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Massive, benign, cystic ovarian tumors: A technical modification for minimally invasive resection

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ABSTRACT

The majority of large, cystic ovarian tumors presenting in children are benign and amenable to ovarian sparing surgery (OSS). Laparoscopy is impractical in these cases and when attempted has been associated with a high rate of intraperitoneal fluid spill. We present a modified technique for controlled cyst decompression that allows delivery of the ovary through minilaparotomy and subsequent OSS. Criteria that must be met for the procedure to be undertaken are discussed.

The management of benign ovarian tumors has evolved from oophorectomy to ovarian sparing surgery (OSS). Given this change in practice it is important to define which lesions are amenable to OSS, given there is often preoperative uncertainty as to the diagnosis. While laparoscopy is clearly superior for smaller lesions in the pelvis, when used for very large masses, it becomes impractical for OSS and is associated with a high rate of intraperitoneal fluid spill. We present a modified technique for minilaparotomy, controlled cyst decompression and extracorporeal OSS that is easy, reproducible and safe. We discuss which lesions meet the criteria for attempting the procedure. Both patients described below gave written consent for their details and photos to be used anonymously. Ethical approval was gained through the SCHN Ethics and Governance Office; Reference number CCR2020/19.

1. Description of operative technique

A 14-year-old girl presented with a three-month history of progressive abdominal pain and distension. An abdominal ultrasound scan showed a large simple cystic lesion occupying the abdomen and pelvis. MRI demonstrated a large unilocular cyst, approximately 4.3 L, thought to be arising from the left ovary, with a claw of ovarian tissue seen posterolateral to the mass (Fig. 1). Ca-125, alpha-feto protein and beta-hCG were normal.

The patient was brought to the operating theater and following catheterization of the bladder, a 3–4 cm modified Pfannenstiel incision and Alexis® wound retractor (Applied Medical Technology, USA) were utilized to identify the anterior aspect of the cyst wall. A shortened size 6 nasopharyngeal airway was glued to the surface of the cyst (Fig. 2) using Dermabond® skin adhesive (Johnson & Johnson) and allowed to dry. A 16 g epidural needle was attached to suction and 6 l of straw colored fluid was aspirated without spillage (Fig. 3). Once the cyst was adequately decompressed the needle was removed and the nasopharyngeal airway was clamped to prevent spillage. The deflated cyst and ovary were then easily delivered into the wound (Fig. 4) and the cyst meticulously dissected free, using a combination of sharp dissection and monopolar cautery, preserving the ovary. The redundant thin ovarian capsule was sutured together with an absorbable monofilament suture to prevent future adhesions and returned to the abdomen. She made a satisfactory postoperative recovery and was discharged on postoperative day 3. Histology confirmed a benign serous cystadenoma. A follow up ultrasound eight weeks later showed the left ovary had reconstituted appropriately and was similar in size to the contralateral normal ovary (29 × 45 × 31 mm vs 16 × 30 × 42 mm) with no signs of recurrence and the patient was discharged from follow up.

An 11-year-old female presented shortly afterwards with a one year history of abdominal discomfort and distension. Tumor markers were

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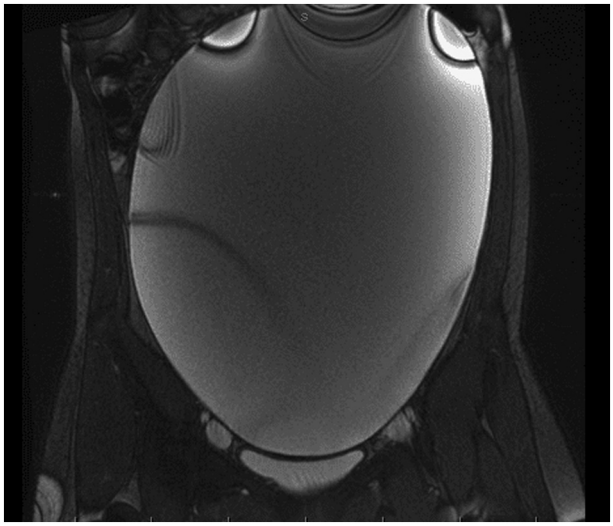

Fig. 1. MRI scan demonstrating large unilocular cyst (note image artifact from fluid volume).

again normal. Ultrasound demonstrated a massive cyst (15 × 11 × 18 cm) arising from the pelvis. MRI showed a mixed lesion arising from the left ovary with a solid component containing fat, suggestive of an ovarian teratoma. The same technique was used with no spillage of fluid and histopathology demonstrated a mature teratoma. A follow up ultrasound was performed at three months with no residual mass or recurrence seen.

2. Discussion

The majority of large ovarian masses in children are benign. In the past oophorectomy was often undertaken, but ovarian sparing surgery (OSS) is now standard of care, even for massive lesions.

OSS can be performed laparoscopically, with all the inherent benefits of minimally invasive surgery. However as ovarian lesions become larger (20 cm and above) laparoscopy becomes impractical. In the instance of a large cystic lesion that is likely to be benign, controlled cyst decompression via minilaparotomy followed by extracorporeal OSS is a more attractive option than major laparotomy.

Fluid rupture during removal of benign ovarian teratomas has led to adverse consequences such as granulomatous peritonitis [1], peritoneal strumosis [2], gliomatosis peritonei [3] and recurrence [4] so limiting leakage of fluid during removal is important. Some series have reported a 100% rate of intraperitoneal spill during laparoscopic cystectomy for ovarian dermoid cysts [5]. Preoperatively there is often uncertainty as to whether a tumor is benign or malignant and given there is evidence that larger tumors may have greater malignant potential [6], removing these large cysts without spillage is essential. Hence this technique

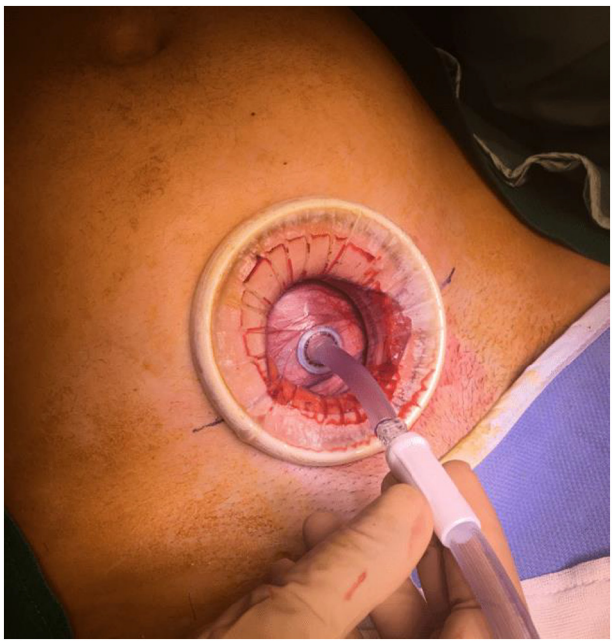

Fig. 2. Nasopharyngeal airway glued to surface of cyst with a soft tissue wound protector allowing good exposure through the small incision.

Fig. 3. Epidural needle utilized with suction via a nasopharyngeal airway to drain the cyst.

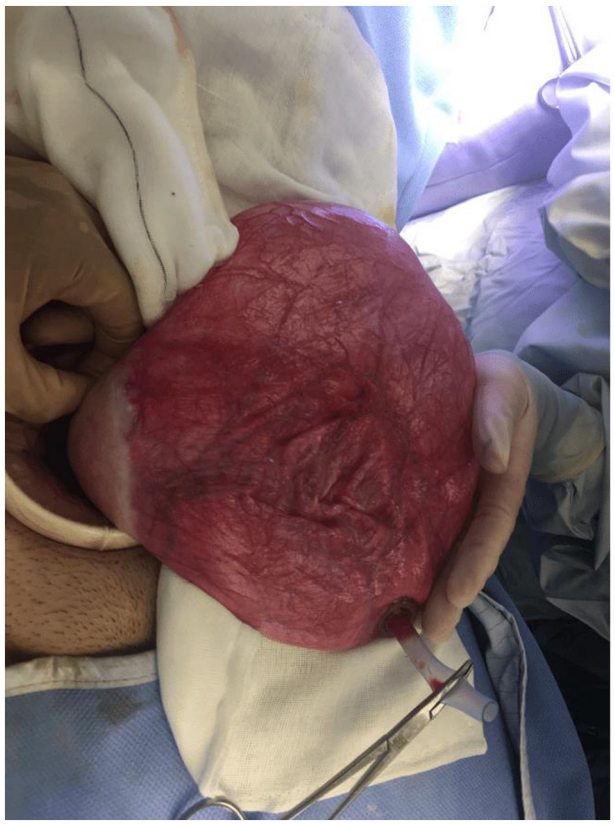

Fig. 4. Partially deflated cyst removed from abdomen via limited Pfannenstiel incision, with clamped nasopharyngeal airway seen at the inferior aspect.

may also be favorable for lesions extending out of the pelvis which are lying directly under the planned incision, when compared with a potentially difficult laparoscopic approach where fluid spill is likely.

Algorithmic pathways have been put forward to determine which lesions are appropriate for such techniques [6]. A number of benign pathologies can present with massive cystic lesions including cystic teratoma, mucinous cystadenoma, serous cystadenoma, borderline ovarian tumors, endometrial cysts and simple cysts.

This technique can be considered if the following criteria are met:

- Large cystic lesion, ideally unilocular, that lies beneath the planned minilaparotomy incision
- Tumor markers (aFP, bHCG, Ca-125, LDH) are normal
- No suspicious features for malignancy on ultrasound and MRI (vascularized septations, solid papillary projections, suggestion of invasion into contiguous structures etc)

Other reports have described techniques to minimize fluid leakage [7,8]; however, our technique of using a nasopharyngeal airway (NPA) glued to the tumor allows direct visualization of the cyst wall, allows the incision to be kept to a minimum and uses cheap and readily available materials. The long NPA and epidural needles ensure no fluid is spilt into the peritoneal cavity. This technique's application could be broadened to other operative scenarios where a spill-free method of fluid drainage is required.

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