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A RARE CASE OF ACQUIRED ABDOMINAL INTERCOSTAL HERNIA MANAGED LAPAROSCOPICALLY

General Surgery

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ABSTRACT

The protrusion of abdominal contents through intercostal spaces under an intact diaphragm is a rare disease phenomenon. We present a case of 52 years old male who presented to surgery outpatient department with swelling in the right upper abdomen. CT scan showed an intercostal hernia with bulging of the liver through it under an intact diaphragm. A laparoscopic approach with composite mesh and metal tacks was used to repair the defect successfully. This case report discusses clinical presentation, pathogenesis, complications, and treatment modalities of AAIH (Acquired abdominal intercostal hernia)

KEYWORDS

BACKGROUND

The herniation of an abdominal viscera through intercostal spaces under the intact diaphragm is a rare phenomenon. Only 19 such cases have been reported in the literature to date.[1] The cause usually identified is the weakness of the abdominothoracic musculature, which may be acquired or congenital. Such hernias can be categorized on the basis of their content (liver/small bowel/ large bowel/ gallbladder) or etiology (blunt trauma/ penetrating trauma/ congenital/ prior surgery). The knowledge and identification of this condition is important as it can cause significant discomfort and complications.

CASE PRESENTATION

A 52 years old male presented to surgery OPD (outpatient department) with the complaint of swelling in the right upper abdomen for three months [Figure1].

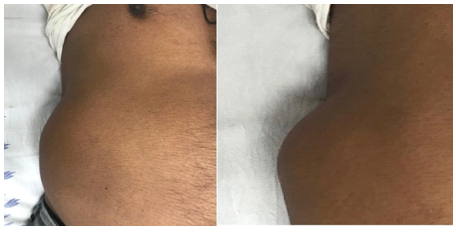

Figure1-Bulge showing abdominal intercostal hernia in lying position

The swelling was non-progressive, moving in and out with respiration and used to become prominent on coughing [Figure2].

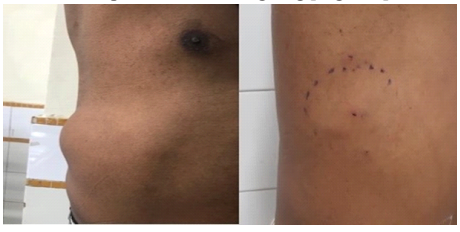

Figure2-Bulge showing abdominal intercostal hernia in standing position

The swelling was also associated with discomfort during breathing. The patient gave history of blunt trivial trauma on the right lower chest three years ago for which the patient took oral analgesics only. The injury was not associated with breathlessness and did not need hospitalization. No history of any prior surgery present. Past history was insignificant. However, the patient was a chronic smoker and had a history of productive cough for the last four months. The general survey was essentially normal except for increased body mass index (29.21 kg/m2). On local examination, swelling of 10 x 8 cm on the lateral side of right upper abdomen overlapping eighth to tenth intercostal spaces was noted. The swelling had well-defined margins, round in shape, firm in consistency, reducible with a positive cough impulse. Movement with respiration was also noted. The swelling reduced on expiration and became prominent on inspiration. On auscultation, no bowel sounds or breath sounds were heard over the swelling. The rest of the abdominal examination was unremarkable. Chest examination revealed a mild decrease in air entry in bilateral basal zone.

INVESTIGATIONS

Abdominal radiographs (upright and supine) were essentially within normal limits. Erect chest radiographs revealed few fibronodular opacities in bilateral upper zones with no evidence of any fracture or deformity of ribs. Contrast-enhanced CT showed old rib fractures of right eighth to eleventh ribs posteriorly with thinned out lateral abdominothoracic wall musculature in that area and focal bulge of liver parenchyma through it. There was no evidence of any diaphragmatic defect on CT [Figure3].

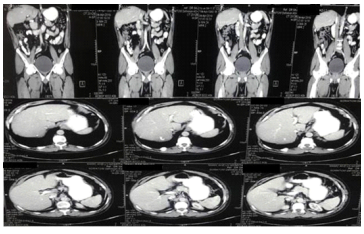

Figure3-CECT abdomen findings (coronal and axial view). Note made of weak abdominothoracic musculature and bulging of liver parenchyma through the intercostal spaces

DIFFERENTIALS

Based on history and clinical examination, a diagnosis of acquired intercostal hernia was made. Transdiaphragmatic intercostal hernia may resemble abdominal intercostal hernia but the presence of intact diaphragm ruled out transdiaphragmatic hernia. Lung hernias may also mimic AIH (Acquired intercostal hernia). Since the site of herniation was above the twelfth rib, a diagnosis of superior lumbar hernia was ruled out as it usually arises subcostal. The absence of any diaphragmatic injury or congenital deformity of the chest wall guided us to the clinical diagnosis of acquired intercostal hernia.

TREATMENT

The patient was planned for elective laparoscopic repair of the intercostal defect under general anesthesia. Patient was placed in right up and head-up position. Surgery was carried out using three ports

placed in infraumbilical, epigastric, and right lumbar region [Figure4]. Intraoperatively, a defect of 10x10cm in right eighth to tenth intercostal spaces was noted and the right lobe of the liver was seen bulging through the defect [Figure5]. Besides, indentations were seen on the liver due to the sliding of ribs [Figure6]. Laparoscopic mesh repair using composite mesh, secured with tacks, was done [Figure7,8]. The postoperative period was uneventful. The patient was allowed orally on postoperative day one and was discharged on postoperative day two.

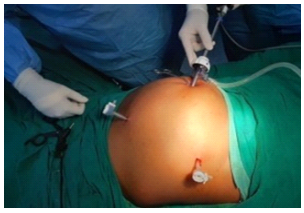

Figure4- Port sites (infraumbilical, epigastric and right lumbar region)

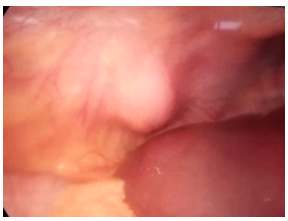

Figure5- Intercostal defect visualized from visceral surface

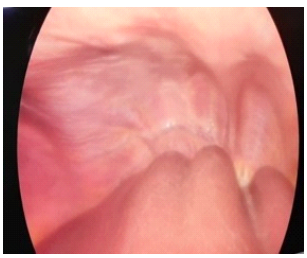

Figure6- Indentations of ribs over liver visualized laparoscopically

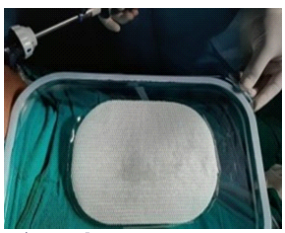

Figure7- Composite mesh

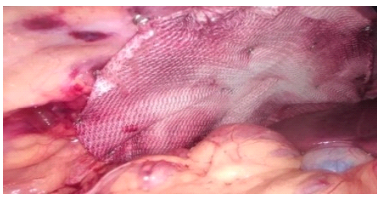

Figure8- Laparoscopic mesh repair

OUTCOME AND FOLLOW-UP

Postoperatively, the patient was relieved of symptoms with no swelling visible in the right upper abdomen. After six months, the patient was doing well with no evidence of any complication or recurrence. The patient is following up in surgery OPD on a biannual basis.

DISCUSSION

Acquired abdominal intercostal hernia (AAIH) is the protrusion of abdominal contents under an intact diaphragm through intercostal spaces. Importantly, it should be differentiated from transdiaphragmat ic intercostal hernia where herniation of viscera occurs through a defect in the diaphragm. If left untreated, strangulation of viscera may occur, so prompt diagnosis and appropriate surgical interventions are critical in these patients.

AIHs occur due to thoracoabdominal wall weakness, which is unable to resist the forces of visceral contents lying against it during variations in intraabdominal pressure. This pressure against the weak wall causes the defect to progressively enlarge and thus leads to the development of a hernia.[2] The major cause identified for such tissue weakness is major trauma (65% of all AAIH) including blunt forces, penetrating injuries, or deceleration injuries.[1,3,4] Rib fractures associated with such injuries may further exaggerate progression by causing direct mechanical damage of abdominal wall musculature by sharp ends of fractured ribs. Other mechanisms that might be responsible include collagen disorders and congenital conditions of chest wall like Poland Syndrome.[5,6] AAIHs occurring after abdominal surgery have also been documented. S.C. Wang and T.P. Singh reported a case of intercostal hernia which developed after open nephrectomy using flank incision.[7] However, it is found in many cases that patients develop symptoms years after trauma which suggests the role of predisposing conditions. In our case, CT showed old fractures of eighth to eleventh ribs. Factors like old age, diabetes, excessive weight loss, respiratory conditions are found to have a role in development in AAIHs.[8] Our patient also had a history of cough and smoking. A. Connery reported a case of AAIH after bouts of severe cough.[9] Several different vulnerable zones for herniation along intercostal spaces are defined. Weak zones lie anteriorly, due to lack of external intercostal muscle from costochondral junction to the sternum and posteriorly due to lack of internal intercostal muscle from the costal angle to vertebrae. In our case, hernia did not develop in any of these areas. Symptoms usually include bulge of the chest wall (85%) associated with pain and discomfort (76%).][1] As seen in our case, such swellings move with respiration commonly. Patients may present with complications like incarceration or strangulation of contents. Edema of the overlying tissue makes diagnosis difficult at first admission.[10] In suspected cases, the CECT abdomen and chest is required to confirm the diagnosis and help in planning definitive treatment. Surgical management is required in nearly all cases. Nonsurgical management is reserved only for high-risk elderly patients with multiple comorbidities. The decision is to be taken only after analyzing acuteness, type, and size of hernia with the patient's general condition. Various surgical approaches are defined but evaluation of each approach and comparison among them is difficult because of the lack of total number of cases reported. The direct approach consists of open thoracotomy using intercostal incision and closure of intercostal defects without the use of any abdominal incision. The indirect approach uses exposure of the visceral surface of the defect, reduction of hernial contents, and closure of intercostal defect from the visceral surface only. This can be achieved by doing laparotomy or by laparoscopic approach. Lastly, a combined method using both open thoracotomy and laparoscopic approach has been described in the literature.[11] The laparotomy approach is suited for emergencies like blunt trauma abdomen as it also allows the surgeon to assess for any other simultaneous intraabdominal injuries. The laparoscopic approach has its advantages of being minimally invasive, early recovery, and shorter hospital stay but requires greater expertise. Various techniques defined to repair the defect include meshes and patches or primary repair. Considering the advantages of laparoscopic repair, we preferred the laparoscopic approach. We placed a composite mesh which was fixed using tacks, to repair the defect. Some surgeons prefer fibrin glue, instead of tacks or sutures, to fix the mesh as it is thought to be associated with decreased postoperative pain.[1] Rarely, when the chest wall anatomy is distorted, as after major trauma with multiple ribs fracture and no reliable anchoring tissue is available around the large intercostal defect, it is found useful to place cable loops to approximate ribs which provide good anchoring tissue for the mesh.[10]

Irrespective of the approach used, recurrence rates as high as 28.6% have been reported.[1] Causes proposed for such recurrences include loosening of the sutures, missed diaphragmatic tear, or displaced jagged rib fractures causing diaphragmatic damage. A preplanned technique according to chest wall anatomy, identification of reliable anchoring tissues, and use of pericostal or transcostal non-absorbable sutures and prosthetic bridges over the defect is associated with a significant decrease in recurrence rate.[10] Further research is needed to identify the exact cause and effective methods to prevent a recurrence.

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