CASE SERIES

Endovascular embolisation treatment in a rare acute abdomen spontaneous rectus sheath haematoma

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ABSTRACT

BACKGROUND: In this study, we aimed to review spontaneous rectus sheath hematoma (RSH) and the results of endovascular therapy in patients presenting with a rare acute abdomen.

METHODS: We evaluated the patients with RSH because of acute abdominal pain and applied endovascular embolization treatment who were admitted to our hospital emergency department retrospectively between December 2016 and December 2018.

RESULTS: Rectus muscle sheath bleeding is an extremely rare and urgent emergency intervention. In the etiology, chronic severe cough crises and trauma may be the cause of haemorrhage in the elderly patient group; spontaneous bleedings may be seen with the increase in the use of anticoagulants. In this study, a total of six patients, 53–95 years old (mean 75.5) endovascular embolization treatment was administered on who were admitted to our hospital with the diagnosis of RSH and long-term anticoagulant use. In our series, physical examination findings, laboratory values, computed tomography (CT), CT angiography and digital subtraction angiography (DSA) findings were presented. The findings showed an active extravasation from the superficial circumflex iliac artery in two patients and the inferior epigastric artery in three patients. We had no bleeding focus in only one patient. An ultrasound-guided 5 Fr arterial sheath was placed on the side of the hematoma in the procedure. Then, the inferior epigastric artery and deep circumflex arteries were selectively catheterized using the Vertebral Diagnostic Catheter (5 Fr or 4 Fr). Superselective catheterization, with the help of microcatheter from the existing diagnostic catheter, was used to embolize the arteries and branches with active extravasation using a detachable coil. In the control angiographies performed after embolization, pathological staining disappeared, and complete embolization was achieved. There were no complications associated with the endovascular procedures. No active extravasation was detected in angiography examination, and inpatient follow-up, blood transfusion, antibiotics and analgesic support were performed in only one patient. However, it was ex as a result of reasons related to advance heart failure.

CONCLUSION: RSH is a life-threatening condition that may cause acute abdominal pain, and endovascular embolization is a safe and effective treatment option that can be applied quickly in this patient group.

Keywords: Embolization treatment; hematoma; rectus abdominis.

INTRODUCTION

Spontaneous rectus sheath hematoma (RSH) is an emergency that occurs in elderly patients with the increased use of anticoagulant medications and may result in death if not intervened. Hematoma is frequently located in the lower wall of the rectus muscle in the abdominal wall and is formed by the rupture in the arteries and branches of the muscle.[1,2] In the unstable patient group, endovascular embolization is an important alternative life-saving alternative treatment method.

MATERIALS AND METHODS

In this retrospective study, six patients who were admitted to our emergency department with an acute abdomen and treated with the endovascular embolization between Decem-

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ber 2016-December 2018 were included. Demographic data, application complaints, medical history, computed tomography (CT) (Aquilion, Toshiba Medical, Japon) and CT angiography and digital subtraction angiography (DSA) images were reviewed from the patient file, computer registry system and imaging archives retrospectively.

RESULTS

A total of six patients (five female, one male) were admitted to our hospital, who used anticoagulant for a long time and diagnosed with spontaneous rectus hematoma (RSH). The mean age of the patients 75,5. The RSH's of the patients who presented with acute abdomen to the emergency department were staged according to the computed tomography imaging findings in Table 1, and their treatment was arranged according to this table.[3] The patients were in the stage 3 group, and five of the six patients were treated with endovascular embolization and conservative treatment in our study. Only one patient had only conservative treatment. Fresh frozen plasma (TDP) was administered intravenously until the INR was lower than 1.5 to reduce the tendency of patients with normal International Normalized Ratio (INR) to bleed. Hemogram follow-up at the same time every six hours in a day and hourly vital follow-up were performed to patients. Blood transfusion was performed to the patients before the procedure to reduce the Hb values to the normal limits. Each patient used low molecular weight heparin as the anticoagulant due to the current disease in this study. In addition, two patients had additional use of aspirin and clopidogrel. Clinically, acute abdominal pain, abdominal mass, and hypotension were present in the patients (Table 2). In our series, preoperative arterial, portal venous and late-phase CT and CT angiography showed active extravasation findings with giant rectus hematoma (Fig. 1). Afterwards, endovascular embolization was performed in the interventional treatment unit of our hospital (Table 3). An ultrasound-guided 5 Fr arterial sheath was placed on the side of the hematoma in the procedure. Subsequently, the diagnostic catheter was selectively catheterized using the vertebral catheter (5 Fr or

Table 1. Classification of the rectus sheath haematoma based on clinical and computed tomographic (CT) findings

Type	Clinical findings	CT findings
1	No haemodynamic compromise	Unilateral, intramuscular haematoma
2	Drop in haematocrit level, moderate deterioration in clinical condition	Uni- or bilateral, haematoma extending to between rectus muscle and transversalis fascia
3	Haemodynamic instability, requiring transfusion, fluid resuscitation	Extension of haematoma to the peritoneum and prevesical space of Retzius

Table 2. Clinical details, treatment, and outcome of patients

Sex	Age (years)	Anticoagulation/ antiplatelet used	Abnormal coagulation profile	Clinical presentations	Transfusion	Fresh frozen plasma	Medication
Female	95	LMWH, aspirin, clopidogrel	NO	Hypotension, abdominal mass, pain	Yes	Yes	Factor IX complex, vitamin K1
Female	68	LMWH		Abdominal mass, pain	Yes	Yes	Vitamin K1
Female	79	LMWH	NO	Abdominal mass, pain	Yes	Yes	Vitamin K1
Female	76	LMWH, aspirin, clopidogrel	NO	Abdominal mass, pain	Yes	Yes	vitamin K1
Female	82	LMWH	NO	Abdominal mass, pain	Yes	Yes	Vitamin K1
Female	53	LMWH	NO	Abdominal mass, pain	Yes	Yes	Factor IX complex, vitamin K1

LMWH: Low-molecularweight heparin.

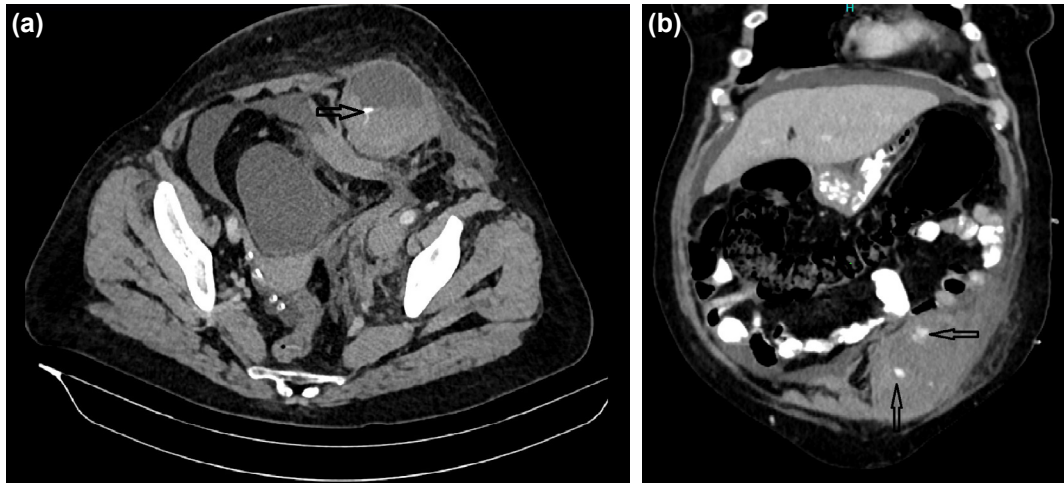

Figure 1. (a) Axial and **(b)** sagital maximum intensity projection images of contrast-enhanced computed tomography showing leftt rectus sheath haematoma with fluid-fluid levels and active contrast extravasation (black arrows).

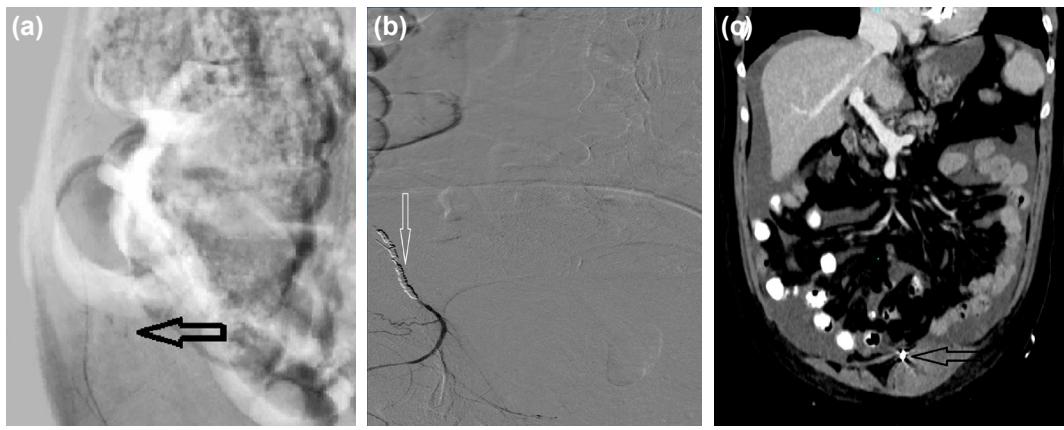

Figure 2. Digital subtraction angiography showing **(a)** extravasation from the right inferior epigastric artery (black arrow) and **(b)** embolisation with microcoil (white arrow). **(c)** Follow-up computed tomography showing the microcoil and resolved left rectus sheath haematoma (black arrow).

4 Fr) [Cordis, Miami Lakers [FL], USA]. Active extravasation was observed in angiography imaging. Subsequently, the microcatheter was inserted using microcatheter 1.8 Fr Echelon 10 [Medtronic, Irvine [CL], USA], and it was used to embolize the arteries and branches with active extravasation using detachable coils [Medtronic, Irvine [CL], USA]. In the control angiographies, we performed pathological staining disappeared, and complete embolization was achieved after embolization (Fig. 2). There were no complications associated with the endovascular procedures. It was not active extravasation detected in angiography examination only one patient, and we follow-up, blood transfusion, antibiotics and analgesic support this patient, but it was ex as a result of reasons related to the advanced heart failure.

Table 3. Endovascular embolization treatment procedure

Side of RSH	Size of RSH (cm)	Pelvic extension	Arteries cannulated	Embolisation agent	Length of stay (days)	Outcome
Right	18x9x9	Yes	No	No	4	Death
Left	14x9x6	Yes	Yes	Microcoil	9	Discharged
Right	10x11x16	Yes	Yes	Microcoil	3	Discharged
Right	15x10x10	Yes	Yes	Microcoil	3	Discharged
Right	12x8x7	Yes	Yes	Microcoil	23	Discharged
Left	10x7x7	Yes	Yes	Microcoil	14	Discharged

RSH: Rectus sheath hematoma

DISCUSSION

Spontaneous rectus sheath haematoma (RSH) is frequently seen in female patients with anticoagulant use.[1] In our study, the female to male ratio is similar to the literature with 1/5. It is observed most frequently in the 5th most common and it accounts for approximately 2% of the abdominal pain that is not known.[4,5] RSH is characterized by a rupture of superior and inferior epigastric veins and arteries, especially in the posterior border in the rectus muscle.[6] Spontaneous rectus hematomas have been reported in the epigastric vessels due to decreased arterial wall elasticity secondary to atherosclerosis changes in epigastric vessels.[7]

Some hematological diseases that disrupt the blood coagulation mechanisms, surgical interventions, trauma and cough secondary conditions, such as sudden rupture of the rectus muscle, may cause hematoma in the abdominal wall. RSH increases the possibility of the increasing use of anticoagulants.[3] INR values were increased in all of the patients due to the use of low molecular weight heparin with an oral anticoagulant in our study. INR was taken to normal limits with fresh frozen plasma support before the procedure. As in our series, complaints of sudden onset abdominal pain, abdominal distention and accompanying hypotension are common. All patients in our series had complaints of abdominal pain and abdominal distention when they were admitted to the hospital emergency department due to an acute abdomen. Abdominal CT is a commonly used imaging modality for the differential diagnosis of other intraabdominal pathologies in patients with rectus hematoma. The sensitivity and specificity is 100%.[8,9] In our study, a detailed anatomic evaluation was performed with CT and CTA in all patients and the active extravasation in the vascular wall and the localization of the hematoma were recorded in three different planes. They were divided into three groups according to clinical and CT imaging findings, as indicated in Patients with RSH in our series (Table 1). The current opinion is that conservative treatment is sufficient in stage 2 and stage 1 group. If there is an elevation of INR in the laboratory values of these patients, it is recommended that the TDP and erythrocyte suspension replacement is sufficient and if the INR level is normal, it should be followed up with erythrocyte suspension. Patients in this group are hemodynamically stable after 24 hours of follow-up. Our stage 3 RSH patient group is hemodynamically unstable and requires rapid surgical intervention or endovascular intervention. Surgical intervention is used to evacuate the hematoma, to find the ligation of the bleeding vessel and to repair the damage in the rectus sheath.[10] However, as the patients were surgically in the high-risk group, endovascular embolization treatment was applied as the first choice in our series. When we review the literature, selective or superselective catheterization and embolization of the damaged vessel with DSA is a very successful method in patients with RSH.[11,12] Complications in the treatment of endovascular embolization in RSH, especially pseudoaneurysm due to vascular injury at the introducer access site, arterial dissection and arteriovenous fistulas, distal embolization due to improper migration of the coil that is the embolizing agent used during the procedure, ischemia which may occur in the rectus muscle with contrast nephropathy due to the contrast of the loaded substance.[10] In our study, no major or minor complications were observed in the patient group. In our series, successful endovascular embolization was achieved in a small group of patients with RSH due to anticoagulant use, and this should be supported by a higher number of patients in the future.

Conclusion

Endovascular embolization is an effective and safe treatment modality for unstable patients who applied to the hospital with acute abdominal pain with RSH.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Peer-review: Internally peer-reviewed.

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Conflict of Interest: None declared.

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CASE SERIES - *ÖZET*

Nadir bir akut karın nedeni olan spontan rektus hematomunda endovasküler embolizasyon tedavisi

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AMAÇ: Bu çalışmada, nadir bir akut karın nedeni olan spontan rektus hematomu (SRH) ile gelen hastalarda endovasküler tedavinin sonuçlarını incelemeyi amaçladık.

GEREÇ VE YÖNTEM: Aralık 2016–Aralık 2018 tarihleri arasında, hastanemiz acil servisine akut karın nedeni olan SRH nedeniyle başvurup endovasküler embolizasyon tedavi işlemi uygulanan hastaları geriye dönük olarak inceledik.

BULGULAR: Çalışmamızda, uzun süreli antikoagülan kullanımı olan SRH tanısı ile hastanemiz acil servisine başvuran 53–95 yaş arası (ort. 75.5) beş kadın, bir erkek olmak üzere toplam altı hastaya endovasküler embolizasyon tedavi işlemi yapıldı. Çalışmamızda, hastaların fizik muayene bulguları, laboratuvar değerleri, bilgisayarlı tomografi (BT), BT anjiyografi ve dijital subtraksiyon anjiyografi (DSA) bulguları sunulmuştur. Üç hastada inferiyor epigastrik arterden iki hastada superfisiyal sirkumfleks iliak arterden aktif ekstravazasyon izlenmiş sadece bir hastada kanama odağı saptanmamıştır. İşlem tekniğinde hematomun olduğu taraftan ultrason eşliğinde 5 Fr arteryel kılıf yerleştirildi. Daha sonra vertebral diagnostik kateteri (5 Fr veya 4 Fr) kullanılarak inferiyor epigastrik arter ve derin sirkumfleks arterler selektif olarak kataterize edildi. Mevcut diagnostik kataterin içerisinden mikrokateter yardımıyla süperselektif kataterizasyon ile aktif ekstravazyonun olduğu arter ve dalları ayrılabilir koil kullanılarak embolize edildi. Embolizasyon sonrası yapılan kontrol anjiyografilerde patolojik boyanmalar ortadan kalktı ve tam embolizsayon sağlandı. Hastalarda endovasküler işlemle ilişkili herhengi bir komplikasyon gelişmedi. Sadece bir hastada anjiyografi incelemesinde aktif ekstravazasyon saptanmamış olup yatarak takip, kan transfüzyonu, antibiyotik, analjezik desteği uygulandı. Ancak ileri kalp yetersizliğine bağlı nedenlerden dolayı hayatını kaybetti.

TARTIŞMA: Spontan rektus hematomu akut karın ağrısına neden olabilen hayatı tehdit edici bir durum olup endovasküler embolizasyon bu hasta grubunda hızlı uygulanabilen, güvenli ve etkili bir tedavi seçeneğidir.

Anahtar sözcükler: Embolizasyon; hematom; rektus abdominis.

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