

RECTUS SHEATH HEMATOMAS

Rectus sheath hematoma is an uncommon condition (unknown precise incidence) that should be considered in the differential diagnosis of patients with acute onset of abdominal pain, especially in older patients on anticoagulation and/or those patients who have suffered recent minor trauma.

Anatomy/Etiology:

- The rectus abdominal muscle extends from the fifth rib to the pubic bone.
- It is enclosed within the rectus sheath, a structure composed of muscular aponeuroses.
- Above the arcuate line of Douglas, which lies just below the level of the umbilicus:
 - the anterior rectus sheath is composed of the aponeuroses of the internal and external obliques
 - the posterior sheath consists of the interior oblique and transversus abdominis.
- Below the arcuate line of Douglas:
 - the aponeuroses pass anteriorly to the muscle, leaving only the transversalis fascia separating the rectus muscle from the peritoneum.
 - Therefore, hematomas below the umbilicus often lead to peritoneal irritation and signs of peritonitis.
- Blood is supplied to the rectus muscle by the superior and inferior epigastric arteries, which travel and anastomose behind it.

Who gets them: most commonly older women (mean age 58) receiving anticoagulation treatment or patients suffering minor trauma

Risk factors:

- Although often termed “spontaneous” rectus sheath hematomas, in the vast majority of cases (80-96% of the time) a careful history will disclose a precipitating factor.
- The most common risk factors are: anticoagulation, trauma, age, muscle exertion, pregnancy, coughing (influenza, asthma exacerbation, and chronic bronchitis), sneezing, prior scar, obesity, ascites, hypertension, atherosclerosis, medication injections

Clinical presentation:

- Acute onset of abdominal pain, usually lower quadrants and usually unilateral
- usually tender palpable mass (70%).
- Fever only present in about 10- 20%
- anorexia, nausea, overlying echymosis, tachycardia and hypotension all possible but uncommon.
- The pain is not made better or worse with food and is not altered by bowel movements.
- It is usually related to posture, worse when sitting or standing and better when supine.

Classic Physical Exam findings:

- Carnett’s sign- abdominal tenderness unchanged or increased when the abdominal wall is tensed (in one study 23/24 patients with + Carnett’s sign had normal laparotomies).
- Fotehgill's sign- the ability to palpate the mass equally well with the patient lying supine and the partially sitting up, flexing the abdominal wall.

- Cullen's sign- (periumbilical ecchymosis) indicates intraperitoneal rupture of the hematoma.
- Grey-Turner's sign (flank discoloration) probably secondary to extraperitoneal extension of the hematoma.
- Signs of intra-abdominal pain: nausea, vomiting, weight loss, diarrhea, constipation, change in bowel habits, pain made better or worse by eating or BMs, jaundice and other LFTS abnormalities, fever, leukocytosis, elevated sedimentation rate.
- Signs of abdominal wall pain: Pain constant, intensity related to posture, not related to meals or BMs, positive Carnett's sign, discrete tender pain, palpable mass

Differential diagnosis:

- Abdominal wall:
 - hematoma,
 - tumor (desmoid usually in association with FAP- Gardner's syndrome, neurofibroma, sarcoma)
 - abscesses usually from perforated diverticulitis.
- Intra-abdominal diseases include:
 - hernia, appendicitis, ovarian cyst, intestinal obstruction, aortic aneurysms, ruptured aneurysms, perforated diverticulitis, intra-abdominal tumors, ectopic pregnancy, perforated ulcer, intestinal obstruction, abruption placenta

The three abdominal wall diseases should be able to be differentiated from each other based on H&P, labs, and imaging, however, it is not always so straightforward and sometimes surgical exploration is necessary to make the correct diagnosis. In fact, the diagnosis of rectus sheath hematoma is still only made preoperatively about 50% of the time.

Desmoid tumor: nontender rectus ms. mass present for several months and appears solid on ultrasound and CT.

Hematoma: tender rectus ms. mass that has been present for several days and appears thickened or cystic on ultrasound and CT, without fever and leukocytosis

Abscess: tender rectus ms. mass that has been present for several days to weeks and appears cystic on Ultrasound and CT, with fever and leukocytosis

Diagnosis:

- Based mostly on H&P.
- No lab tests are sensitive or specific for rectus sheath hematomas.
- Anemia and leukocytosis are possible, however, they are only present in approximately 10% and 40% respectively.
- Confirmatory tests are ultrasound and CT.
- CT scan is more sensitive.

Literature:

- Mostly case studies and series reporting of patients in whom rectus sheath hematomas were found and how they were managed.
- The largest study examining disorders of the rectus abdominis muscle and sheath (RMS) is a retrospective chart review from 1971-1992 at the NYH reviewed 40 patients with

RMS diseases during this period.

Of the 40 patients:

- 21 had tumors (18 desmoid, 1 neurofibroma, 1 embryonal rhabdomyosarcoma, and 1 dermatofibrosarcoma protuberans),
- 9 hematomas
- 9 infections (3 scar abscesses, 3 diverticulitis, 1 perforated sigmoid carcinoma, 1 gallbladder empyema, 1 subcutaneous heparin injection).

A word about desmoid tumors:

- desmoids originate in the aponeuroses of skeletal muscle,
- they are unencapsulated
- they are poorly demarcated.
- they are an aggressive type of fibromatosis.
- they may arise in the abdominal wall, the abdominal cavity, and many extraabdominal locations.
- there is a firm link between FAP and desmoid tumors, known as Gardner's syndrome, with between 5-10% of patients with FAP also having desmoid tumors.
- otherwise they are a very rare tumor, with an estimated incidence of 2-4 new cases per million people per year.

Treatment:

- The majority of rectus sheath hematomas are self-limited, therefore, their management is conservative with analgesics, IV fluids, and close observation.
- Anticoagulation should be stopped immediately when the diagnosis is suspected and can be restarted after resolution of the rectus sheath hematoma.
- If the patient is supratherapeutic on their anticoagulation treatment, protamine sulfate, FFP, or Vitamin K should be given, depending on the patient's specific treatment.
- For anemic patients, transfusions should be considered on an individual basis depending on comorbid conditions.
- Prompt diagnosis is essential to correct treatment and can avoid surgical intervention, which may carry a high mortality.
- Hemodynamically unstable patients should be taken to the OR for evacuation.
- Patients in whom the diagnosis is unclear should undergo exploratory laparotomy or laparoscopy with laparoscopy being preferred.
- If hematomas are visualized in the OR, they should not be treated unless the patient's condition is continuously deteriorating or if they are hemodynamically unstable.
- Minimally invasive techniques using interventional radiology are available for patients with massive hemorrhage whom are poor operative candidates or who refuse transfusion.
- Gelfoam embolization of the rectus sheath hematoma from the inferior epigastric has been used therapeutically since it was reported in 1980 in a paper in AJR by Levy et al.
- More recently, a case report by Zack et al. in J of Trauma reported successful coil embolization in of rectus sheath hematoma in a Jehovahs Witness who hemorrhaged to down to a hematocrit of 16 and refused transfusion.
- Although, usually self-limited, fatalities in elderly patients with significant comorbidities have been reported (JAMA 1983).

- To avoid deadly outcomes, every patient with a tender abdominal mass, hypotension, and anticoagulation should be immediately take to the OR, with delay possibly leading to death.

Recent classification by CT in 1996 paper by Bcrna et al. which shows that based on clinical presentation and CT scan, treatment can be guided.

- Type I hematoma
 - present with mild-moderate abdominal pain and abdominal mass,
 - hyperdense unilateral foci on CT
 - are mild
 - do not require hospitalization
 - resolve by themselves within one month.
- Type II hematoma
 - are often bilateral
 - moderate in size
 - require hospitalization for close observation, to observe their favorable evolution.
 - Most do not require transfusions and most go home within 3 days.
- Type III hematoma
 - are more severe
 - often occur in patients taking anticoagulants.
 - These patients require hospitalization;
 - they often have drops in hemoglobin requiring transfusion.
 - They usually go home within 1 week.
 - Only rarely will they develop hemodynamic instability not able to be controlled with FFP and fluid resuscitation, and then require surgical evacuation.

Prognosis:

- Type I usually resolve within 30 days
- Type II usually resolve within 2-4 months
- Type III usually require more than 3 months to resolve.
- After resolution, rectus sheath hematomas do not usually recur and cause no long term sequelae.

Conclusions:

- Rectus sheath hematomas should be suspected in patients with a palpable, tender, unilateral abdominal mass, positive Carnett's sign and history of anticoagulation, trauma, vigorous coughing or exercise.
- To make this diagnosis, clinicians must look always think of it in their differential of the acute abdomen, to avoid unnecessary tests and surgery.
- Ultrasound and CT should be used as confirmatory tests.
- 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.