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Rectus abdominis muscle abscess due to possible infection of spontaneous hematoma: An unusual presentation

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ABSTRACT

Rectus abdominis muscle abscess due to infection of spontaneous rectus sheath hematoma is an uncommon clinical condition. There are many predisposing factors known to cause rectus abdominis muscle abscess and rectus sheath hematoma. If an abdominal wall abscess is not diagnosed and treated in time, it can have serious consequences for life. It is rare for rectus muscle abscess to be detected incidentally without risk factors and clinical symptoms. Clinically, abdominal wall abscesses or hematomas can mimic many abdominal diseases. In this case, we preferred to do a biopsy because even the laboratory and imaging findings were not helpful enough in diagnosis. This case of rectus abdominis muscle abscess highlights the need for a high index of suspicion for patients who present without clinical symptoms and do not conform the usual natural history of the abscess, particularly if they have no risk factors for infection.

Keywords: rectus abdominis muscle; abscess; hematoma; ultrasonography; computed tomography

INTRODUCTION

An abscess is a localized collection of pus that is confined by an inflammatory tissue. This collection composed of cellular debris, enzymes, and liquefied remnants which can be from an infection or non-infectious source. Abscess cavity may be unilocular and multilocular, and clinically, it can also be classified as simple or complex. It can develop almost anywhere in the body. When it occurs in the anterior abdominal wall and extends into the abdominal cavity, it is usually confined to some part of the peritoneal or intraperitoneal structures. In general, drainage and antibiotics are used in the treatment of abscess. If left untreated, it can result in serious conditions such as septic shock.[1, 2] Rectus abdominis muscle abscess (RAMA) is a type of abdominal wall abscess (AWA). RAMA due to infection of the spontaneous rectus sheath hematoma (RSH) is a relatively rare clinical condition. RSH has been strongly associated with predisposing factors such as trauma, anticoagulation, surgery, and strong rectus muscle contractions. It usually occurs as a result of injury to the epigastric vessels or direct rectus muscle rupture. It is an uncommon cause of abdominal pain and swelling, and may mimic other acute and chronic abdominal pathologies. Although RSH is generally accepted as a self-limiting condition, it may result in death in some cases. Its treatment can be conservative or invasive depending on the patient's condition.[3, 4] We present a case of rectus abdominis muscle abscess due to possible infection of a spontaneous RSH, in a young patient without associated clinical symptoms and medical history (e.g., trauma, anticoagulation, surgery, etc.). In this context, AWA and RSH were discussed separately in this article.

CASE REPORT

A 36-year-old male patient was referred to the Radiology department for abdominal ultrasonography (USG) as part of a routine medical check-up. The general condition of the patient was quite good and there was no significant finding except for kidney stone disease in his anamnesis. Physical examination findings were within normal limits (HR: 86 beats/min, BP: 115/75 mmHg, RR: 16 breaths/min, BT: 37.4 °C). Laboratory studies showed only leukocytosis as an abnormal finding (WBC: 18x10³/µL, Hemoglobin: 15.1 g/dl,

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Hematocrit: 44.6%, INR: 0.9). Abdominal USG incidentally showed a lesion with heterogeneous appearance and irregular shape in the left lower quadrant of the abdomen. The lesion was partially located in the lateral part of the left rectus abdominis muscle, and partially in the intra-abdominal region. The size of the lesion was measured approximately 6x5 cm. The part of the lesion within the rectus abdominis muscle was located near the inferior epigastric vessels. Color Doppler USG revealed a few vascular signals around the lesion, but there was no apparent signal in it (Figure 1A and 1B).

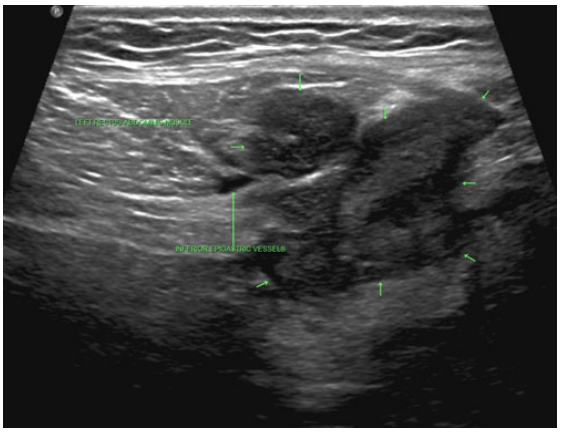

Figure 1a: Transverse gray-scale sonographic image reveals a heterogeneous and irregularly shaped lesion (small arrows) adjacent to the epigastric vessels (long arrow). It is located partly in the rectus abdominis muscle and partly in the abdomen.

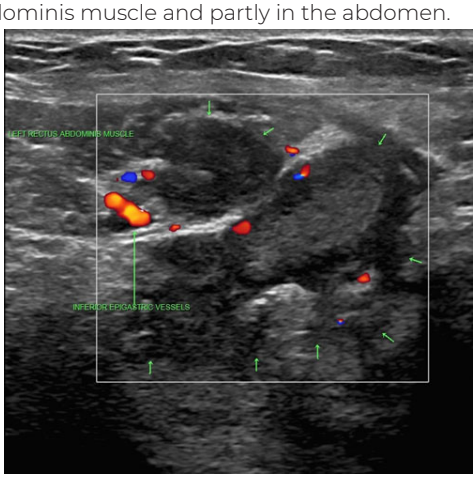

Figure 1b: Transverse color Doppler sonographic image illustrates some peripheral vascular signal with no obvious vascularity within the lesion (small arrows).

The patient did not have any complaints or physical examination findings at the lesion site. Then, we re-evaluated the computed tomography (CT) examinations of the patient previously performed for kidney stones. CT examination without intravenous and oral contrast material performed seven months ago showed a smoothly circumscribed and non-specific lesion adjacent to the left rectus abdominis muscle, with a density similar to muscle tissue, approximately 1x1 cm in size (Figure 2A and 2B).

Figure 2a

Figure 2b

Second CT examination without intravenous and oral contrast material performed six months ago demonstrated that the size of the lesion was 3x2 cm and its borders were unclear. In addition, there was an increase in the density of surrounding adipose tissue (Figure 2C and 2D).

Figure 2c

Unfortunately, this lesion had not been noticed in both CT examinations. In order to further evaluate the lesion, the patient underwent CT examination with intravenous and oral contrast material. CT examination revealed a heterogeneous mass-like invasive lesion, 6x5 cm in size, located partly in the left rectus abdominis

Figure 2d

Figure 2. Unenhanced axial (A) and sagittal (B) computed tomography images demonstrate a relatively well demarcated non-specific lesion (arrows) with soft tissue density adjacent to the left rectus abdominis muscle. Unenhanced axial (C) and sagittal (D) computed tomography images performed one month later display the increase in the size of the lesion, the blurring of its borders, and the increase in the density of the surrounding fat tissue.

muscle and partly in the abdomen, which was irregularly shaped and showed heterogeneous enhancement. Moreover, the lesion was partially encircled by the intestines and there was an increase in fat tissue density around it (Figure 3A and 3B).

Figure 3a

Figure 3b

Figure 3: Contrast-enhanced axial (A) and sagittal (B) computed tomography images delineate heterogeneous contrast enhancement of an irregularly shaped mass-like invasive lesion, located partly in the left rectus abdominis muscle and partly in the abdomen. It is partially surrounded by the intestines and there is an increase in density of surrounding adipose tissue.

Then, we performed a fine needle aspiration biopsy and a cutting needle biopsy to further analyze the lesion. The pathologist reported that the biopsy specimens were consistent with infection, inflammation, and necrosis (Figure 4).

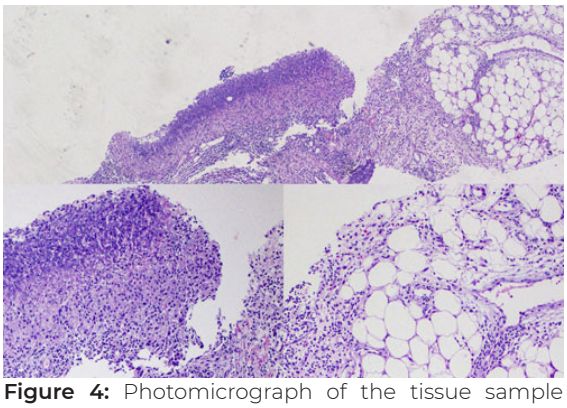

Figure 4: Photomicrograph of the tissue sample from core needle biopsy illustrates the fibrinous area is surrounded by histiocytes, and mixed type inflammation of the surrounding fibroadipose tissue (hematoxylin and eosin stain, original magnification; x50 and x100).

The patient's general condition deteriorated, and hematocrit hemoglobin values decreased approximately five hours after the biopsy was performed. No acute hematoma was observed on emergency CT examination performed in terms of possible acute bleeding owing to biopsy. We kept the patient under surveillance and applied supportive treatment. Ten days of Metronidazole and Ciprofloxacin treatment was initiated with the diagnosis of complex abscess of the rectus abdominis muscle before performing a possible interventional procedure or surgery. A targeted USG examination carried out after the treatment depicted that the size of the abscess reduced to 2x1 cm. Additionally, we observed that the intra-abdominal part of the complex abscess disappeared and was present only within the lateral part of the rectus abdominis muscle (Figure 5A and 5B). His general condition and laboratory values were normal, and he was discharged at his own request. A targeted USG performed in the out-patient clinic one month later showed complete disappearance of the abscess (Figure 5C).

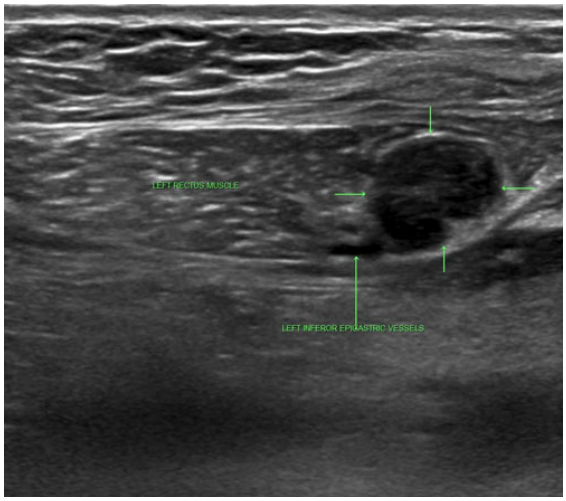

Figure 5a

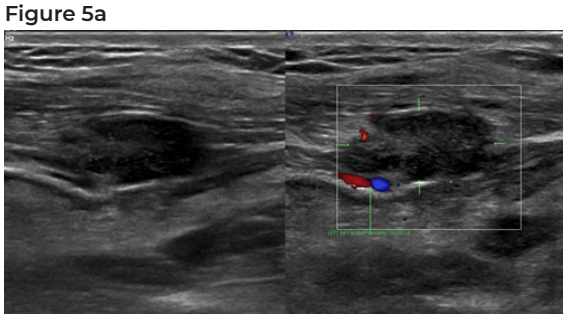

Figure 5b

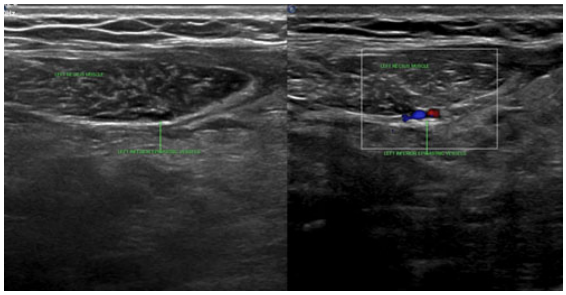

Figure 5c

Figure 5: Transverse gray-scale (A) and oblique color Doppler (B) sonographic images depict the residual lesion within the lateral part of the rectus abdominis muscle and disappearance of intra-abdominal part. (C) Transverse gray-scale and color Doppler sonographic image portrays complete resolution of the lesion.

DISCUSSION

Terminologically, an abscess is defined as a localized accumulation of pus in a cavity surrounded by inflamed tissue. Abscess cavity contains broken-down tissues, dead cells, bacteria, leukocytes, and extracellular fluid. The inflamed tissue surrounding the abscess is also called a capsule. Capsule tissue is mainly made by healthy tissue and cells adjacent to the inflamed area and separates the abscess from healthy tissues by keeping it limited. The capsule may also contain the omentum, inflammatory adhesions or adjacent organs, depending on where it is located. Clinically, it may be called as simple or complex depending on the its radiological appearance. In general, simple abscess is defined as unilocular and well-circumscribed, while complex abscess is described as multiloculated and poorly circumscribed. The abscesses usually contain a mixture of aerobic and anaerobic bacteria. Skin flora may be responsible for abscesses after a penetrating injury. It is a serious condition and to avoid the high morbidity and mortality, it must be promptly diagnosed and treated. If the abscess is left untreated and/or perforated, the process continues until bacteremia develops, which then progresses to sepsis and septic shock.[1, 2, 5, 6]

AWAs may occur owing to spread of skin infection, direct trauma, infection of rectus sheath hematoma, and other abdominal conditions such as appendicitis or diverticulitis. RAMA is a type of AWA and may extend into the abdominal cavity. Patients with an AWA may present with abdominal pain, fever, mass, anorexia, tachycardia, prolonged ileus, and septic shock. Laboratory data is non-specific, and may reveal general features of the infection and/or inflammation such as leukocytosis, elevated acute-phase reactants, abnormal liver function tests, anemia or thrombocytopenia. Plain abdominal x-rays are not sensitive for identifying an AWA. USG is the first line imaging test and can detect the abscess. It is an easy, inexpensive, and radiation-free test. CT is considered the most accurate test. It shows the location and boundaries of the abscess better than USG. All patients with an AWA need close monitoring as they can quickly become septic. Patients should be followed up with regular physical exams, vital signs and imaging tests. Once a diagnosis of an AWA is done, a general surgeon and a radiologist should be consulted. Percutaneous drainage, open surgical drainage and broad-spectrum antibiotics are used in the treatment of AWA, depending on the clinical condition of the patient.[6-8]

The rectus abdominis muscles are two parallel vertically aligned muscles of the anterior abdominal wall. They originate from the superior ramus of the pubis, pubic symphysis, pubic crest and pubic tubercle, and insert into the ventral aspect of the fifth, sixth, and seventh costal cartilages and the xiphoid process. They are separated by a midline band of connective tissue called the linea alba, and located in the rectus sheath formed by the aponeuroses of the lateral abdominal muscles. The arcuate line is a demarcation visible from the peritoneal surface of the abdominal wall, and is located approximately one-third of the distance between the umbilicus and the pubis. It occurs due to the change in composition

of the rectus sheath at this level. The posterior rectus sheath is weak below the arcuate line compared with above, due to the altered course of fascias. The main arterial supply of the rectus muscle and sheath is provided by the upper and lower epigastric arteries. The inferior epigastric artery originates from the external iliac artery, and the superior epigastric artery arises from the internal thoracic artery. Inferior epigastric artery enters the rectus sheath at the level of arcuate line. These arteries, along with the superior and inferior epigastric veins, run within the posterior rectus sheath. While the inferior epigastric artery lacks rectus sheath protection up to the level of the arcuate line, the superior epigastric artery is within the posterior rectus sheath along its course. The rectus abdominis muscles are important postural muscles, and mainly responsible for flexion of the lumbar spine. They also play an important role in breathing, keeping the internal organs intact and creating intra-abdominal pressure.[9, 10]

RSH is an uncommon and often clinically misdiagnosed cause of abdominal pain. It occurs as a result of bleeding into the rectus sheath due to injury to the superior or inferior epigastric vessels or their branches or direct rupture of the rectus muscle. Anticoagulation, surgery, abdominal injections, paracentesis, peritoneal catheter insertion, pregnancy, coagulation disorders, hypertension, atherosclerosis, vasculitis, hematologic diseases, and strong rectus muscle contractions (e.g., coughing, sneezing, exhaustive exercise, defecation) have been described as predisposing factors for developing RSH in the literature. The most common clinical signs and symptoms of RSH consists of abdominal pain, palpable abdominal mass, tenderness, abdominal guarding, nausea, vomiting, fever and chills, in descending order of frequency. Physical examination may reveal tachycardia, hypotension, palpable non-pulsatile abdominal mass, abdominal wall (periumbilical or flank) ecchymosis, and syncope. Moreover, the Fothergill and the Carnett sign on physical examination can help distinguish anterior abdominal wall lesions from intra-abdominal lesions. It is 2-3 times more common in females than in males. RSH is more common and larger in the lower abdominal wall owing to weak posterior rectus sheath. Although RSH is generally a self-limiting pathology, it can cause hypovolemic shock and even death if it reaches adequate expansion. RSH below the arcuate line can expand into the abdominal cavity with relative ease, since there is no strong posterior fascia. Laboratory tests may be normal, or decrease in hemoglobin and hematocrit values and leukocytosis may be observed depending on the severity of the hematoma. Coagulation parameters may be normal or abnormal. USG, CT and magnetic resonance imaging are useful imaging methods in the diagnosis of RSH. Intravenous contrast-enhanced CT may show active extravasation, if present. Further, a classification of RSH has been made based on CT findings, in terms of presentation, severity, prognosis and therapy. RSH has widely variable presentation and different radiological appearances depending on its location and stage. Therefore, other causes of abdominal pain such as appendicitis, diverticulitis, cholecystitis, biliary colic, urinary tract infection, tumors, abdominal aneurysm, intestinal obstruction, ovarian torsion, nerve entrapment and hernia should be considered in the differential diagnosis. Its treatment can be conservative or invasive according to the patient's condition. Physicians should be familiar with RSH because it can mimic almost any abdominal condition. RSHs do not usually recur after resolution and typically do not cause long-term sequelae.[4, 9, 10]

Our case was a young patient who did not have any predisposing factors and complaints associated with abscess. Therefore, we initially considered the possibility of an invasive complex mass or a complicated mass. In this case, when the history, physical examination and laboratory findings were evaluated together, the only remarkable clue was leukocytosis, which is a non-specific sign. The heterogeneous contrast enhancement and invasive appearance of the lesion on CT increased our concern about the possibility of this lesion being a tumoral mass. For this reason, we chose to do a biopsy. In this case diagnosed with complex abscess, we could not explain the development of abscess without risk factors, and the lack of abscess symptoms. Furthermore, although there was no acute hematoma in the abdomen after the biopsy, we could not clarify the sudden decrease in hemoglobin and hematocrit levels and the return of these values to normal after a few days. Another point that attracted our attention was that the complex abscess firstly shrunk, and then disappeared completely after ten days of antibiotic treatment, without the need for drainage. In addition, we concluded that the abscess was caused by the infection of the RSH since it is in the immediate vicinity of the epigastric vessels.

In summary, we report a patient with unusual presentation of RAMA due to possible infection of spontaneous RSH

without associated clinical symptoms and medical history. Previously reported cases of RSH have been associated with anticoagulants, trauma, surgery, and other risk factors. This unusual case reveals that RAMA and RSH should be considered in the differential diagnosis of lesions located adjacent to the epigastric vessels, even if there are no supportive anamnesis and clinical signs.

REFERENCES

1. Rotstein OD, Meakins JL. Diagnostic and therapeutic challenges of intraabdominal infections. World J Surg. 1990 Mar-Apr;14(2):159-166.

2. Gleason TG, Pruett TL, Sawyer RG. Intra-Abdominal Abscesses: Emphasis on Image-Guided Diagnosis and Therapy. J Intensive Care Med 1998; 13(6): 320-328.

3. Ben Selma A, Genese T. Spontaneous Rectus Sheath Hematoma: An Uncommon Cause of Acute Abdominal Pain. Am J Case Rep. 2019 Feb 7;20:163-166.

4. Karapolat B, Tasdelen HA, Korkmaz HAA. Conservative Treatment of Spontaneous Rectus Sheath Hematomas: Single Center Experience and Literature Review. Emerg Med Int. 2019 Feb 21;2019:2406873.

5. Wittmann DH, Schein M, Condon RE. Management of secondary peritonitis. Ann Surg. 1996 Jul;224(1):10-18.

6. Sartelli M, Chichom-Mefire A, Labricciosa FM, Hardcastle T, Abu-Zidan FM, Adesunkanmi AK, et al. The management of intra-abdominal infections from a global perspective: 2017 WSES guidelines for management of intra-abdominal infections. World J Emerg Surg 2017; 12: 29.

7. Golash V. Rectus sheath abscess after laparoscopic appendicectomy. J Minim Access Surg. 2007 Apr;3(2):64-65.

8. Lin YT, Chen KC, Wang TL, Chong CF, Hung SW. Rectus sheath abscess caused by perforation of the small bowel by a fish bone. Journal of Acute Medicine 2013; 3(4): 152-154.

9. Hatjipetrou A, Anyfantakis D, Kastanakis M. Rectus sheath hematoma: a review of the literature. Int J Surg 2015; 13: 267-271.

10. Fitzgerald JE, Fitzgerald LA, Anderson FE, Acheson AG. The changing nature of rectus sheath haematoma: case series and literature review. Int J Surg. 2009 Apr;7(2):150-154.