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Expanding refractory rectus sheath hematoma: a therapeutic dilemma

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ABSTRACT
Rectus sheath hematoma is an uncommon but well-described complication of a tussive paroxysm. It is an accumulation of blood within the sheath of the rectus abdominis secondary to disruption of the epigastric vessels or the rectus muscle and is often misdiagnosed as acute abdomen. Increases in the number of elderly patients and the use of therapeutic anticoagulation may increase the prevalence and severity of rectus sheath hematomas encountered in clinical practice. Expanding rectus sheath hematomas are occasionally refractory to conservative treatment and may require hemostatic intervention. Here, we describe the case of an 87-year-old woman who presented with two separate rectus sheath hematomas that were precipitated by a paroxysm of coughing. Repeated computed tomography showed two separate expanding rectus sheath hematomas, which were not accompanied by obvious contrast extravasation on angiography. Empiric left inferior epigastric artery embolization resulted in rapid hemodynamic stabilization, and the hematomas shrank gradually. Early empiric transcatheter arterial embolization may be appropriate for patients who are poor surgical candidates and have enlarging hematomas that are refractory to conservative treatment.

Key words: • *rectus abdominis* • *hematoma* • *cough* • *epigastric artery* • *embolization*

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Rectus sheath hematoma (RSH) is a rare pathology. RSH is often misdiagnosed because its symptoms vary. Conservative management, including bed rest, analgesia, and intravenous fluid replacement, has long been the standard treatment for RSH, and problematic cases are rarely described (1). We report a case of two expanding refractory RSHs without evidence of active bleeding on contrast-enhanced computed tomography (CECT) and angiography. The patient was successfully treated by empiric transcatheter arterial embolization (TAE) of the inferior epigastric artery.

Case report

An 87-year-old woman with a history of hypertensive cardiovascular disease was admitted because of an acute cerebral infarction. She was initially treated with aspirin and dipyridamole. On the day of admission, she developed an excessive cough secondary to recurrent choking episodes. A nasogastric tube was then inserted to facilitate feeding. Antiplatelet agents were discontinued because material with a coffee-ground appearance was present in the nasogastric effluent on the second day after admission. An upper gastrointestinal panendoscopy confirmed that she had active gastric ulcers. Her hemoglobin level was 13.3 g/dL. On the eighth day after admission, she experienced a paroxysm of coughing that lasted several minutes and was followed by severe abdominal pain and hypotension (blood pressure, 93/44 mmHg). Physical examination revealed a large tender mass in the lower left quadrant of the abdomen and the absence of rebound tenderness or muscular rigidity. Her hemoglobin level decreased to 8.3 g/dL, but her platelet count and coagulation profile were normal. Urgent CECT of the abdomen and pelvis revealed a 9.8×7.2×10.3 cm left RSH and a 3.2×2.3×5.9 cm right RSH. Ecchymosis developed in the periumbilical region and expanded into the bilateral inguinal regions by the thirteenth day after admission. Despite conservative treatment and transfusion of four units of erythrocyte, the size of the masses gradually increased, and persistent hemodynamic instability was present by the twenty-fourth day after admission. A repeat CECT scan was conducted on suspicion of continued bleeding and expanding hematomas. The left RSH measured 10.5×8.2×13 cm, extending into the pelvis, and the left inferior epigastric artery was engorged; the right RSH measured 4.5×2.8×7 cm (Figs. 1 and 2). Interventional radiology was conducted because of the patient's instability and poor response to conservative treatment. On angiography with selective catheterization of the left external iliac artery, the main trunk and branches of the vessel appeared normal, and there was no obvious contrast extravasation (Fig. 3). Because of the engorged left inferior epigastric artery and the patient's vigorous tussive efforts, the risk of microhemorrhage and cough-induced intermittent bleeding could not be disregarded. Consequently,

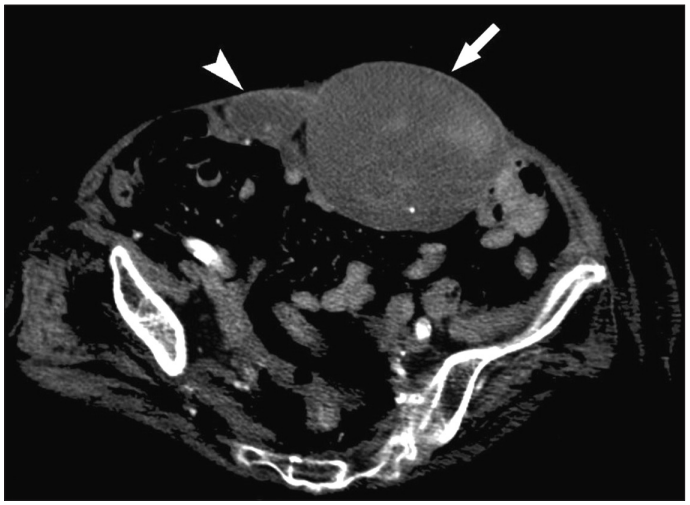

Figure 1. CECT image of the abdomen and pelvis showing a large ovoid-shaped hematoma of nonhomogeneous density in the left rectus sheath (10.5×8.2×13 cm) *(arrow)* and a hematoma in the right rectus sheath (4.5×2.8×7 cm) *(arrowhead)*.

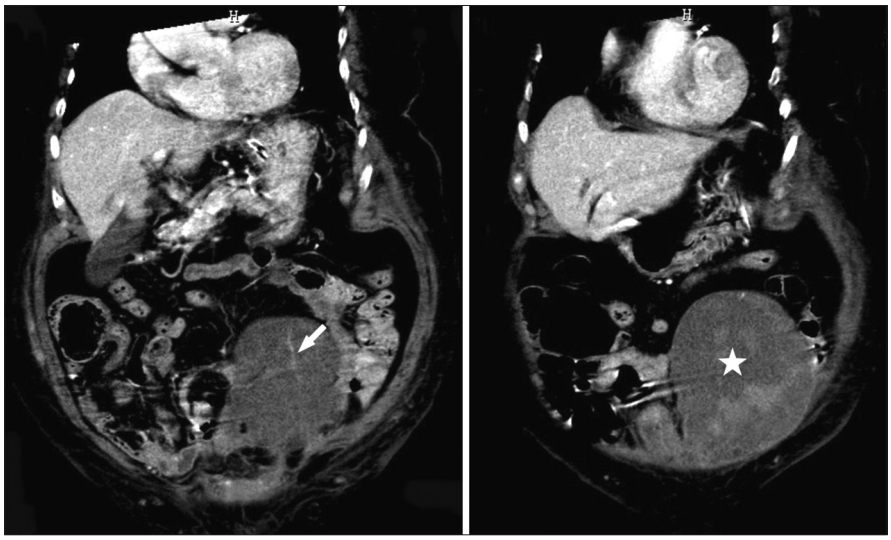

Figure 2. Reconstructed CECT image (coronal aspect) showing a large left rectus sheath hematoma extending into the pelvis *(asterisk)* and engorgement of the left inferior epigastric artery *(arrow)*.

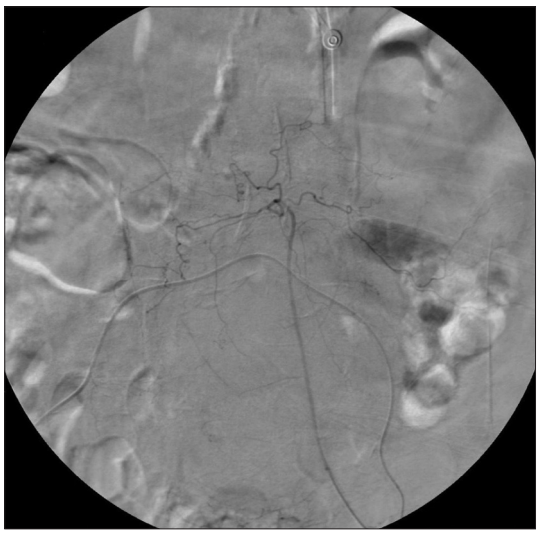

Figure 3. Angiography during selective catheterization of the left inferior epigastric artery showed a normal appearance without obvious contrast extravasation.

empiric TAE was performed using two fibrocoils and gelfoam pieces to attenuate the flow of the left inferior epigastric artery. On the second day after TAE, her hemodynamic values returned to normal (systolic blood pressure was approximately 100–110 mm Hg with heart rate <100 beats/min) without clinical evidence of continued bleeding, and she was discharged 1 week after embolization. A follow-up 3 months later confirmed that she had recovered uneventfully.

Discussion

A paroxysm of repetitive coughing with excessively vigorous contractions of the rectus muscle may contribute to RSH secondary to disruption of the epigastric vessels or the rectus muscle. Other predisposing factors for RSH include advanced age, arterial hypertension, atherosclerosis, systemic anticoagulation, direct trauma to the abdomen, pregnancy, intra-abdominal injections, and strenuous exercise with vigorous contractions of the rectus muscle (2). Furthermore, the increase in the number of elderly patients and the use of therapeutic anticoagulation may increase the prevalence and severity of RSHs encountered in clinical practice (1).

Teske (3) reported that more than 80% of RSHs are located in the lower abdominal quadrants. The lower abdominal quadrants are more frequently involved because contractions in these regions are the longest, resulting in the greatest muscle shortening. In addition, the absence of a substantial posterior rectus sheath and the firm attachment of blood vessels to the recti render vessels vulnerable to injury during severe muscle contraction or trauma. RSHs below the arcuate line are more likely to dissect extensively or cross the midline and become bilobar because no posterior sheath wall or tendinous inscriptions are present to restrict the bleeding.

Common presenting signs and symptoms of RSH are abdominal pain, an abdominal wall mass, abdominal wall ecchymosis, tachycardia, and fever (4). The nonspecific nature of these clinical manifestations and the low incidence of RSH make diagnosis in elderly patients difficult. Misdiagnosis may result in unnecessary laparotomies, morbidity, or mortality (5). Clinical history, physical examination, and

abdominal ultrasonographic or CECT findings are necessary to establish a definitive diagnosis of RSH. CECT is the most appropriate modality because it provides useful supplementary information for further management of the patient (6).

Early diagnosis and prompt treatment may improve clinical results and prevent further complications such as infection, abdominal compartment syndrome, hypovolemic shock, or death. This is especially important for patients with comorbid conditions. The best treatment modality for RSH depends upon the clinical presentation of the patient, the coagulation status, and the degree of hemodynamic compromise. Conservative management and concurrent treatment of predisposing conditions have long been the standard treatment for RSH. In a minority of cases, interventional therapeutic procedures may be required if there is evidence of continued bleeding. The mainstay of treatment for RSH that is unresponsive to conservative therapy and accompanied by hemodynamic compromise has been surgical exploration and ligation of the bleeding vascular lesions (1). However, the mortality rate of elderly patients who undergo surgery is high. Recent advances in intervention radiology have facilitated successful hemostasis in RSH patients using TAE of feeding arteries that show contrast extravasation under radiological guidance (7, 8). Digital subtraction angiography with arterial embolization is an important tool in modern interventional radiology because of its diagnostic and therapeutic properties. However, intermittent bleeding, microhemorrhage with a bleeding rate <0.5 mL/min, and vasospasm may result in negative angiographic findings (9). Zissin et al. (8) conducted a case study of four patients with RSH. In one case, the source of the bleeding could not be demonstrated by angiography, but the patient improved after empiric embolization of both inferior epigastric arteries. Our case exhibited refractory RSHs and impending shock after conservative treatment over 15 days. Empiric TAE induced a dramatic remission of symptoms and normalization of the hemodynamic status in less than 36 hours. To the best of our knowledge, our patient is the second reported case of RSH without contrast extravasation on angiography that was successfully treated by empiric TAE.

The power of empiric angiographic embolization to control bleeding in selected high-risk patients remains unclear in RSH. However, when surgery is unpredictable and risky, technological advances and angiography accessibility will prompt the physician to undertake empiric angiographic embolization. Although prospective studies are necessary to confirm this strategy, our report suggests that empiric TAE may be a good alternative to surgery. However, empiric embolization may not be helpful in controlling bleeding. Nevertheless, bleeding in RSH could be intermittent; embolization of the feeding artery may have a prophylactic effect, even when no extravasation is visible on the angiogram.

Some studies have suggested using provocative angiography with vasodilators, anticoagulants, and thrombolytics, which is believed to enhance the sensitivity of the technique in localizing bleeding in cases of obscure gastrointestinal hemorrhage (10). In retrospect, we might have avoided the disturbance involved in localizing the bleeding site if a pharmacological agent had been administered to provoke bleeding during the angiography. However, further studies are needed to confirm the safety and efficacy of this concept.

In conclusion, RSH is an uncommon yet potentially life-threatening complication of a tussive paroxysm. It is essential that physicians who treat patients with RSH be aware of the features of expanding hematomas that are refractory to conservative treatment, even in the absence of identified active bleeding on CECT or angiography, because early empiric TAE of the ipsilateral epigastric artery may prevent further complications, minimize hemodynamic instability, and shorten the hospital stay.

Conflict of interest disclosure

The authors declared no conflicts of interest.

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