Technical Innovation

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Laparoscopic morgagni hernia repair using single-site umbilical and full-thickness abdominal wall repair: Technical report of two cases

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ABSTRACT

Single incision laparoscopic surgery is used in many centres for routine cases such as appendisectomy, splenectomy and cholecystectomy. Morgagni hernias are uncommon and account for 1-2% of all congenital diaphragmatic hernia. We report our first laparoscopic repair of two Morgagni hernias, using a single umbilical incision and full-thickness abdominal wall repair with standard straight laparoscopic instruments. Operative time was short and compared favourably with the laparoscopic repair.

Key words: Morgagni hernia, laparoscopic, single incision

INTRODUCTION

Laparoscopic surgery has become a well-established approach for many paediatric surgical procedures. The natural evolution of this approach is towards the use of less and smaller incisions, to decrease the trauma of surgery and further improve cosmesis. Using only a single umbilical access has only recently gained popularity and is rapidly gaining ground. In paediatric surgery, the single incision method is mainly used for cholecystectomy and appendisectomy, but has recently proven to be safe and feasible for many other abdominal operations, including pyloromyotomy, splenectomy and adrenalectomy.[1-4] Usually this is a more difficult method than the standard laparoscopic method, because of the close alignment of the working instruments and camera.[3] The reward is, however, a great improvement in cosmesis and patient satisfaction.

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To our knowledge there is no report in literature on the use of single-site umbilical and full-thickness abdominal wall laparoscopic surgery for Morgagni hernia repair. We report our experience using this technique to treat two patients with Morgagni hernia.

PATIENTS AND METHODS

In 2011 two patients (two boys) ages nine months and two years respectively were referred to our institution for repair of their Morgagni hernia. Both hernias were diagnosed incidentally on chest X-rays for unrelated lung infections [Figure 1].

Surgical technique

After the introduction of general anaesthesia the patient was placed in the supine position. A horizontal skin incision was made through the umbilicus. We created a circumferential, prefacial plane.[5] Through this incision, using the Hasson technique, we then introduced a 5mm trocar through the umbilicus. A 35cm × 5mm 30° camera was introduced through this port and the abdomen was insufflated with CO_2 to 10mm Hg. We placed two 3mm working ports through separate facial incisions in the 3 and 9 o'clock positions, on both sides of the camera port [Figures 2 and 3]. In one patient we had to reduce the transverse colon which was incarcerated in the hernia, with the help of a 3mm bowel grasper. The falciform ligament was then separated from the anterior abdominal wall, using a Ligasure (Boulder, CO). For this procedure the 5mm camera was substituted with a 3mm camera to free the 5mm port for the Ligasure. In both patients, we left the sac of the hernia. Cauterisation of the edges of the Morgagni hernia was done to induce scar tissue, to reduce the incidence of recurrence. Camera illumination was used to mark the corresponding area of the skin. The skin was perforated with a 20-G needle and a 2.0 Ethibond (Johnson and Johnson) suture was passed through the abdominal wall. The needle was retrieved with a 3mm



Figure 1: Lateral chest X-ray showing bowel in the Morgagni hernia

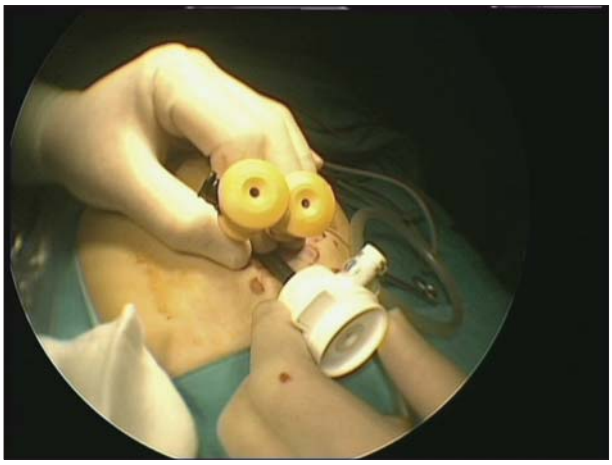


Figure 2: Single umbilical incision with a 5mm camera port and two 3mm working ports

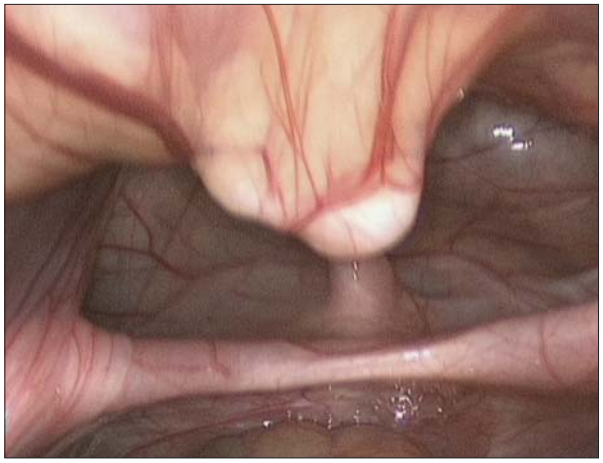


Figure 3: Laparoscopic view of Morgagni hernia

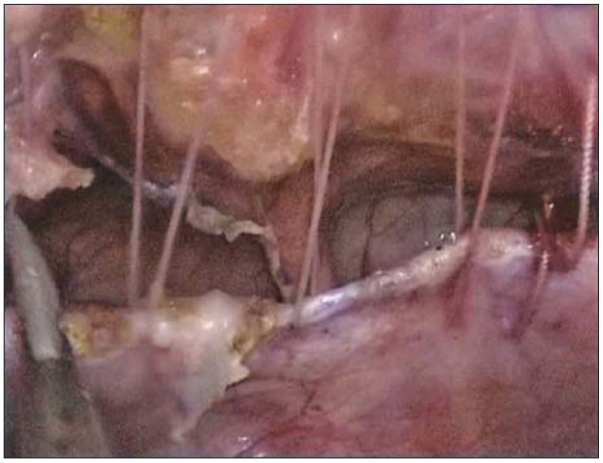


Figure 4: Interrupted sutures before tying

needle holder and then passed through the posterior edge of the hernia. An Endoclose device (Tyco medical; Mansfield, MA) was passed through the abdominal wall through the same skin opening, grasped and pulled to the outside. Five separate sutures were placed, and each was tied in the subcutaneous tissue [Figure 4].

RESULTS

Both operations were completed successfully with no intraoperative complications. Operative time was 55 min and 60 min respectively. Both patients were discharged the first postoperative day. Chest X-rays were taken after a month and showed no abnormalities in both patients. Both are currently asymptomatic, eight and nine months post-surgery.

DISCUSSION

Morgagni hernias are uncommon and account to only 1–5% of all congenital diaphragmatic hernia. Although most are asymptomatic, surgical treatment is recommended to prevent possible future complications.[6] Minimal invasive surgery is today the gold standard treatment. Different minimal invasive techniques are used, e.g. patch repair, primary suture closure or full-thickness anterior abdominal repair.[7] We favoured the last method, which included placement of a 5mm umbilical camera port and two 5mm ports placed right and left of the midline in the upper abdomen. Using the single incision umbilical approach, the core surgical steps are the same, but access to the abdomen is obtained through only one umbilical incision, through different placements of the ports. Roticulating or curved instruments are not necessary, and only two standard straight needle holders are used.

Cauterisation of the edges of the hernia was done in both cases to increase fibrosis to promote healing and minimise recurrence. Recent studies on inguinal hernia repairs indicate that traumatising of the edges might be beneficial towards total obliteration of the hernia.[8]

Despite the proximity of the instruments and limited triangulation, operating time is quick and compares favourably to the standard full-thickness anterior abdominal repair.

In conclusion, single-site umbilical incision and full-thickness abdominal wall repair for Morgagni hernia is an easy and effective alternative to the standard laparoscopic repair. It can be performed with operating time close to that of the conventional repair, with a good outcome and excellent cosmetic result.

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