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Klinik Çalışma

Spontaneous rectus sheath hematoma: an analysis of 15 cases

Spontan rektus kılıf hematomu: 15 olgunun analizi

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BACKGROUND
Spontaneous rectus sheath hematoma (RSH) is an uncommon and frequently misdiagnosed cause of acute abdominal pain. The purpose of this study is to present our experiences in the diagnosis and treatment of spontaneous RSH.

METHODS
This is a retrospective study of the medical histories of 15 patients admitted to our emergency surgery unit between January 2000 and July 2009 and diagnosed with spontaneous RSH (12 females, 3 males; mean age, 64.5 years; range, 20-79 years).

RESULTS
All cases presented with acute abdominal pain or abdominal wall mass, or both. Eleven of the cases (73%) had been receiving some form of anticoagulation therapy. The leading indications for anticoagulation and/or anti-platelet therapy were atrial fibrillation in 5 patients (33%) and mitral valve replacement in 3 patients (20%). Diagnosis was made by abdominal ultrasonography and/or computerized tomography in 14 patients (93%). Twelve (80%) of the 15 patients were discharged uneventfully after conservative management following a mean hospital stay of 8.8 days (range, 3-24 days). The mortality rate was 20%.

CONCLUSION
Spontaneous RSH must be suspected in patients with advanced age who are using anticoagulation medications and present with acute abdominal pain. Early diagnosis permits conservative management and avoids unnecessary surgical interventions.

Key Words: Acute abdomen; anticoagulant therapy; diagnosis; rectus sheath hematoma; spontaneous; treatment.

AMAÇ
Spontan rektus kılıf hematomu (RKH) akut karın ağısının sıklıkla gözden kaçan nadir bir nedenidir. Bu çalışmada, spontan RKH'nin tanı ve tedavisindeki tecrübelerimizi sunmayı amaçladık.

GEREÇ VE YÖNTEM
Bu çalışmada, Ocak 2000-Temmuz 2009 tarihleri arasında acil cerrahi polikliniğine başvuran ve spontan RKH tanısı alan 15 hastanın (12 kadın, 3 erkek; ortalama yaş 64,5 yıl; dağılım 20-79 yıl) tıbbi kayıtları retrospektif olarak incelendi.

BULGULAR
Tüm olguların başvuru nedeni akut karın ağrısı ve/veya karında kitle idi. Toplam 11 olgu (%73) antikoagülan ve/veya antiagregan tedavisi almaktaydı. Antikoagülan/antiagregan tedavisin endikasyonları arasında en sık olanları 5 hastada (%33) atriyel fibrilasyon ve 3 hastada (%20) mitral kapak replasmanı yer almakta idi. Tanı 14 olguda (%93) karın ultrasonografisi ve/veya bilgisayarlı tomografi ile kondu. Hastaların 12'si (%80) ortalama 8,8 gün (dağılım 3-24 gün) yatış süresi sonrası konservatif tedavi ile sorunsuz bir şekilde taburcu edildi. Mortalite oranı %20 idi.

SONUÇ
Akut karın ağrısı ile başvuran ve antikoagülan tedavisi almakta olan ileri yaş hastalarında spontan RKH'den şüphe edilmelidir. Erken tanı konservatif tedaviye olanak sağlayarak gereksiz cerrahi girişimleri önler.

Anahtar Sözcükler: Akut karın; antikoagülan tedavi; tanı; rektus kılıf hematomu; spontan; tedavi.

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Rectus sheath hematoma (RSH) is a relatively uncommon condition and often a clinically misdiagnosed cause of acute abdominal pain. It is caused by hemorrhage into the rectus sheath, which is caused by damage to the superior or inferior epigastric arteries or their branches, or by direct damage to the rectus muscle.[1,2] It is usually localized in the lower abdominal wall.[3] Many causes of RSH have been described, including trauma, anticoagulation medications, medication injection, hematological and coagulation disorders, increased abdominal pressure from straining, pregnancy, and hypertension.[1,2,4,5] The most frequent predisposing factor is anticoagulation therapy. Women are more prone to RSH than men. Although most cases are self-limiting, RSH can lead to significant morbidity and its overall mortality rate is reported as 4%.[5]

The most commonly presented feature is a painful lower abdominal mass that never crosses the midline.[3] If RSH is suspected, the diagnosis is made on the basis of history, physical examination, ultrasonography (US) and computerized tomography (CT) findings. With early diagnosis and conservative management, surgical intervention can be avoided even with large hematoma. Surgery would be necessary in cases in which hemodynamic stability is not achieved. Early diagnosis is mandatory in order to prevent unnecessary surgical interventions.[6]

In this retrospective study, we aimed to report our experiences with 15 cases including the previously reported five cases[2] diagnosed with nontraumatic or spontaneous RSH.

MATERIALS AND METHODS

We retrospectively reviewed the medical records of patients who had been consecutively registered and diagnosed with RSH at our emergency surgery unit between January 2000 and July 2009. The search yielded 19 potential cases. Four cases were excluded as they had alternate diagnoses such as postsurgical RSH and fall-offs. The demographic data (sex, age at diagnosis

Table 1. Clinical characteristics of patients diagnosed with spontaneous RSH

No	Age/ Sex	Past medical history	Previous medication	Physical signs	INR on admission	Radiological study	Treatment	Hospital stay (d)	Outcome
1	74/F	AF	Warfarin	Tender mass in right lower Q	1.81	None	Surgery (HI)	5	Exitus
2	53/F	COPD	None	Tender mass in right lower Q	1.11	CT	Conservative	7	Exitus
3	65/F	AF	Warfarin	Tender mass in left lower Q	1.48	US + CT	Conservative	3	Discharged
4	72/F	Acute coronary syndrome	Warfarin	Tender mass in both lower Q + peri-umbilicus	2.34	US + CT	Conservative	21	Discharged
5	73/F	MVR	Warfarin	Tender mass in right lower Q	1.96	US + CT	Conservative	16	Discharged
6	64/F	HT	Anti-platelet Tx	Mass in right lower Q	*	US + CT	Conservative	4	Discharged
7	77/F	AF	Anti-platelet Tx	Tender mass in right lower Q	†	US	Conservative	6	Discharged
8	72/F	MVR	Warfarin + LMWH	Tender mass in both lower Q	1.80	US + CT	Conservative	10	Discharged
9	49/F	SLE	LMWH	Tender mass in left lower Q	None	CT	Conservative	24	Discharged
10	79/M	MI	Warfarin	Tenderness in left upper Q	2.39	US + CT	Conservative	3	Discharged
11	79/F	AVR	Warfarin	Tender mass in left lower Q	5.09	US	Conservative	7	Discharged
12	62/F	MVR	Warfarin	Tenderness in right lower Q	None	US + CT	Conservative	3	Discharged
13	68/M	AF	LMWH	Tender mass in right upper Q (infected hematoma)	None	US + CT	Conservative	7	Exitus
14	60/F	AF	Warfarin	Tender mass in right lower Q (infected hematoma)	3.5	CT	Surgery (HI)	13	Discharged
15	20/M	Factor VIII deficiency	None	Mass in left lower Q	‡	CT	Conservative	5	Discharged

* Bleeding time >12 min, † Bleeding time >9 min, ‡ APTT (activity partial thromboplastin time) = 154 s (normal range, 26-37 s). LMWH: Low-molecular-weight heparin; AF: Atrial fibrillation; COPD: Chronic obstructive pulmonary disease; HT: Hypertension; MVR: Mitral valve replacement; AVR: Aortic valve replacement; MI: Myocardial infarction; SLE: Systemic lupus erythematosus; HI: Hemodynamic instability; Q: Quadrant; Tx: Treatment.

of RSH), clinical characteristics and comorbid conditions, predisposing medications, and presenting signs and symptoms of the patients were evaluated. International normalized ratio (INR) results, radiological (US and CT) findings, treatment approaches, length of hospital stay, and patient outcomes were also documented.

RESULTS

Fifteen patients were hospitalized with the diagnosis of spontaneous RSH. The clinical features of the patients are summarized in Table 1. Twelve of the 15 patients were female (80%), with a female to male ratio of 4:1. Their ages ranged from 20 to 79 years (mean age, 64.5 years). All patients presented with either abdominal pain or abdominal wall mass, or both. Hemodynamic instability was detected in 2 patients. A total of 11 patients (73%) were receiving some form of anticoagulation therapy: 8 (53%) were on warfarin alone, 2 (13%) were on low-molecular-weight heparin (LMWH) injections, and 1 was on both warfarin and LMWH. Two patients were receiving anti-platelet (aspirin) treatment. The indications for anticoagulation and/or anti-platelet therapy were atrial fibrillation in 5 (33%) and mitral valve replacement in 3 (20%), and the other indications were aortic valve replacement, myocardial infarction, acute coronary syndrome, hypertension, and systemic lupus erythematosus. Chronic obstructive pulmonary disease in 1 case and factor VIII deficiency in 1 case were also detected.

The most common presenting symptom was acute abdominal pain followed by an abdominal wall mass. Physical abdominal examination revealed a tender mass or tenderness in all of the cases. INR ranged from 1.11 to 5.09. The diagnosis was made by abdominal CT (Fig. 1) and/or US in 14 patients (93%), and US was utilized for the follow-up.

Thirteen patients (87%) were treated nonsurgically with red blood cells (4-11 units), fresh frozen plasma infusions (4-8 units), and vitamin K as required. Surgical evacuation of large and/or infected hematoma and hemostasis were performed in 2 patients (13%). Mean length of hospital stay was 8.6 days (range, 3-24 days). There were 3 fatal cases with a mortality rate of 20%.

DISCUSSION

RSH is a rare but well-documented clinical entity with an elusive diagnosis. Clinical presentation, past medical history and previous medications in these patients should be carefully questioned in order to obtain valuable information for the correct diagnosis. RSH demonstrates a female to male ratio of 2-3:1, with the highest incidence in the fifth decade. It accounts for up to 2% of cases of unexplained abdominal pain and may occur more often in the right lower quadrant.[2,5,7,8] The present study includes RSH cases who presented with no apparent abdominal trauma such as surgical trauma or falls. Although we found one young patient with hemophilia A, the mean age was 64.5 years (peak age, 79 years). This may be because older patients are more likely to be receiving anticoagulation and/or anti-platelet therapy.[1] The female to male ratio was 4:1, slightly higher than in the earlier reports.[1,7]

Other than blunt abdominal trauma, RSH typically occurs in patients who receive anticoagulant or fibrinolytic treatment and in severe hypocoagulability states such as hemophilia and von Willebrand disease.[9] Hemorrhage is the major complication of anticoagulation therapy. The risk of hemorrhage is correlated with the underlying patient characteristics, intensity of anticoagulation and length of the therapy. A similar risk of bleeding is associated with LMWH[10,11] and anti-platelet (acetylsalicylic acid) therapy. The concurrence of synergic side effects from different anti-thrombotics

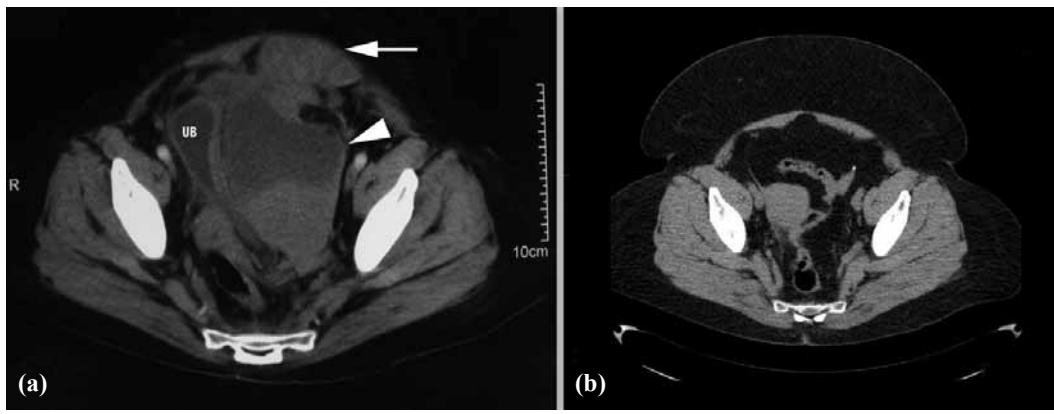

Fig. 1. The abdominal CT appearance of spontaneous RSH in a female patient who had been taking warfarin prior to hospital admission **(a)**. The hematoma arose from the left rectus muscle (arrow). The urinary bladder (UB) was shifted to the right with the expansion of the hematoma to the intraperitoneal cavity (arrowhead). Following conservative treatment, complete resolution of the hematoma was seen on follow-up CT after 12 months **(b)**.

will be a growing clinical problem due to the vulnerability of the aged populations and the increasing incidence of age-related diseases such as thrombosis.[9] In our series, 13 patients (86%) were already on some form of anticoagulation and/or anti-platelet therapy on admission. Thus, we highlight the fact that the use of these drugs even in prophylactic doses requires prudent application and deliberate follow-up during their use, especially in the elderly.

Both US and CT have been used as diagnostic aids to differentiate between RSH and any intra-abdominal pathology.[5] US may be useful in the diagnosis of RSH, but with a sensitivity rate ranging from only 70% to 90%. CT is useful in excluding other intra-abdominal conditions, and is the gold standard, with 100% sensitivity and specificity.[4,7,12] Magnetic resonance imaging is used for long-standing hematomas whenever there is difficulty in distinguishing between a soft tissue tumor and RSH on the CT scan.[4,13] We identified that the findings on the US and CT reports were diagnostic in all of the cases except for one who needed an emergent surgical evacuation of the hematoma due to hemodynamic instability. Infraumbilical localization of the hemorrhage was detected in the majority of our patients (87%). This can be explained by the anatomy of the rectus abdominis muscle below the arcuate line where the posterior rectus sheath passes anteriorly and allows a greater movement of the lower portion of the muscle but also predisposes to vessel rupture with accumulation of large hematomas.[14]

As the lesion is self-limited, most RSH can be treated conservatively with analgesia, the treatment of predisposing conditions and cessation of the anticoagulation. When necessary, the coagulation profile should be corrected with the administration of vitamin K, fresh frozen plasma and protamine sulfate in patients being treated with heparin[2,5,11] or, as in our case, factor VIII replacement in patients with hemophilia A. Recombinant VIIa has also been shown to enhance thrombin generation on already thrombin-activated platelets in the absence of factors VIII and IX.[15] The decision to perform a transfusion depends on the hemodynamic status and the presence of comorbid conditions such as coronary ischemia and severe anemia. Active bleeding can be managed either surgically by evacuating the hematoma and ligating the bleeding vessels, or radiologically with catheter embolization.[5,16] An interesting report by Berná-Serna et al.[6] described the complementary therapeutic role of US in the reabsorption of RSH.

RSH is rarely fatal, but clinicians should be aware of this possibility especially in frail elderly patients. The high mortality rate (20%) in our series can be explained by the patients' accompanying hemodynamic instability and/or comorbid conditions. In the first case with atrial fibrillation, emergent surgical exploration was done because of the hemodynamic instability of the patient, and the diagnosis of RSH was made; the bleeding vessel was ligated at laparotomy. During the follow-up in the intensive care unit, she died on postoperative day 5 due to myocardial infarction. The second case, who had a history of severe chronic obstructive pulmonary disease, died of nosocomial pneumonia on the 7th day of hospitalization. The third fatal case, for whom surgery was planned because of the subsequent infection of the hematoma, developed symptoms and signs of septic shock.

Based on the findings of the present study, we conclude that RSH is a rare but potentially serious problem that can occur particularly in elderly patients on anticoagulation medications. A high index of suspicion, diagnostic vigilance and rapid radiological imaging are important for expeditious conservative management. Surgery should be reserved for cases in whom hemodynamic stability can not be established.

REFERENCES

1. Cherry WB, Mueller PS. Rectus sheath hematoma: review of 126 cases at a single institution. Medicine (Baltimore) 2006;85:105-10.
2. Zengin K, Carkman S, Kiliç I, Beken E, Eyüboğlu E. Treatment approaches to rectus sheath hematoma. Ulus Travma Acil Cerrahi Derg 2007;13:55-9.
3. Siu WT, Tang CN, Law BK, Chau CH, Li MK. Spontaneous rectus sheath hematoma. Can J Surg 2003;46:390.
4. Luhmann A, Williams EV. Rectus sheath hematoma: a series of unfortunate events. World J Surg 2006;30:2050-5.
5. Donaldson J, Knowles CH, Clark SK, Renfrew I, Lobo MD. Rectus sheath haematoma associated with low molecular weight heparin: a case series. Ann R Coll Surg Engl 2007;89:309-12.
6. Berná-Serna JD, Sánchez-Garre J, Madrigal M, Zuazu I, Berná-Mestre JD. Ultrasound therapy in rectus sheath hematoma. Phys Ther 2005;85:352-7.
7. Osinbowale O, Bartholomew JR. Rectus sheath hematoma. Vasc Med 2008;13:275-9.
8. Klingler PJ, Wetscher G, Glaser K, Tschmelitsch J, Schmid T, Hinder RA. The use of ultrasound to differentiate rectus sheath hematoma from other acute abdominal disorders. Surg Endosc 1999;13:1129-34.
9. Macías-Robles MD, Peliz MG, Gonzalez-Ordonez AJ. Prophylaxis with enoxaparin can produce a giant abdominal wall haematoma when associated with low doses of aspirin among elderly patients suffering cough attacks. Blood Coagul Fibrinolysis 2005;16:217-9.
10. Rimola J, Perendreu J, Falcó J, Fortuño JR, Massuet A, Branera J. Percutaneous arterial embolization in the management of rectus sheath hematoma. AJR Am J Roentgenol 2007;188:497-502.
11. Berná JD, Zuazu I, Madrigal M, García-Medina V, Fernández C, Guirado F. Conservative treatment of large rectus sheath hematoma in patients undergoing anticoagulant therapy. Abdom Imaging 2000;25:230-4.
12. Moreno Gallego A, Aguayo JL, Flores B, Soria T, Hernández

Q, Ortiz S, et al. Ultrasonography and computed tomography reduce unnecessary surgery in abdominal rectus sheath haematoma. Br J Surg 1997;84:1295-7.
13. Berná JD, Garcia-Medina V, Guirao J, Garcia-Medina J. Rectus sheath hematoma: diagnostic classification by CT. Abdom Imaging 1996;21:62-4.
14. Denard PJ, Fetter JC, Zacharski LR. Rectus sheath hematoma complicating low-molecular weight heparin therapy. Int J Lab Hematol 2007;29:190-4.
15. He S, Blombäck M, Jacobsson Ekman G, Hedner U. The role of recombinant factor VIIa (FVIIa) in fibrin structure in the absence of FVIII/FIX. J Thromb Haemost 2003;1:1215-9.
16. Zissin R, Gayer G, Kots E, Ellis M, Bartal G, Griton I. Transcatheter arterial embolisation in anticoagulant-related haematoma-a current therapeutic option: a report of four patients and review of the literature. Int J Clin Pract 2007;61:1321-7.