An Unusual Complication of EVAR, Spontaneous Rectus Sheath Hematoma: A Case Report

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Objective: To report a successful conservative management in a case of spontaneous rectus sheath hematoma (SRSH) after Endovascular Aneurysmal Repair (EVAR) of infrarenal Abdominal Aortic Aneurysm (AAA).

Case Presentation: An 84-year-old woman with a 6 cm in diameter infrarenal AAA underwent EVAR at our hospital. During the procedure, intravenous heparin was administered to keep the activated clotting time around 300 seconds. One hour after the procedure, the patient complained of pain on her right side abdomen. Physical examination revealed a tender mass in the right lower abdominal wall. Laboratory studies showed a fall in hemoglobin from 12.7 g/dl to 9.3 g/dl. Ultrasound (US) examination demonstrated an 8 × 5 cm hematoma within the right rectus muscle. Follow-up US examination revealed that the hematoma had enlarged and a computed tomography (CT) examination of the lower abdomen was performed. CT scan showed a smooth-shaped mass within the layers of the anterolateral abdominal wall leading to enlargement of the right rectus abdominis muscle without signs of active bleeding. A conservative management was considered.

Result: The clinical course was uneventful with a stable hemodynamic state. The patient was discharged 12 days later and was doing well at the 2 week follow-up.

Conclusion: Spontaneous rectus sheath hematoma is an unusual complication of a patient on anticoagulant therapy during EVAR. A prompt radiological investigation may prevent unnecessary surgical procedures in this unusual complication.

Key words: abdominal wall, hemorrhage, anticoagulation therapy, endovascular

INTRODUCTION

Rectus sheath hematoma is an unusual cause of painful abdominal mass which is produced by a tear in the epigastric vessels or the muscle fibers of the rectus abdominis is a well-described clinical entity.² Anticoagulant medication has come into use as a prophylaxis against thrombosis in Endovascular Aneurysmal Repair (EVAR). The major complication of anticoagulant therapy is bleeding, which may occur in different organs.² Spontaneous hemorrhaging of the abdominal wall secondary to anticoagulant therapy could be a common and sometimes life-threatening condition in patients undergoing anticoagulation therapy.³ It is difficult to differentiate rectus sheath hematoma from other abdominal diseases which show acute abdomen symptoms or abdominal masses; therefore, a definite diagnosis has typically been performed after surgical procedures in the majority of cases. With the current advances in imaging, such as ultrasound (US) and computed tomography (CT), proper
diagnose can be made before surgery.\textsuperscript{5, 6} Herein, we report a case of spontaneous rectus sheath hematoma caused by anticoagulation therapy during EVAR which was correctly diagnosed using US and CT of the abdomen. She was treated conservatively without any invasive techniques. As we know, spontaneous anterior abdominal wall hemorrhaging following EVAR has not been previously reported in the English language literature before.

\textbf{CASE}

An 84-year-old woman with a 6 cm in diameter infrarenal AAA underwent EVAR at our hospital with the Zenith-Cook stent graft size 26 × 96 – 20 × 45 (Cook Inc./Michael Graef. Bloomington, IN, USA). The patient’s coagulation screen had been normal preoperatively without any evidence of consumptive coagulopathy. During the procedure, intravenous bolus dose heparin of 50 units/kg was administered to keep the activated clotting time around 300 seconds. We had a difficulty in insertion and deployment of the right limb stent graft. The immediate Digital Subtraction Angiography (DSA) showed no endoleak or contrast media extravasation (Fig. 1). One hour after the procedure, the patient complained of acute pain on the right side of her abdomen. Physical examination, revealed a tender mass with the size of 5.0 × 8.0 cm on the right lower abdominal wall. There was a bruise around the right groin incision extended through the lower abdomen and buttock (Fig. 2). On palpation, the mass had no fluctuation, the patient complained of mild tenderness. There was no sign of peritoneal irritation and the bowel sound was normal. Her blood pressure was 90/50 mmHg; pulse rate 110 beats per minute and regular; respiratory rate 22 times/minute; body temperature 37.8°C; white blood cell count 11,900 cells/mm$^3$; hemoglobin level drop from 12.7 mg/dl to 9.3 mg/dl; platelets

\begin{figure}[h]
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\includegraphics[width=\textwidth]{image1.png}
\caption{Digital Subtraction Angiography (DSA) showed no endoleak or contrast media extravasation.}
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\begin{figure}[h]
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\includegraphics[width=\textwidth]{image2.png}
\caption{A bruise around the right groin incision extended through the lower abdomen and buttock.}
\end{figure}
count 66.3 × 103 cells/mm³; total bilirubin level 0.27 mg/dl; SGOT 23 IU/liter; SGPT 38 IU/liter; Alkaline phosphatase, 389 IU/liter; BUN 16 mg/dl; creatinine level 1.3 mg/dl; bleeding time 1 minute 34 seconds; prothrombin activity 81%; fibrinogen 280 mg/dl; plasminogen 85%; and fibrinogen degrading products (FDP), 65 ng/dl. Intravenous fluid resuscitation was administered and blood pressure rose to 120/80 mmHg.

Immediate ultrasound examination demonstrated a large rectus sheath hematoma (RSH) 8 × 5 cm in size. A subsequent abdominal computed tomography (CT) scan showed a smooth-shaped mass within the layers of the anterolateral abdominal wall extended from the pubis to 10 cm below the umbilical line leading to enlargement of the right rectus abdominis muscle without signs of active bleeding (Fig. 3). Intra-abdominal disorders were not found as well as the findings of US. From these findings, we diagnosed the patient with rectus sheath hematoma, and determined to treat her conservatively with analgesics, IV fluids, and close observation. Because the hematoma was restricted locally in the right lower quadrant and the size of the hematoma was not enlarged. The patient was transfused with 4 units of packed red cells and the hemoglobin level rose to 11.8 mg/dl. The demarcation of the hematoma was clear, compared with that on the first day. The clinical course was uneventful with a stable hemodynamic state. The value of the follow up coagulation data was: platelets count 55.6 × 100 cells/mm³; fibrinogen 260 mg/dl; plasminogen 82%; and fibrinogen degrading products (FDP), 71 ng/dl. The patient was discharged 12 days later and was doing well at the 2 week follow-up. At the 2 week of the follow up the patient’s coagulation data was within normal limit and much resolved of the rectus sheath hematoma.

**Discussion**

The widespread use of anticoagulant therapy increased the rate of spontaneous hemorrhage. The abdominal wall is a common site of spontaneous bleeding in patients undergoing anticoagulant therapy. Small vessel arteriosclerosis or heparin-induced immune microangiopathy are among the most accepted pathogenetic processes. Overcontraction of the abdominal wall due to sneezing, coughing, and vomiting may also be regarded as precipitating factors. The diagnosis of rectus sheath hematoma is usually difficult since it may mimic other pathologies leading to acute abdomen. US and CT scan are diagnostic modalities for rectus sheath hematoma cases. The method of classification for rectus sheath hematoma on the basis of CT findings are. In type 1, the hematoma is intramuscular and an increase in muscle size is observed with focal or diffuse increased density; the hematoma is unilateral and does not dissect along fascial planes. In
type 2, the hematoma is intramuscular, as it is in type 1, but blood is between the muscle and the fascia transversalis, the hematoma can be unilateral or bilateral, no blood is seen prevesically, and a hematocrit effect (fluid-fluid level) can be seen. In type 3, the hematoma may or may not affect the muscle, the blood is between the muscle and the fascia transversalis, is in the peritoneum prevesical space, and a hematocrit effect can be seen. In a hemodynamically stable patient, the usual mode of therapy is conservative management, hematomas will resolve with time. Surgical intervention is indicated only for complicated uncontrollable cases causing hemodynamically unstable or in cases in which diagnostic doubts persist. Transcatheter embolization with Gelfoam from the inferior epigastric artery was an effective and less invasive alternative to surgical treatment in the management of spontaneous hemorrhages.

Very few cases of consumptive coagulopathy following treatment with EVAR have been reported in literature. In the presented case, the pre-operative and post-operative coagulation studies were normal and we thought the spontaneous hemorrhage of the abdominal wall was caused by prophylactic anticoagulation therapy, which was initiated in order to provide patency of the implanted aortic stent graft. Additionally, to the best of our knowledge, this complication due to anticoagulation therapy following EVAR has not been reported previously.

In conclusion, spontaneous rectus sheath hematoma must be considered in the differential diagnosis of a patient on anticoagulant therapy who developed sudden abdominal pain or mass. Ultrasound and CT should be used as confirmatory tests and may prevent unnecessary surgical procedures. Treatment should be based on the severity of the hematoma, with the majority treated conservatively. Surgery is only indicated if the patient is hemodynamically unstable or if the diagnosis is in question.

REFERENCES