

Rectus Sheath Hematoma: Review of an Uncommon Surgical Complication

Charles Wayne Perry, MD

Bradley J. Phillips, MD

A rectus sheath hematoma (RSH) is an uncommon cause of abdominal pain.¹ In a series of 1257 patients for whom ultrasonography was used to evaluate acute abdominal pain of unclear origin, only 23 (1.8%) were diagnosed with RSH.² However, it is not uncommon for pain that is caused by an RSH to be misdiagnosed.¹ This report describes a patient who developed an RSH as a complication of an abdominal hysterectomy. The article also discusses anatomic, clinical, and therapeutic issues relating to RSHs.

CASE PRESENTATION

Initial Presentation and Treatment

A 44-year-old woman with a 2-year history of dysfunctional uterine bleeding presented to our institution for evaluation and treatment. A sonogram of her uterus revealed 3 intrauterine fibroids with ill-defined borders. The uterine bleeding was unresponsive to hormone therapy over the ensuing 6 months, and an elective total abdominal hysterectomy through a modified Pfannenstiel's incision was subsequently performed. The skin was incised transversely, exposing the anterior rectus sheath superior to the pubis. Elevating the sheath with blunt dissection superiorly and inferiorly allowed the peritoneum to be entered in a vertical manner between the rectus muscles. After control of the uterine vessels was established, the sacrouterine, round, cardinal, and ovarian ligaments were divided. The uterus was removed, and the vaginal cuff was approximated. The closure was uncomplicated. The patient experienced a paroxysmal coughing episode after extubation.

Subsequent Complication and Treatment

The following morning, the patient had mild tachycardia, pale conjunctivae, and a tender lower abdominal wall mass without peritoneal signs. A complete blood count revealed a hematocrit of 19%, a decrease of 12 percentage points from her preoperative value. A transfusion of 3 units of packed erythrocytes was per-

formed. A computed tomography scan confirmed the presence of an RSH (**Figure 1**). The patient was managed nonoperatively with 3 days of bed rest and serial physical examinations and complete blood counts. Her coughing was controlled with suppressants, and she was discharged home on postoperative day 4, with complete resolution of her signs and symptoms.

DISCUSSION

Anatomy of the Rectus Sheath

The rectus sheath consists of 2 vertically aligned parallel muscles, a posterior blood supply originating from the internal thoracic and external iliac arteries, and an enveloping fascial sheath. Above the arcuate line, the rectus muscles are divided in the midline by the linea alba and are enveloped by fascia from the aponeurosis of the external oblique, internal oblique, and transversus muscles. Below the arcuate line, there is only an anterior rectus sheath (**Figure 2**). Three to 4 tendinous inscriptions attach the rectus muscles to the enveloping fascia above the arcuate line. These intersections contain multiple perforators from the epigastric vessels, supplying the overlying fascia and soft tissue.³ The perforators are most dense in periumbilical areas.

Rectus Sheath Hematoma

General characteristics. An RSH occurs after a rupture of the rectus muscles or perforating epigastric vessels.⁴ RSHs can occur somewhat easily, owing to the significant mobility of the rectus muscles in the region below the arcuate line, exposing the fixed epigastric vessels to injury.⁵ Below the linea semicircularis, the absence of a posterior rectus sheath allows a hemorrhage to cross the midline and invade the space of Retzius, irritating the bladder and peritoneum.

Dr. Perry is a resident in General Surgery, University of Arizona Health Sciences Center, Tucson, AZ. Dr. Phillips is a Research Fellow, Brigham and Women's Hospital, Boston, MA.

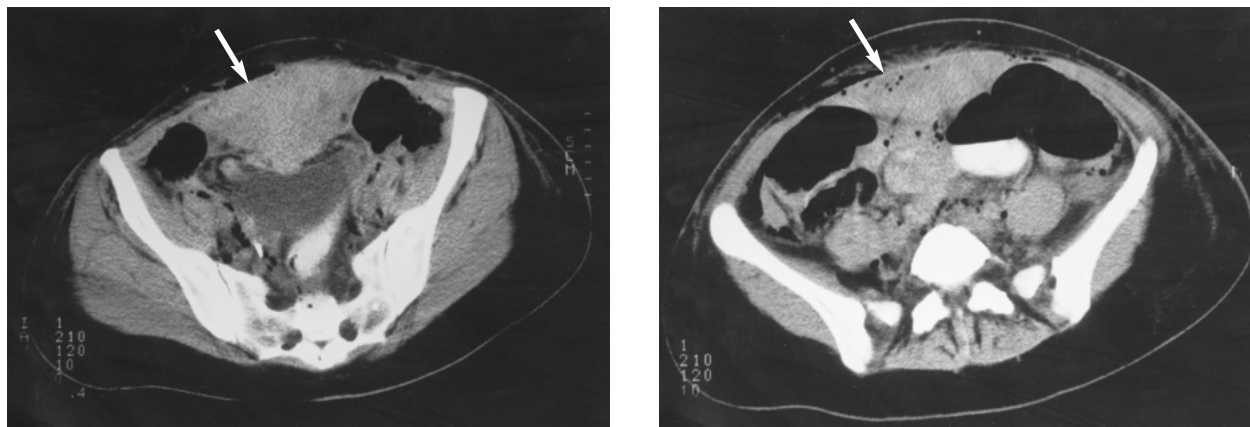


Figure 1. Computed tomography scans of the case patient's lower abdomen showing a rectus sheath hematoma (arrows).

Three types of RSH can be distinguished by way of the severity of hemorrhage as delineated on computed tomography scans. Type I RSHs are unilateral hematomas contained within the muscles. Type II RSHs are bilateral hematomas or hematomas not contained within the muscle sheath. Type III RSHs invade the prevesicular space or peritoneum. Patients with hematomas of this severity usually present with tachycardia and anemia.

Clinical and laboratory features. Patients with RSHs may have unexplained tachycardia or hypotension. Also, patients with an RSH classically present with an acute onset of constitutional symptoms, such as lower abdominal pain, fever, nausea, and emesis. They usually complain of sudden severe, unilateral abdominal pain that increases with movement. Also, they often exhibit Fothergill's sign: Fothergill's sign was initially established in 1926 to aid in identifying RSHs. According to the sign, an RSH is present if there is a tender lower quadrant abdominal wall mass that remains fixed and palpable when the rectus muscle is tensed, through elevation of the patient's head while he or she is in a supine position.⁶ The tenderness typically increases with movement of the rectus muscles.⁷ Ecchymosis of the abdominal wall is not uncommon. Also, RSHs can be associated with anemia and elevated clotting times; thus, a complete blood count should be obtained and coagulation studies should be performed for an individual suspected of having an RSH.

Risk factors. Risk factors for an RSH include older age (> 60 years), anticoagulation therapy, hypertension, atherosclerosis, and chronic cough⁸: patients with RSHs are often elderly and on anticoagulant therapy. RSH has been documented to occur spontaneously, in association with pregnancy and localized trauma and

after a surgical procedure.⁹ A patient may have a history of trauma to the abdominal wall in the region of the rectus muscles or a paroxysm of coughing.

Diagnosis and treatment. Imaging modalities such as computed tomography, ultrasonography, and magnetic resonance imaging have been used to confirm the diagnosis of an RSH. However, ultrasonography, although useful as an initial screening test, may not be as sensitive as computed tomography (71% vs 100%).⁸ Magnetic resonance imaging is helpful in distinguishing chronic RSH from other anterior abdominal wall masses.¹⁰

After confirmation of the diagnosis and elimination of the possibility of other intra-abdominal conditions (such as ovarian torsion, hernia, appendicitis, or urinary tract obstruction) treatment often consists of abdominal wall rest, analgesia, discontinuation of any anticoagulation therapy, blood and blood product transfusions (if appropriate), and clinical observation.⁹ Recently, the radiographic criteria used to distinguish the types of RSH have been correlated with management strategies.¹¹ A type I hematoma will likely resolve without inpatient or transfusion therapy. Patients with a type II hematoma require hospitalization until stabilization is documented. Patients with a type III hematoma will often require a blood transfusion and several days of inpatient bed rest, with serial physical examinations, serial hematocrit measurements, and additional imaging as indicated.

Surgical procedures may be used for diagnostic purposes as well as to control continued hemorrhage or intraperitoneal rupture.² In general, surgical procedures for these purposes consist of clot evacuation, ligation of all bleeding vessels, and closed suction drainage, as necessary. Although drainage of the hematoma percutaneously has been discouraged because of the possibility of contamination and the release of a tamponade, this

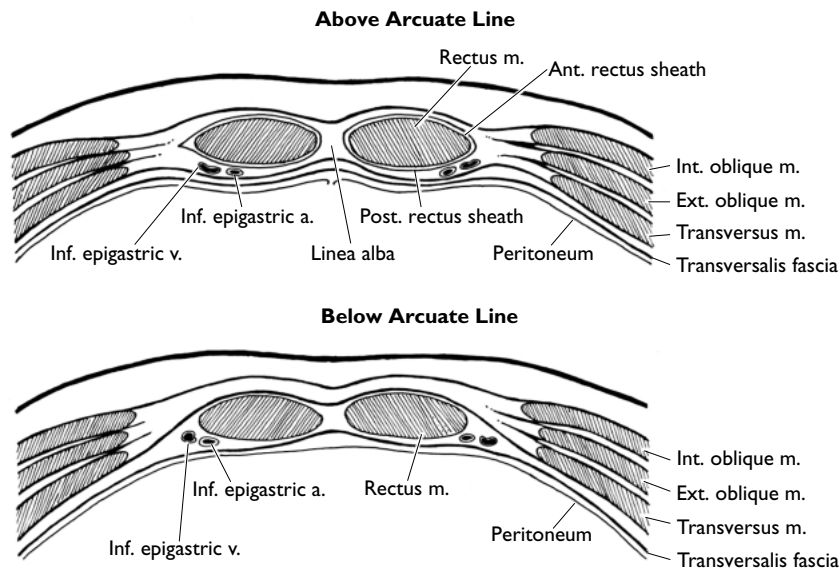


Figure 2. Anatomic features of the rectus muscles. a = artery; Ant = anterior; Ext = external; Inf = inferior; Int = internal; m = muscle; Post = posterior; v = vein.

technique may be both therapeutic and diagnostic. After correcting any coagulation abnormalities, embolization may also be used to obtain local control.¹²

The disease process is usually thought of as self-limited. However, a mortality rate of 18% of patients with RSHs who underwent surgery has been reported.¹³ Also, a spontaneous death rate of 25% of individuals with an RSH has been reported.¹³

Discussion of the Case Patient

Our patient, whose disorder is best classified as a type III RSH, most likely developed her postoperative RSH after the coughing paroxysm. The coughing episode most likely increased venous pressure and rectus muscle tension along the fresh surgical incision and resulted in the hemorrhage. Her favorable clinical response to the erythrocyte transfusion, the diagnostic confirmation of her disorder with computed tomography scans, and improved clinical examinations allowed for nonoperative management.

CONCLUSION

RSHs are a rare cause of abdominal pain. They are associated with local trauma, coagulopathies, coughing, hypertension, and peripheral vascular disease. An RSH typically presents as a palpable lower abdominal mass that becomes fixed and often tender with abdominal wall contraction. The diagnosis is usually confirmed with ultrasonography or computed tomography. Results of imaging studies and the patient's clinical condition define the management strategy. RSHs not invading the prevesicular space or peritoneum in a sta-

ble patient will often resolve nonoperatively with rectus rest and correction of any predisposing characteristics. RSHs occurring in postoperative patients and in those on anticoagulation therapy must be followed with caution, because, in such cases, surgical interventions may be required to control hemorrhaging. **HP**

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(continued on page 56)

(from page 37)

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