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journal homepage: www.casereports.comLaparoscopic cholecystectomy in adult with asymptomatic partial agenesis of the right diaphragm: Case report and the literature[☆]

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ABSTRACT

INTRODUCTION: The importance of unilateral diaphragmatic agenesis (DA) in adults for performing a laparoscopic cholecystectomy has not been well described in literature.

PRESENTATION OF CASE: A 60-year-old female patient entered our ward in March 2019 for laparoscopic cholecystectomy after 6 months history of epigastric pain and multiple episodes of biliary colic treated conservatively. She never complained of pulmonary symptoms. Preoperative chest Computed tomography (CT) was negative for diaphragmatic or pulmonary pathologies. Laparoscopic cholecystectomy was performed in 60 min with intraoperative detection of a thoracoabdominal communication with partial right hemidiaphragm agenesis. A chest CT and x-ray were performed in the postoperative period with progressive reduction of an asymptomatic small pneumothorax. The patient was discharged at home without complications on the fifth postoperative day. Thoracopulmonary surgery examination was performed without indications for diaphragmatic repair.

DISCUSSION: DA is a rare condition and usually occurs in early neonatal period. The congenital form occurs in 1 out of 2200–12500 live births and is traditionally divided into anterior (Morgagni's: 10%) and posterolateral (Bochdalek's: 90%) hernias. Chest and abdomen CT with coronal and sagittal reconstructions is the most effective and useful imaging technique for the diagnosis of diaphragmatic hernia. In literature there are former two case reports of asymptomatic DA in cholelithiasis in which laparoscopic cholecystectomy was performed effectively.

CONCLUSION: In adults with partial DA, laparoscopic cholecystectomy can be performed successfully. A conservative management only with gallstones dissolution therapy can be used if laparoscopy cannot be done. Further studies with a higher level of evidence are needed.

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1. Introduction

The importance of unilateral diaphragmatic agenesis (DA) in adults for performing a laparoscopic cholecystectomy has not been well described in literature. Congenital DA can be isolated or associated with other additional major malformations such as pulmonary defects, limb defects, cardiac defects, genitourinary anomalies, and central nervous system abnormalities [1]. Actually, in literature there are former two case reports of asymptomatic DA in cholelithiasis in which laparoscopic cholecystectomy was performed effectively [2,3]. In this case report we present a

patient with unknown asymptomatic partial agenesis of the right diaphragm discovered during laparoscopic cholecystectomy. This paper has been reported in line with the SCARE criteria [4].

2. Presentation of case

A 60-year-old female patient entered our ward in March 2019 for performing laparoscopic cholecystectomy for persistent postprandial epigastric pain and multiple episodes of biliary colic. At the remote pathological anamnesis: previous hospitalizations for lung bronchiectasis with pneumonia, uterine myomectomy for fibroids, laparotomy appendectomy and a cesarean section. The patient never complained of pulmonary symptoms and the physical examination revealed no alteration in the upper and lower limbs.

All laboratory parameters and liver function tests were normal. An upper abdominal ultrasound was performed on preoperative examinations and revealed cholelithiasis without dilation of the intrahepatic and extrahepatic biliary tract. So, she did not perform magnetic resonance cholangiopancreatography (MRCP).

Abbreviations: CT, computed tomography; DA, diaphragmatic agenesis; DH, diaphragmatic hernias; ERCP, endoscopic retrograde Cholangiopancreatography; MRCP, magnetic resonance cholelithiasis; BH, Bochdalek's hernia.

[☆] No patient or author details are included in all the figures.

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Fig. 1. Postanterior chest x-ray.

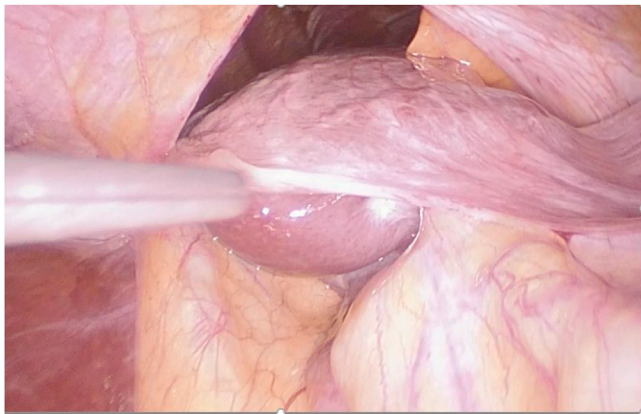


Fig. 2. Laparoscopic image of the detection of thoracoabdominal communication.

The chest x-ray revealed a sketch of the right hemidiaphragm and no other pathological alteration (Fig. 1). Preoperative chest Computed tomography (CT) was negative for diaphragmatic or pulmonary pathologies.

After CO₂ insufflation of the abdomen to 12 mmHg, trocars were inserted in supra-umbilical site for the camera, in subxiphoid site and two paraumbilical working ports. The laparoscopy revealed an intraoperative detection of a thoracoabdominal communication with partial right hemidiaphragm agenesis (Fig. 2). No abdominal organs were in thorax except that the gallbladder. Probably, the liver with a valve mechanism closes thoracoabdominal communication and the patient has never had respiratory symptoms. And the pneumoperitoneum opened the communication, and the gallbladder was herniated in the chest. Laparoscopic cholecystectomy was performed in 60 min. A right thoracic drainage with pneumoperitoneum exsufflation was placed (removed in fourth postoperative day) and an ultrasound check of the fully expanded lung was performed at the end of the operation.

A chest CT and x-ray were performed in the postoperative period with progressive reduction of an asymptomatic little pneumothorax and small right lung thickenings (Fig. 3). The patient was discharged at home without complications on the fifth postoperative day. Thoracopulmonary surgery examination was performed without indications for diaphragmatic repair.

3. Discussion

DA or diaphragmatic hernias (DH) are rare conditions and usually occurs in early neonatal period. There are two main types of diaphragmatic hernia (DH), congenital and acquired [5]. Chest and abdomen CT with coronal and sagittal reconstructions is the most effective and useful imaging technique for the diagnosis of diaphragmatic hernia [6].

Usually, acquired DH is rare, most of the cases are traumatic in origin, and the majority occurs on the left side of the diaphragm. Surgical repair is indicated for the treatment of traumatic DH [7,8].

The congenital form occurs in 1 out of 2200–12500 live births and is traditionally divided into anterior (Morgagni's: 10%) and posterolateral (Bochdalek's: 90%) hernias. The exact etiology of this pathology remains unknown. The most common type of congenital DH occurs in the posterolateral segment of the diaphragm, namely, Bochdalek's hernia. Many patients with Bochdalek's hernia (BH) are diagnosed at birth for life-threatening cardiopulmonary distress. Instead, in adults it is symptomatic only in 10% of cases [6].

In asymptomatic Bochdalek's hernia, the wait-and-see approach is preferable to surgical repair of BH, especially when there is no digestive tract herniation [6].

Studies of association of asymptomatic DA or DH and laparoscopic cholecystectomy are very few in literature and are all case reports. There are former two case reports of asymptomatic DA in cholelithiasis in which laparoscopic cholecystectomy was performed effectively [2,3].

Wakai et al. failed the laparoscopic cholecystectomy. The case of Wakai et al. [3] was similar to our case report because they performed a laparoscopy who revealed right hemidiaphragm agenesis with an elevated and rotated intra-thoracic liver. The gallbladder was not visualized at laparoscopy, precluding laparoscopic cholecystectomy. And five months later after the presentation of five days of jaundice and upper abdominal pain they performed non-operative management of cholecystocholedocholithiasis. Abdominal ultrasound revealed dilatation of intra and extra-hepatic bile ducts suggestive of choledocholithiasis. The patient had no other co-morbid medical condition, so they decided on conservative management with ERCP [3].

Sagioglu et al. described a patient with symptomatic cholelithiasis associated to agenesis of right hemidiaphragm and bilateral upper extremity malformations. The diagnostic tests demonstrated



Fig. 3. Postoperative computed tomography (CT), coronal view.

that her entire liver and some bowel loops were in the right hemithorax, suggesting right-sided diaphragmatic hernia. Laparoscopic cholecystectomy was performed in 45 min [2]. The case of Sagioglu [2] differs from our case because her patient had a congenital disease with congenital diaphragmatic agenesis and limbs malformation. Instead, in our case report, the patient was asymptomatic from birth for respiratory symptoms.

We present a case of a 60-year-old female patient entered to us in March 2019 for performing laparoscopic cholecystectomy with a partial asymptomatic agenesis of the right diaphragm discovered only during the operation. We confirmed the technical feasibility of the laparoscopic cholecystectomy in these types of pathology. Then, the surgeon had to do the adequate expertise to convert to open procedure if necessary. If the patient is not fit for surgery or the laparoscopy does not guarantee a correct visualization of gallbladder and the ductal system, it can be performed an exclusive conservative management with gallstones dissolution therapy with ERCP.

4. Conclusion

In adults with partial diaphragmatic agenesis, cholecystectomy can be performed successfully in laparoscopy. This the third case report in literature. Moreover, bile duct aberrations must be documented prior to surgery, and the surgeon should be able to convert to laparotomy if necessary. A conservative management only with gallstones dissolution therapy can be used if laparoscopy cannot be done. Further studies with a higher level of evidence and numerosity are needed.

Conflicts of interest

None.

Sources of funding

None.

Ethical approval

None.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Dario Bono: Conceptualization, Methodology, Software, Data curation, Writing - Original draft preparation Giovanni Arnone, Monica Suppo and Roberto Saracco: Writing - Review and editing, Supervision and Project administration.

Registration of research studies

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