

## CASE REPORT

# Spontaneous Ventral Hernia through the Rectus Abdominis Muscles

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## **ABSTRACT**

A hernia is a condition in which tissues or organs are abnormally protruding through a defect in the surrounding wall. We experienced a rare spontaneous ventral hernia that penetrated the right transverse abdominal fascia and rectus abdominis muscles.

A 92-year-old woman was admitted to our hospital with major complaints of right abdominal pain and some quadrant mass. She had no history of trauma and lower abdominal surgery. Computed tomography revealed that a protrusion of the hernia from the right lower abdominal wall. The hernia contents were small intestine, which penetrated the transverse abdominis fascia and rectus abdominis muscles. The herniation has been manually reduced. Elective surgery was performed 3 days later. The intraoperative findings indicated that the hernia sac was located around the middle of the rectus abdominis muscles in the right lower abdominal wall. Hernioplasty was performed using Bard Light PerFix Plug<sup>®</sup>. The patient fully recovered and was discharged 8 days after surgery. No recurrence was identified for 42 months during patient follow-up.

We presented a rare case of hernia, which was protruded through the rectus abdominis muscles. Intrinsic anatomical weakness of the abdominal wall and age-related muscle atrophy might have caused this rare hernia. This case report provides clinicians useful information for accurate diagnosis and successful treatments of this type of hernia in the elderly and contributes to identifying the anatomical features of some rare ventral hernias.

## **KEYWORDS**

Ventral hernia; Rectus abdominis muscles; Transverse abdominis; Fascia; Elderly

## **INTRODUCTION**

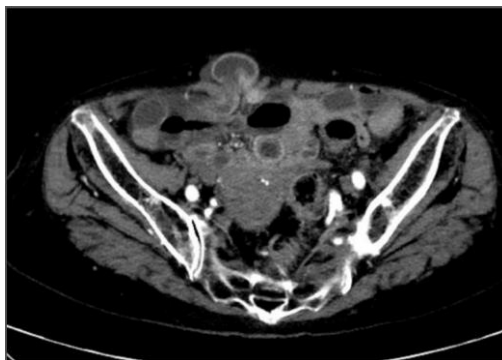
A hernia is a condition in which tissues or organs are abnormally protruding through a defect in the surrounding wall. It can occur congenitally or acquired, and the common types of hernia include inguinal, femoral, ventral, and incisional. Intraperitoneal, Richer and Littre hernias of the abdominal wall, as well as sciatic obturator and perineal hernias in the pelvis are also known, but those types of hernias are uncommon [1].

Here, we present a rare case of another type of hernia, a ventral hernia that penetrates the right transverse abdominal fascia and rectus abdominis muscles. There is no defect around the rectus abdominis muscles, which appeared to have a normal anatomy. This is the first case report of the rectus abdominis muscles hernia.

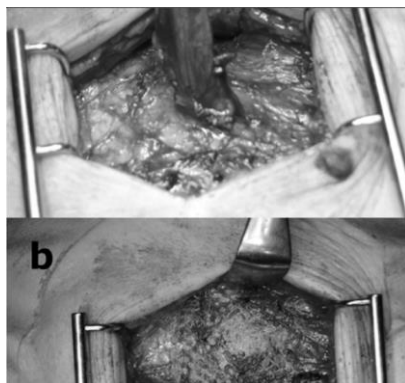
Written informed consent was obtained from the patient's daughter for publication of this case report and accompanying images.

## **CASE REPORT**

A 92-year-old woman was admitted to our hospital with major complaints of right lower abdominal pain and some quadrant mass. Her medical history included oral treatment for osteoporosis. The patient had a history of pregnancy but no history of trauma and lower abdominal surgery. She had no psycho-social history. On admission, the blood pressure, pulse rate and body temperature were 150/90 mmHg, 76 beats per minute and 36.7°C, respectively. Clinical examination showed a small mass about 2.0 cm × 2.0 cm on the right lower abdomen, with moderate tenderness around the mass. Physical examination did not reveal bowel obstruction. All laboratory findings were within normal limits, except for a slight increase of lactate dehydrogenase (261 IU/L). It was observed that the patient had neither drinking nor smoking. The patient's family history was non-contributory. Computed tomography (CT) of her abdomen demonstrated a protrusion of the hernia from the right abdominal wall (Figure 1). The hernia contents were small intestine, which penetrated the transverse abdominis fascia and rectus abdominis muscles. There was a slight dilatation of the bowel loops. The herniation has been manually reduced. There was no evidence of the bowel ischemia and elective operation was performed 3 days later. The intraoperative findings were an atypical ventral hernia. The hernia sac was located around the middle of the rectus abdominis muscles in the right lower abdominal wall. The defect size was 2.0 cm × 2.0 cm (Figure 2A). Hernioplasty was done using Bard Light PerFix Plug®. The defect was filled with Plug and covered by Onlay patch (Figure 2B). No defect was found on the contralateral site, and the left space was not repaired by any method. The patient recovered uneventfully and was discharged on postoperative day 8. No recurrence was identified for 42 months during patient follow-up.



**Figure 1:** Preoperative CT. CT investigation revealed protrusion of the small intestine from the right rectus abdominis muscle.

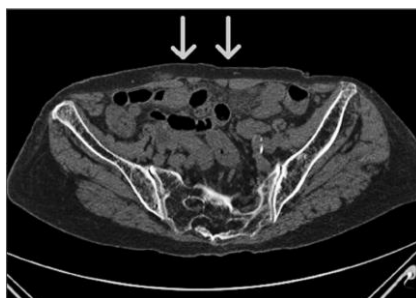


**Figure 2:** Intraoperative findings. A) Hernia sac was located around the middle of the rectus abdominis muscle. B) Hernioplasty was made using Bard Light PerFix Plug®.

## **DISCUSSION**

In clinical anatomy of the abdominal wall, the rectus abdominis muscles is protected by the rectus sheath. Above the arcuate line, the rectus sheath was formed by aponeurosis of inferior oblique muscles, external oblique muscles and transverse abdominis muscles. However, below the arcuate line, the sheath was completely lacking. These anatomical features make the abdominal wall below the arcuate line weaker when compared to other sites [2,3]. In addition, the patient presented here was 92-year-old, and her muscles may have progressively atrophied, as she grew older. In fact, in retrospect, CT one year before surgery showed that there was already a narrow space in the bilateral rectus abdominis muscles (Figure 3). We suggest this had developed. Aging and pregnancy could contribute expanding the space. Although there is a slight high-density area in the subcutaneous adipose tissue on the right rectus abdominis muscle, detailed interview about patient's medical history revealed that she had neither trauma nor surgery. Anatomical weakness of the abdominal wall and age-related muscle atrophy might have caused herniation from this space in the present case [4]. This type of hernia should be distinguished from Spigelian hernia as a differential diagnosis. Spigelian hernia is named after Adrian van der Spiegel, who depicted the semilunar line in 1645 [5]. The semilunar line is defined as the transition of the transverse abdominis muscle to its aponeurotic Tendon [6]. Spigelian fascia is located between the semilunar line and the lateral edge of the rectus abdominis muscle. Spigelian hernia is a spontaneous abdominal hernia caused by a defect in the Spigelian fascia. The characteristics of the hernia in our case, as well as similar hernias such as Spigelian hernia, incisional hernia and spontaneous posterior rectus sheath hernias are reported in Table 1. We indicate differences about the site of hernia orifice, etiology and the hernia sac position of each case. Spigelian hernia protrudes from Spigelian fascia and some cases cause congenitally [7]. Spontaneous posterior rectus sheath hernias are a type of interparietal hernias where the hernia sac lies between the various layers of the abdominal wall muscles and dose not penetrate into the subcutaneous tissue [1,8]. Etiologically, in addition to the similar to other type of hernias, posterior sheath components of linea alba to be thinner than the anterior components [9]. Colonal Plane CT demonstrates that the position relationship between a hernial orifice, the rectus abdominis muscles, the semilunar line and the Spigelian fascia. (Figure 4) We also showed the arcuate line where the inferior epigastric vessels perforate the rectus abdominis [10]. This location was found to be at a mean of  $2.1 \pm 2.3$  cm superior to the level of the anterior superior iliac spines [11]. The most common complications of abdominal wall hernias are bowel obstruction secondary to the hernia, incarceration, and strangulation [1]. CT is the gold standard for diagnostic modality due to its high sensitivity in diagnosing such complications [1]. For hernia treatment, Preoperative accurate diagnosis is very important. Most abdominal wall hernias are surgically repaired, considering the risk of development of

above-mentioned complication, even if asymptomatic [1]. Repair of the defect of abdominal wall entails fascial closure, or fascial suturing reinforced with synthetic mesh in the case of large defects [12,13]. Small hernia defects can be repaired only by laparoscopic herniorrhaphy [14]. Placement of sutures too close or too far from the defect margin and pulling sutures too tight can result in hernia recurrence [13]. However, in the current case, we performed open hernioplasty using Bard Light PerFix Plug® because of muscle weakness and fascial attenuation in the elderly. Preoperative knowledge of the type of the herniation, whether below the arcuate line or not, help preoperative planning to facilitate primary fascial repair, which can then be supported with on-lay mash, depending on the clinical situation [11]. An excellent anatomic layer-by-layer closure can be achieved using the anterior approach [15].



**Figure 3:** Previous CT. a narrow space among the bilateral rectus abdominis muscle was revealed 1 year before the CT.



**Figure 4:** Colonal CT. We demonstrate the location of: A) The semilunar line, B) The arcuate line, C) Spigelian fascia, D) Hernia orifice, E) Rectus abdominis muscles.

**Table 1:** The list with our case and other similar hernia cases.

	<b>Our Case</b>	<b>Spigelian Hernia</b>	<b>Incisional Hernia</b>	<b>Spontaneous Posterior Rectus Sheath Hernia</b>
<b>Orifice Site</b>	Rectus abdominis muscle below the arcuate line	Spigelian fascia below the arcuate line	Incisional scar	Posterior rectus sheath below the arcuate line
<b>Etiology</b>	Aging Anatomical weakness	Increase the intra-abdominal pressure Deterioration of abdominal wall Congenitally Anatomical weakness	Complication	Aging Posterior sheath components of linea albas thinner than the anterior Increase the intra-abdominal pressure Anatomical weakness
<b>Sac Position</b>	Protrusion into subcutaneous tissue	Protrusion into subcutaneous tissue	Protrusion into subcutaneous tissue	Lying between the various layers

We show the differences about the site of hernia orifice, etiology and the hernia sac position of each hernia.

**CONCLUSION**

To the best of our knowledge, this is the first case report of spontaneous trans-rectus abdominis muscle hernia. This is notable because hernia was located around the middle of the right rectus abdominis muscles. This hernia is associated with severe abdominal pain and incarceration. Therefore, prompt diagnosis and surgery are important

to achieve a successful outcome in the elderly patients. Surgeons should be aware of this very rare type of hernia and may be able to suspect it preoperatively on imaging studies. Principle of surgical repair of this type of hernia is using on-lay mesh.

### **ACKNOWLEDGMENT**

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### **CONFLICT OF INTEREST**

Not applicable. No conflict of interest between co-authors.

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