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Case Report

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

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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 paraoesophagal hernia into the abdominal cavity in the first time. In second time, we realised a pleural decortication using esophageal hiatus like an uniportal video-assisted thoracic surgery and at the end, reparation of paraoesophagal hernia. The clinical course was satisfactory. A review of the literature allowed us to understand and discuss the diagnostic and surgical approches of this association of two pathologicals 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 intra-thoracic 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 recurence 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/mm^3) 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 paraoesophagal 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

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" or "intrathoracic appendicitis" AND "diaphragmatic hernia". Eleven case reports with full text avaible 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

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

Authors	Age/ Gender	Mechanism	Symptomatology	Medical imaging	Surgical approach
Schellhaas E, et al. Gangrenous intrathoracic appendicitis, a rare cause of right-sided chest pain: report of a case. Surgery Today. 2010	54 y / F	Right-sided enterothorax probably caused by hemihepatectomy several years before	Fever Pleural syndrom	Thoraco-abdominal CT scan	Laparotomy
Barakat MJ, et al. Necrotic gangrenous intrathoracic appendix in a marfanoid adult patient: a case report. BMC Surg, 2005	43 y / F	Congenital diaphragmatic hernia in an adult marfanoid patient	Acute appendicitis	Thoraco-abdominal CT scan Laparoscopy	Laparotomy
Parsons C, et al. Intra-thoracic appendicitis in a child with Down's syndrome J Pediatr Surg, 2013	10 y / M	Morgagni congenital diaphragmatic hernias in a child with Down's syndrome	Respiratory symptom Fever	Thoraco-abdominal CT scan	Laparotomy
Margaret E Clark, et al. Perforated Appendicitis Within a Morgagni Hernia: A Laparoscopic Repair Journal of the Society of Laparoendoscopic Surgeons. 2014	22 y / M	Morgagni hernia	Douleur péri-ombilicale à type de crampe et de pesenteur Nausée, vomissement Fièvre	(C T) scans of the chest, abdomen	Laparoscopy
Fahed R, et al. Appendicite aigue¨ intrathoracique : A propos d'un cas. Archives de Pédiatrie. 2012	6 y / M	Right-sided Bochdalek hernia	Acute abdominal pain High Plasmatic C réactive (CRP)	Chest X ray Abdominal ultrasound Chest CT scan	–
Bettini A, et al. Appendicitis within Morgagni Hernia and simultaneous Paraesophageal Hernia. BMC Surgery 2015	76 y / M	Right Morgagni hernia with Paraesophageal hernia	Abdominal pain	Computed tomography (CT) scans of the chest, abdomen and pelvis	Upper midline laparo tomy
C.E. Costa Almeida, et al. Adult right-sided Bochdalek hernia with ileo-cecal appendix: Almeida-Reis hernia. International Journal of Surgery Case Reports. 2013	49 y / F	Right-sided Bochdalek hernia	Severe respiratory failure Fever (38°C) Without abdominal complaints	Chest X ray Thoracic CT scan	Laparotomy by Kocher incision
Ashok Yadavrao Kshirsagar, et al. Acute appendicitis presenting as chest pain. International Journal of Surgery Case Reports. 2012	12 y / M	Diaphragmatic hernia located retrosternally	Acute pa in in chest and epigastric region Vomiting Afebrile	Chest X ray Gastrograffin contrast	Trans-abdominal approach
Sema Aktas, et al. Acute Appendicitis After Diaphragmatic Hernia After Pediatric Liver Transplant. Experimental and Clinical Transplantation. 2011	2 y / M	Diaphragmatic hernia after pediatric liver transplant	Fever, cough without respiratory distress, and abdominal pain with vomiting	Radiograph of the thorax Thoracoabdominal computed tomography	Previous right subcostal incision
Zerin JM, et al. Invest Radiol. Intrathoracic appendicitis in a ten-year-old girl. 1990	10 y / F	Left-sided Bochdalek hernia	Fever Nausea Peri-umbilical pain	Chest X ray	Laparotomie
Razafimanjato NNM, et al.	52 y / F	Minor blunt truncal trauma Paraesophagal hiatus hernia	Fever Thoraco-abdominal pain	Thoracic/Abdominal CT scan	Laparotomy Transdiaphragmatic thoracoscopy

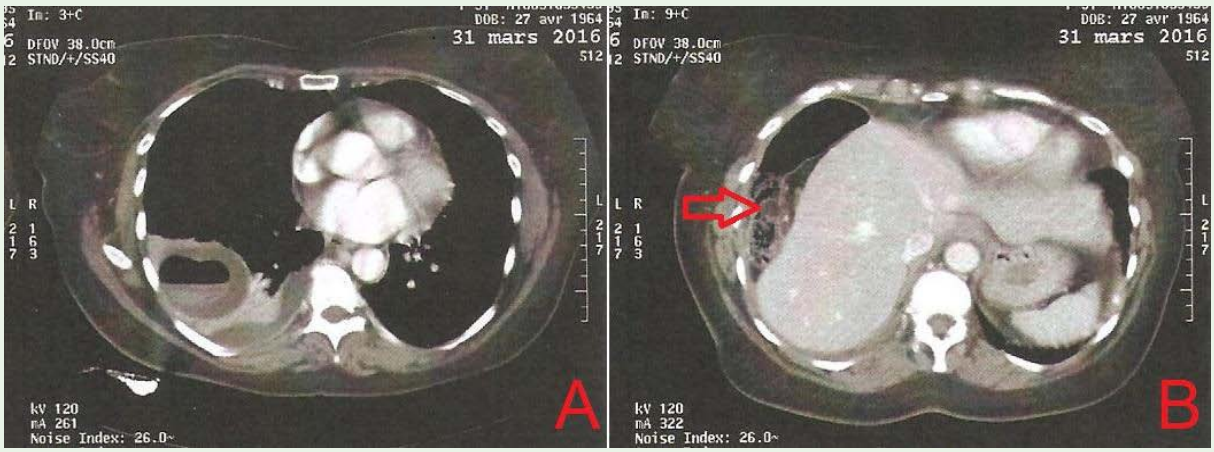

Figure 1: A: Axial computed tomography scans demonstrating right-sided thoracic air-fluid level and minimal pleural effusion corresponding to emphysema. B: Axial computed tomography scan with arrow showing appendiceal inflammation within paraesophageal hiatal hernia.

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 paraoesophagal hernia. Herniation through an 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 paraoesophagal 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 diagnoctic 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 abcess 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. Kafih 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 cm^2 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 paraesophagal hernia is a congenital defect that may obscure the diagnosis of common intra-abdominal pathology, particularly appendicitis. Systematic CT scan is recommanded 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 abcess within paraesophagal hiatus hernia treated succefully with laparotomie and thoracoscopie transdiaphragmatic with a single operation.

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