8 cm masses which were heterogeneous density, well defined, containing fluid fluid levels, compressing and impression upon intestine inferolaterally located in rectus sheath and internal oblique muscle, respectively. Clot resorption leads to diminution of density and fluid fluid levels because of haematocrit effect.

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