Case Report

Surgical Management with a Single Operation of Intrathoracic Appendicular Abscess: A Clinical Observation and Literature Review

Razafimanjato NNM¹*, Ravoatrarilandy M¹, Hunald FA², Samison LH² and Rakotovao HJL¹

¹Department of Surgery & Division of Thoracic Surgery, Teaching Hospital of Joseph Ravoahangy Andrianavalona, Madagascar
²Department of Surgery & Division of Visceral Surgery, Teaching Hospital of Joseph Ravoahangy Andrianavalona, Madagascar

Abstract

The authors describe the case of intrathoracic appendiceal abscess associated with right diaphragmatic hernia (hiatal hernia) discovered in a 52 years old woman. The surgical treatment consisted of conventional laparotomy appendectomy after reduction of paraoesophageal hernia into the abdominal cavity in the first time. In second time, we realized a pleural decortication using esophageal hiatus like an uniportal video-assisted thoracic surgery and at the end, reparation of paraoesophageal hernia. The clinical course was satisfactory. A review of the literature allowed us to understand and discuss the diagnostic and surgical approaches of this association of two pathological entities, benign and anodyne in its isolated and uncomplicated clinical forms. The available literature on intrathoracic appendicitis is reviewed.

Introduction

Acute intra-thoracic appendicitis associated with a right diaphragmatic hernia is an exceptional entity with high risk of complication as hernia strangulation and possible appendicular complication [1] including tension fecopneumothorax secondary to intrathoracic perforation of colon [2]. We report the case of a 52-year-old woman with febrile thoraco-abdominal pain secondary to an intrathoracic appendicular abscess. We demonstrate the safety and efficacy of using laparotomy and the defect diaphragmatic to perform simultaneously a conventional appendicectomy and pleural decortication using thoracoscopy with a single operation.

Case Presentation

A 52-year-old woman with a surgical history of minor blunt truncal trauma and conventional cholecystectomy 13 years earlier, was referred for non specific pain in the right thoracic region of the abdomen.

It was characterized by a sudden flare of pain so intense spreading in the right arm for which the patient consulted. The pain was relieved by antispasmodic and antalgic level 1. After 48 hours, the recurrence of symptomatology motivated her to refer at the emergency department. She had an increased temperature of 38.5°C. A clinical examination showed that the patient had pleuritic chest pain on the right side. The breath sounds were reduced on that side. The abdomen was not tender on palpation, and there was no guarding. Bowel sounds could be detected in all four abdominal quadrants. Blood tests showed leukocytosis (16,190 WBC/mm³) without other significant features. The C-reactive protein was also elevated, at 18.2 mg/dl (normal <0.5 mg/dl). Chest X ray showed homogenous radio-opacity with complete collapse of right lower lobe. Firstly, it was evoked a clinical and pathological picture similar to a pleural empyema but axial CT scan image confirmed a right-sided thoracic air-fluid level and minimal pleural effusion. Coronal CT scan image showed herniation of bowel loops in the right hemithorax through the large diaphragmatic defect. A strangulated diaphragmatic hernia was retained as a definitive diagnosis. The abdominal cavity was accessed by reopening the old upper median laparotomy. After a meticulous dissection of the adhesions, the hernial sac was carefully opened, which involved the reduction of paraoesophageal hernia into the abdominal cavity, and contained several loops of bowel, including the terminal ileum, ascending colon, cecum, and the appendix. The aetiology of the empyema was a perforated gangrenous appendicitis. Conventional appendicectomy was performed repair and right video-thoracoscopy completed the laparotomy for pleural decortication and effective drainage of the right pleural cavity. Pledgeted repair of of crural pillars by interrupted suture had completed the surgery procedure.
Surgical follow-up was relatively simple. Postoperatively, the patient had a daily chest physiotherapy and non-invasive ventilation session. The chest X-ray showed a good re-expansion of the right lung with disappearance of intra-thoracic herniation authorizing the removal of chest drains early on 3 days post-operatively. The patient was discharged from her hospitalization at J6 postoperative and was put on adapted antibiotherapy with cephalosporin of 3rd generation combined with an imidazole for 3 weeks. No recurrence was noted after 1 month of decline.

**Discussion**

**Table 1:** Data on all patients diagnosed with intrathoracic appendicitis within diaphragmatic hernia.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Age/ Gender</th>
<th>Mechanism</th>
<th>Symptomatology</th>
<th>Medical imaging</th>
<th>Surgical approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schellhaas E, et al.</td>
<td>54 y / F</td>
<td>Right-sided enterothorax probably caused by hemihepatectomy several years before</td>
<td>Fever Pleural syndrom</td>
<td>Thoraco-abdominal CT scan</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>Barakat MJ, et al.</td>
<td>43 y / F</td>
<td>Congenital diaphragmatic hernia in an adult marfanoid patient</td>
<td>Acute appendicitis</td>
<td>Thoraco-abdominal CT scan</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>Razafimanjato NNM, et al.</td>
<td>10 y / M</td>
<td>Morgagni congenital diaphragmatic hernias in a child with Down’s syndrome</td>
<td>Respiratory symptom Fever</td>
<td>Thoraco-abdominal CT scan</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>Margaret E Clark, et al.</td>
<td>22 y / M</td>
<td>Morgagni hernia</td>
<td>Douloure péri-ombilicale à type de crampe et de pesenteur Naussée, vomissement Fièvre</td>
<td>(C T) scans of the chest, abdomen</td>
<td>Laparoscopy</td>
</tr>
<tr>
<td>Fahed R, et al.</td>
<td>6 y / M</td>
<td>Right-sided Bochdalek hernia</td>
<td>Acute abdominal pain High Plasmatic C reactive (CRP)</td>
<td>Chest X ray Abdominal ultrasound Chest CT scan</td>
<td>–</td>
</tr>
<tr>
<td>Bettini A, et al.</td>
<td>76 y / M</td>
<td>Right Morgagni hernia with Paraesophageal hernia</td>
<td>Abdominal pain</td>
<td>Computed tomography (CT) scans of the chest, abdomen and pelvis</td>
<td>Upper midline laparotomy</td>
</tr>
<tr>
<td>C.E. Costa Almeida, et al.</td>
<td>49 y / F</td>
<td>Right-sided Bochdalek hernia</td>
<td>Severe respiratory failure Fever (38°C) Without abdominal complaints</td>
<td>Chest X ray Thoracic CT scan</td>
<td>Laparotomy by Kocher incision</td>
</tr>
<tr>
<td>Ashok Yadavrao Kshirsagar, et al.</td>
<td>12 y / M</td>
<td>Diaphragmatic hernia located retrosternally</td>
<td>Acute pain in chest and epigastric region Vomiting Afebrile</td>
<td>Chest X ray Gastrografin contrast</td>
<td>Trans-abdominal approach</td>
</tr>
<tr>
<td>Sema Aktaş, et al.</td>
<td>2 y / M</td>
<td>Diaphragmatic hernia after pediatric liver transplant</td>
<td>Fever, cough without respiratory distress, and abdominal pain with vomiting</td>
<td>Radiograph of the thorax Thoracoabdominal computed tomography</td>
<td>Previous right subcostal incision</td>
</tr>
<tr>
<td>Zerin JM, et al.</td>
<td>10 y / F</td>
<td>Left-sided Bochdalek hernia</td>
<td>Fever Nausea Peri-umbilical pain</td>
<td>Chest X ray</td>
<td>Laparotomie</td>
</tr>
<tr>
<td>Razafimanjato NNM, et al.</td>
<td>52 y / F</td>
<td>Minor blunt truncal trauma Paraesphagal hiatus hernia</td>
<td>Fever</td>
<td>Thoraco-abdominal pain</td>
<td>Laparotomy Transdiaphragmatic thoracoscopy</td>
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</table>

Acute intrathoracic appendicitis associated with a congenital diaphragmatic hernia of incidental discovery is a rare diagnosis. A systematic review of English and French medical literature was conducted from the PubMed and Google scholar databases. The search was performed as keywords with “intra-thoracic appendicitis” AND “diaphragmatic hernia” AND “intrathoracic appendicitis” AND “diaphragmatic hernia”. Eleven case reports with full text available have been reported since 1958 to date in the world literature including our case (Table 1).

CDH includes Bochdalek hernia (70%) in the posterior lateral and Morgagni hernia (25-35%) in the anterior or central (2-5%) part of the...
diaphragm [3]. Congenital Diaphragmatic Hernia (CDH) is caused due to abnormal formation of the muscular parts of diaphragm. The incidence of CDH in common births ranges from 1/25000 to 1/30000 [4]. In adulthood there are different causes of diaphragmatic hernia such as trauma, phrenic nerve paralysis, and delayed diagnosis of hiatus hernia as our observation [5].

Paraesophageal hiatal hernias account for approximately 14% of hiatal hernias. [6,7]. Our patient presented a right-sided abcess appendicular due to a large paraesophageal hernia. Herniation through a diaphragmatic hernia occurs for 3 reasons: pressure differential between abdominal and thoracic cavities; delayed healing caused by constant motion of the diaphragm; and thin musculature of the diaphragm [8]. In our case, the intrathoracic passage of the abdominal viscera is explained by the surgical history of minor blunt truncal trauma, congenital defect of fixation of the right colon and a large paraesophageal hernia unnoticed during the first intervention of cholecystectomy. Abdominal diseases associated with late-presenting congenital diaphragmatic hernia are often manifested by an atypical clinical presentation, which can be a source of delay and complication (gastric dilatation volvulus, occlusion) or error in diagnosis (differential diagnosis with pleuro-pulmonary infectious or myocardial ischemia) [9,10]. The situation of defect at the anterior part of esophagus may cause characteristic symptoms of chest pain, dysphagia, regurgitation, and occult bleeding [6,11]. Our case have typically presented with fever and thoraco-abdominal pain, which would be expected given that the inflammatory process is intrathoracic. Currently, tomodensitometry is the gold standard in visceral imaging and research of abdominal pathologies [2,9,12,13].

In our case, CT scan (Figure 1) obtained before the surgical consultation to emergencies unit proved to be beneficial given that it allowed us to suspect an abnormal location of the appendix, to perform better preoperative planning. It will avoid a diagnostic error as the case of observation reported by Bakarat et al. [14].

There is currently no consensus on the best surgical approach, partly because the condition is rare. The abdominal approach, whether laparoscopic or open, allows for easier reduction of hernia contents and easier evaluation and repair of intra-abdominal pathology [1,6,15]. Authors who advise for thoracotomy refer to the greater ease in separating adhesions between the thoracic viscera and the hernial sac [12,16].

In our patient, based on history surgical of our patient, we adopted for conventional surgery, an upper median laparotomy provided an excellent common access to the abdominal cavity, diaphragm and pleural space.

Only a few cases of intrathoracic appendicular abscess have been reported in the literature, and none clearly describe a laparoscopic or laparotomy to perform simultaneously a conventional appendicectomy and pleural decortication transdiaphragmatic through hiatus hernia with a single operation unlike cases reported by M. Kaifi and al. [2] or Oliveira and al. who advise a combined approach (laparotomy plus thoracotomy) [17]. Other authors recommended for defects larger than 20 to 30 cm2 to use mesh repairs in all cases congenital diaphragmatic hernia with delayed presentation [18]. Many materials have been used, including polypropylene, expanded polytetrafluoroethylene, and bovine pericardium [1,19]. Given our patient’s concomitant infectious process, we chose to repair the hernia defect primarily without mesh. Surgery is the treatment of choice, with a mortality rate of less than 4% for elective surgery and 32% for emergency surgery [12]. Patients with delayed manifestation of CDH have better prognosis than patient with early manifestation [18]. The outcomes of late-presenting CDH are usually favorable which are related to the absence of accompanying pulmonary hypoplasia and low incidence of other congenital malformations [10].

Conclusion

A paraesophageal hernia is a congenital defect that may obscure the diagnosis of common intra-abdominal pathology, particularly appendicitis. Systematic CT scan is recommended before an atypical clinical presentation of acute appendicitis. In any case, asymptomatic and symptomatic patients require surgery to avoid morbidity as a result of incarceration or compromise of abdominal contents in the chest as in this case. Thoracoscopy, laparoscopy, thoracotomy and laparotomy are all valid method but surgery approach depend especially at the surgeon preference. To our knowledge, this is the first case of intrathoracic appendicular abscess within paraesophageal hiatus hernia treated successfully with laparotomie and thoracoscopic transdiaphragmatic with a single operation.
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References


