

Laparoscopic mesh repair of a Bochdalek diaphragmatic hernia with acute gastric volvulus in a pregnant patient

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ABSTRACT

The advantages of minimally invasive therapy can be utilised in the surgical disorders of pregnant patients. To our knowledge, there has not been a previous report describing laparoscopic management of diaphragmatic hernia (with mesh) in pregnancy. A 23-year-old pregnant (second trimester) woman was admitted with vomiting, epigastric pain, oliguria and dyspnoea of one month duration. Investigations revealed posterolateral diaphragmatic hernia of Bochdalek with gastric volvulus. Successful laparoscopic meshplasty of the diaphragmatic hernia was performed without mortality or morbidity to both mother and child. Principles of laparoscopic surgery for diaphragmatic hernias remain the same. Pregnancy poses challenges to both surgeon and anaesthetist due to changes in the physiology. Acute diseases that threaten the life of mother and child have to be dealt with urgently. We conclude that even complex laparoscopic surgery during pregnancy is feasible.

Keywords: diaphragmatic hernia, gastric volvulus, laparoscopic surgery, pregnancy

Singapore Med J 2008; 49(1): e26-e28

INTRODUCTION

Laparoscopy was first used for evaluation of acute abdominal pain in pregnancy in 1980 by gynaecologists.⁽¹⁾ In a large series, Lachman et al analysed 518 pregnant patients undergoing surgeries and found that laparoscopic cholecystectomy was the commonest (45%), followed by adnexal surgery (34%) and appendicectomy (15%).⁽²⁾ Most Morgagni and Bochdalek hernias are found in children, and the incidence in adults is 5%. Bochdalek hernias are the most common congenital diaphragmatic hernias (CDH) in newborns, with the prevalence being one in 2,200 births.⁽³⁾

The incidence in pregnant patients is not known. In adulthood, Bochdalek hernias are diagnosed incidentally or when they become symptomatic. These hernias are one of the causes of secondary gastric volvulus. Surgical repair is indicated in all symptomatic adults.⁽⁴⁾ In 1848, Victor Alexander Bochdalek first described both right and left posterolateral CDH. The major problem in Bochdalek hernias is the posterolateral defect of the diaphragm. Bruscianno et al published a case report in 2003 of treating a pregnant patient with diaphragmatic hernia;⁽⁵⁾ the authors repaired the defect laparoscopically without a mesh and reported a good outcome.⁽⁵⁾ As far as we know, there are no reports in the literature describing a mesh repair.

CASE REPORT

The patient was a 23-year-old pregnant woman who had retching, oliguria and breathlessness for one month. She was in her sixth month (second trimester) of pregnancy. Initially, these symptoms were thought to be due to the pregnancy itself. She continued to express the symptoms in spite of treatment, and she was referred to us in June 1996. Upon examination, she was dehydrated, anaemic and poorly nourished. Complete haemogram, serum electrolytes (including calcium), urine analysis, liver function tests including prothrombin time, bleeding profile, blood grouping and X-matching were done. The abnormalities were hyponatraemia, hypocalcaemia, and hypochloraemia. Radiograph of the chest, abdominal ultrasonography and computed tomography (CT) of the chest revealed left-sided diaphragmatic hernia of Bochdalek with acute gastric volvulus (organo-axial type). The left chest was filled with the omentum, colon and stomach (Fig. 1), causing a mediastinal shift to the opposite side. The foetus was found to be healthy.

The electrolyte imbalances were corrected and after adequate preoperative preparation, the patient was scheduled for laparoscopic mesh repair of the posterolateral diaphragmatic hernia. Informed consent was obtained from the patient after explaining the need for surgery and the

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risks involved. The Hasson technique was used to create a pneumoperitoneum. Port placement was as follows: a 10-mm port for the telescope placed 3 cm above and left of the umbilicus; a 10-mm port placed along the left midclavicular line, parallel to the umbilicus for the right working hand; a 5-mm port placed in the midline 2 cm below the xiphisternum for the left working hand; a 5-mm port placed along the right midclavicular line just below the right subcostal margin for cephalad retraction of the liver; and an additional 10-mm port was placed 6 cm lateral to the right hand port for caudal retraction of the bowels using a Babcock grasper.

Laparoscopy revealed the gravid uterus in the pelvis (Fig. 2). A large left-sided diaphragmatic hernia was seen with a twisted stomach, part of the transverse colon and omentum in the sac. The stomach was untwisted and the contents were reduced gently using atraumatic graspers (Fig. 3). The stomach was found to have normal colour with only mild congestion. The colon and greater omentum

were also normal. Five seromuscular sutures were used along the greater curvature to fix the stomach to the parietal peritoneum. Similarly, a colopexy was also performed to fix the colon. The defect was found to be 5 cm × 4 cm in size. It was approximated with continuous 1.0 polypropylene sutures and then covered with a 10 cm × 15 cm size Parietex™ mesh. The mesh was anchored with interrupted 1.0 polypropylene sutures (Fig. 4). The gravid uterus was not touched or handled during any part of the procedure. The operating time was 125 minutes and there was no significant blood loss. She recovered smoothly from anaesthesia.

The patient was ambulant the same evening. She was started on a liquid diet orally on the second postoperative day (POD) after removing the nasogastric tube, placed on a semisolid diet on the third POD and discharged on the fourth POD. After the surgery, the patient had a smooth course of pregnancy and delivered a normal baby in September, 1996. The patient was followed up for eight years, and there was no evidence of recurrence to date.



Fig. 1 Barium swallow shows the colon and stomach in the left chest.

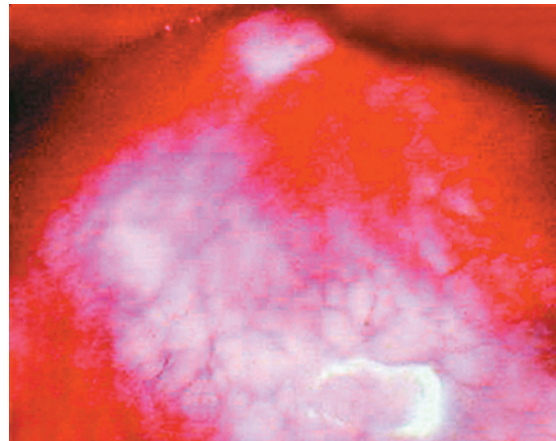


Fig. 2 Operative photograph shows the gravid uterus.

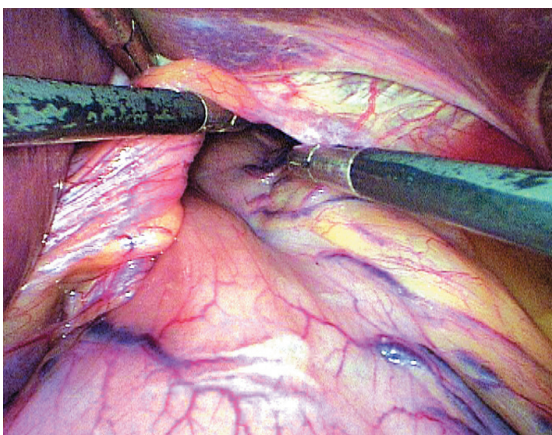


Fig. 3 Operative photograph shows the reduction of the contents of the diaphragmatic hernia.

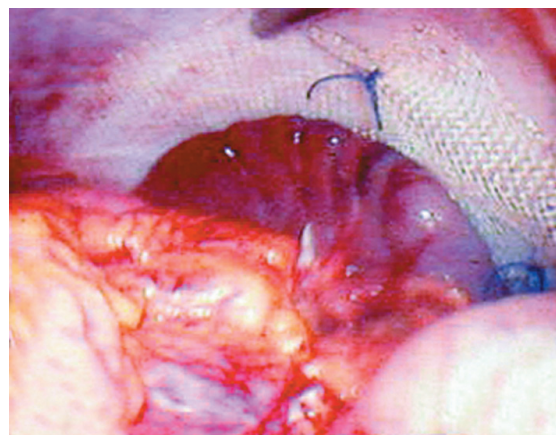


Fig. 4 Operative photograph shows the mesh anchored with polypropylene stitch. The spleen can be seen below.

DISCUSSION

Our patient presented a unique situation—symptomatic diaphragmatic hernia during the second trimester of pregnancy. It is unique because the patient's symptoms could be attributed to the pregnancy itself rather than diaphragmatic hernia. At the present time, in the literature, there are mostly case reports of Bochdalek hernias associated with gastric volvulus being repaired laparoscopically.⁽⁶⁾ The association of diaphragmatic hernias with pregnancy is even more rare. Laparoscopic surgery (defect closure with meshplasty) for this condition has never been described before, according to an Internet search. Generally, it is believed that the placement of a mesh is mandatory, while excision of the hernial sac and primary closure of the defect remains a controversial issue.

In our patient, a Parietex™ mesh was used as it is a composite mesh where the two surfaces are different, so reperitonealisation is not necessary. One surface is covered with a smooth film, and this surface faces the viscera during mesh placement. This is supposed to reduce postoperative adhesions. Polypropylene meshes are not to be used if they cannot be reperitonealised, as the risk of postoperative adhesion is much higher. In the case of diaphragmatic hernia in a pregnant patient, there is more chance of irreducibility and recurrence due to the negative pressure of the pleural cavity, inadequate closure of defect and increasing intra-abdominal pressure due to the growing uterus. We always suture the defect close in all our patients with diaphragmatic hernias. Gastropexy and colopexy were done to prevent recurrence of the volvulus; these can be performed before or after the meshplasty.

Physiological and anatomical changes introduce certain risks unique to the pregnant patient, some associated with laparoscopy. These risks are:

1. Poor visualisation due to the gravid uterus.
2. Uterine injury during trocar placement or Veress needle insertion.
3. Decreased uterine blood flow.
4. Premature labour from the increased intra-abdominal pressure.

5. Increased foetal acidosis or other unknown effects due to the CO₂ pneumoperitoneum.
6. Technical difficulty of laparoscopic surgery.⁽⁷⁾

Nasogastric tube suction and strict airway management were done to prevent aspiration. Electrocautery was used sparingly and the resulting smoke was immediately evacuated. Ideally, surgery should be done in the second trimester, after completion of organogenesis, because the risk of teratogenesis, preterm delivery and miscarriage is lowest in this trimester.⁽⁸⁾ If the patient presents in the late third trimester, surgery should be postponed to after delivery if possible. Laparoscopic procedures during pregnancy may be advantageous, particularly in upper abdominal disease in which visualisation and accessibility are not compromised by the expanding uterus. Other advantages are reduced narcotic use (less foetal depression), less postoperative pain, early return of bowel function, better cosmesis and diminished postoperative maternal hypoventilation. The indications for laparoscopic surgery have been slowly but steadily growing to include a wide array of diseases. We conclude that with the proper precautions, even complex laparoscopic surgery can be made safe during pregnancy, provided it is done in specialised centres by experienced surgeons.

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