Ultrasonography and CT Findings of Epigastric Hernia: 3 Case Report

Hyun Kim, M.D., Si Won Kang, M.D.

This article presents a description of the ultrasonographic and computed tomographic findings with a discussion on the imaging features in three patients with epigastric hernias, simulating abdominal wall lipomas. Ultrasonogram showed a heterogeneous hypoechoic mass encircled by echogenic rim within subcutaneous space of the abdominal wall. Computed tomographic findings were a localized fatty mass surrounded by a thin capsule in association with a focal discontinuity of the linea alba. Ultrasonogram was not diagnostic, but computed tomogram was suggestive because of the well demonstrated focal defect in linea alba.

Index Words: Hernia
Abdominal wall
Abdomen, CT
Abdomen, US

Epigastric hernias are protrusions of abdominal contents through the interstices between the decussating fibers of the aponeuroses of the sheet muscles of the abdominal wall in the midline—the linea alba—between the umbilicus and the xiphoid process of the sternum (1). Epigastric hernias as well as Spigelian hernias occur with the lowest frequency among a variety of abdominal hernias, but their correct and prompt diagnosis is important as they are associated with a high rate of bowel obstruction and strangulation (1, 2). Generally, abdominal wall hernias are easily diagnosed by the ultrasonogram (US) and computed tomogram (CT) because of direct visualization of an abdominal wall defect itself and herniated abdominal contents including the bowel loop (3-8). However, they may cause diagnostic problems, particularly in obese patients or patients with scars, in those in whom a herniated sac produces between muscle layers, or in case of small hernias. Epigastric hernias can mimic abdominal wall lipomas if they do not contain bowel loop within the hernial sac. The authors described the US and CT findings of three cases of the epigastric hernias.

CASE REPORTS

Case 1
A 36-year-old woman suffered from a painful mass at the epigastric region of the abdominal wall that appeared to be gradually growing for 3 years. Physical examination revealed an approximately 5 cm sized, soft, tender mass at the epigastric region. US (Fig. 1) showed a well-defined, oval shaped, hypoechoic mass within the subcutaneous space of the abdominal wall, which contained multiple, small strand-like echogenicities without posterior acoustic shadow. No definite abdominal wall defect could be detected. At operation an ovoid, 5 X 3 cm sized, lobulated preperitoneal fat was herniated into the epigastric subcutaneous space through a small defect of the linea alba. The omentum and bowel loops were normal in position.

Case 2
A 45-year-old woman who had approximately 10 years history of a palpable, non-tender, abdominal mass with epigastric discomfort was admitted. Physical examination disclosed a localized smooth bulging of the abdominal wall at the epigastric region with a faint suggestion of a mass measuring approximately 3 X 4 cm. The mass was soft in consistency. US (Fig. 2a) showed a small, well-defined, slightly nodular hypoechoic mass with a central echogenic band in the
subcutaneous space of the abdominal wall, anterior to the left rectus abdominis muscle. Any defect of the abdominal wall could not be seen on US examination, however. CT of the abdomen (Fig. 2b) revealed that a localized fatty tissue passed through the abdominal wall defect and was encircled by a thin fibrous capsule, and was confined to the subcutaneous layer of the abdominal wall in association with a focal disruption of linea alba. At surgery, some preperitoneal fat and a portion of the falciform ligament were herniated into the subcutaneous fat space through a focal defect (approximately 1 cm in diameter) of the linea alba without definite protrusion of the omentum or bowel loop.

Case 3
A 52-year-old female patient was admitted with an adult fist sized, soft, palpable abdominal mass for several years. Recently, she has suffered from intermittent epigastric discomfort especially in the region of the abdominal mass. Abdominal CT (Fig. 3) showed an oval shaped fatty mass surrounded by a thin capsule within the subcutaneous space of the abdominal wall along with a focal defect of the linea alba. At operation, preperitoneal fat was herniated through a small defect of the linea alba.

DISCUSSION
The abdominal wall consists of skin, subcutaneous tissues, and a muscular layer, and is separated from the peritoneum by the transversalis fascia and extraperitoneal fat (9). The space between the transversalis fascia and peritoneum is the preperitoneal space, which is loosely filled with fat and fibrous tissue and is the internal analog of the abdominal panniculus (10). Epigastric hernias occur through defects in the midline linea alba at any site between the umbilicus and the xiphoid process, due to a structural congenital weakness of the linea alba or a lack of fibers at the midline decussation, allowing preperitoneal fat to herniate be-

Fig. 1. Ultrasnogram of anterior abdominal wall with a linear 7 MHz transducer shows an oval shaped heterogeneous hypoechoic mass within the relative echogenic subcutaneous fat space.

Fig. 2. a. Transverse abdominal wall sonogram shows an ovoid, well-defined hypoechoic mass with a central, band like echogenicity within the subcutaneous space of the anterior abdominal wall.
b. Consecutive CT scans of the abdomen demonstrate a focal defect of the linea alba in association with a localized fat tissue (arrow heads) at epigastric region of the anterior abdominal wall.
Hyun Kim, et al: Ultrasonography and CT Findings of Epigastric Hernia

between the gaps. The size of midline opening in the fascia is usually only a few millimeters, but wider defects are rarely seen. Usually only a small amount of preperitoneal fat and/or omentum protrudes through the defect. The smaller hernias may become painful because of strangulation of the herniated preperitoneal fat by being nipped by the sharp fascial edges of the opening. Omentum in the sac may also strangulate, in which case the hernia may become swollen, painful, and tender, and the overlying skin redens. Larger sacs commonly contain some omentum, small bowel, transverse colon, or even part of the stomach wall may be present. Larger hernia containing bowel may also strangulate, but this is rare (1).

The diagnosis of abdominal wall hernias is not usually difficult, although in obese people the typical smooth, rounded, midline, slightly tender lump may be lost in the depth of the subcutaneous fat. Several diagnostic methods have been described including electromyography, peritoneography, bowel contrast studies, tangential radiograph, US, and CT (3-8, 11).

US findings of abdominal hernias have been reported as highly echogenic structures that contained gas and cast an acoustic shadow. Herniated mesenteric fat also appeared as highly echogenic structures, more echogenic than the adjacent subcutaneous fat (3). In cases of large hernias containing bowel loops, it may be easily diagnosed because of well-visualization of the abdominal wall defect itself and hernial contents by the US. Although US can delineate the abdominal wall layers and muscle defect, we could not make a diagnosis of epigastric hernia with US in case 1 and 2 because of failure for detecting abdominal wall defect. However, utilization of higher frequency transducer with meticulous examination technique would possibly have demonstrated the abdominal wall defect. Thus care must be taken to ultrasonographically document fascial disruption for definitive diagnosis of abdominal hernia. Our cases of epigastric hernias had a very small sized hernial orifice and only contained preperitoneal fat tissue with/without herniation of the falciform ligament. Therefore we could not find the usual US findings, shadows for fluid and/or gas filled bowel loop, of abdominal wall hernias. Interestingly, in case 1, the herniated preperitoneal fat was seen as a heterogeneous hypoechoic mass on US as compared to the surrounding echogenic subcutaneous fat. It may be attributed to the fact that the herniated preperitoneal fat is edematous and looser than that of more compact subcutaneous fat. In fat, we frequently could see the hypoechoic preperitoneal fat at epigastric region during the abdominal US. In case 2, a central echogenic band within the hypoechoic herniated fat on US, which was consistent with central linear increased densities on CT, was confirmed as the herniated falciform ligament and folded peritoneal membrane at surgery. The hernial contents were surrounded by an echogenic rim on US. This surrounding echogenicity may be produced by different acoustic impedance of tissue layers (12), the already stretched aponeurosis (13), and fibrotic

Fig. 3. Serial CT scans of the abdomen demonstrate a localized fat tissue surrounded by fibrotic capsule, stretched aponeurosis, at epigastric region of the abdominal wall in association with a focal defect of the linea alba.
components of the hernial sac.

It is well known that the CT scanning is more accurate diagnostic method for abdominal wall hernias than other methods. On CT scans, a hernia sac protruding through the abdominal wall defect and containing bowel or fat is well identified. The density of the herniated fat shows the same attenuation with that of the adjacent subcutaneous fat tissue. Therefore, if hernia sac contains only pre- or peritoneal fat, it can be mistaken for an abdominal wall lipoma. (7)

In our cases, detection of a focally disrupted linea alba was only suggestive finding of epigastric hernias, which was clearly visualized on CT scan than sonogram did. Detection of focal defect in the linea alba was important in diagnosing epigastric hernia. If the defect of the hernia were very small, CT scan is more useful than US. We stress the fact that the abdominal hernias do not always contain bowel loops as in the cases with small epigastric hernias. One should be aware of the possibility of small epigastric hernia when abdominal wall mass is subtle. Thus care must be taken to ultrasonographically document fascial disruption for definite diagnosis of abdominal hernia.

Although the US is a useful diagnostic tool in the evaluation of abdominal wall hernia, it is imprecise in small epigastric hernia as described here. We recommend the use of CT when a suspected epigastric hernia cannot be diagnosed by routine methods.

REFERENCES


대한방사선의학회지 1995; 32(2): 303-306

상복부 헬리니아의 초음파 및 전산화단층촬영 소견: 3례 보고

1. 나서렛에수병원 방사선과, 2. 대전성모병원 방사선과

김현, 강시원

상복부 헬리니아는 복사근과 복직근의 갭이 융합한 백선에 발생한 알공을 통해 복부의 내용물이 흉골의 검상돌기와 배꼽사이의 구간에서 탈출된 복부 헬리니아의 일종으로, 장관의 폐쇄나 감돈을 잘 일으키는 드문질환이다.

저자들은 복벽의 지방종과 유사한 소견을 보였던 상복부 헬리니아의 초음파 및 전산화단층촬영소견에 대해 기술하고자 한다. 상복부 헬리니아의 초음파소견은 복벽의 피하조직층에 에코성 테두리에 둘러싸인 불규칙한 저에코의 종괴였으며, 이의 전산화단층촬영소견은 복부 중심부의 백선에 작은 알공과 함께 이를 통해 탈출된 복막전 지방조직이 압박된 피막에 의해 둘러싸여 복벽의 피하조직층에 발생한 지방증처럼 관찰되었다. 초음파소견보다는 전산화단층촬영소견이 상복부 헬리니아의 진단에 도움을 주었다.