Case Report

Minilaparotomy Approach for Giant Mucinous Cystadenoma of the Ovary in Children: Report of Two Cases

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Abstract: Mucinous cystadenomas (MCAs) are rare benign neoplasms in children. To the best of our knowledge, only 22 cases in children have been described. MCAs may reach huge sizes, and thus are not readily amenable to laparoscopic treatment due to the risk of rupture and the limited working space. We report two cases of giant MCA of the ovary treated by minilaparotomy. In case 1, a 12-year-old girl was admitted with abdominal pain and vomiting. Diagnostic imaging showed a large polycystic mass occupying nearly the whole abdominal cavity. With a provisional diagnosis of ovarian cyst, surgery was performed. The cyst was punctured under direct vision through a small subumbilical incision. After aspiration of 2,000 ml of mucinous fluid, laparoscopic examination revealed a tumor originating from the left ovary. Left oophorectomy was performed through an 8-cm incision in the left lower abdomen. The histopathological diagnosis was MCA. In case 2, a 15-year-old girl presented with slowly increasing abdominal distension over 5 months. A polycystic mass measuring 36×21×14 cm was evident on imaging. After drainage of 9,500 ml of clear mucinous fluid, right oophorectomy was performed through a small (5 cm) midline incision. The final pathology revealed a benign MCA. No recurrence has been detected for 2 years postoperatively in case 1 and for 6 years postoperatively in case 2.

Key words: giant ovarian tumor, mucinous cystadenoma, laparoscopy, minilaparotomy, child

Introduction

The etiologies of ovarian enlargement in children include functional cysts, ovarian torsion, and malignant and benign neoplasms1, although ovarian neoplasms account for only 1% of all tumors in children and adolescents2,3. Ovarian mucinous cystadenomas (MCAs) occur principally in middle adult life and are exceptional in children4,5, with only 22 reported cases in children to our knowledge5-8. MCAs may reach huge sizes9. With advances

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in laparoscopic surgical procedures and surgical equipment, laparoscopic surgery generally provides a safe, definitive treatment for patients with benign ovarian cysts. This minimally invasive surgery has been an acceptable technique for use in children. MCAs generally expand to become more bulky than serous cysts, and laparoscopy can be difficult for such ovarian masses due to the risk of rupture and the limited working space. Herein, we report two cases of giant MCA of the ovary in children treated by minilaparotomy.

Case Reports

Case 1

A 12-year-old girl was admitted to our hospital with abdominal pain and vomiting. Approximately 1 week before presentation, she developed abdominal distension. A large mass, arising from the pelvis and reaching up to the umbilicus, with a smooth surface was palpable. Physical examination revealed a satisfactory general health status, with normal blood pressure, heart rate, and body temperature. Hematological and biochemical profiles were all within normal ranges, including alpha-fetoprotein (AFP), quantitative β human chorionic gonadotropin (HCG), and carcinoembryonic antigen (CEA). Abdominal computed tomography (CT) showed a polycystic mass measuring approximately 25 cm in diameter (Fig. 1). Magnetic resonance imaging (MRI) confirmed a large polycystic mass occupying nearly the entire abdominal cavity with various signal intensity components (Fig. 2). CT and MRI both revealed a thin-walled cystic lesion with a smooth surface and without solid components. With a provisional diagnosis of ovarian cyst, surgery was performed. A small (1 cm) subumbilical incision was made, and the cyst was punctured under direct vision via a S.A.N.D. balloon catheter (Hakko Medical, Nagano, Japan). The cyst contents were aspirated as far as possible under ultrasonographic control. Two liters of mucinous fluid were drained, without spillage into the peritoneal cavity. A 10-mm trocar was then inserted into the same incision, and an additional 5-mm port was placed in the right upper abdo-
men. Under laparoscopic observation, the right ovary appeared normal, and the tumor was found to originate from the left ovary. A lateral incision of about 8 cm was made in the left lower abdomen to remove the ovarian cyst (Fig. 3). Left oophorectomy was also performed with the tumor removal. The final pathology revealed an MCA. The patient is being followed up regularly, with no recurrence 2 years after surgery.

**Case 2**

A previously healthy 15-year-old girl presented with slowly increasing abdominal distension over 5 months. No discomfort, pain, or other symptoms were noted. A smooth, soft mass occupying the entire abdomen was palpable. General physical examination and routine
blood tests were normal. Serum biochemical examinations, including serum CEA, CA 19-9, CA 125, CA 15-3, and CA 72-4, were all within normal limits. Abdominal ultrasonography showed a large multi-separated cystic mass. CT scans and MRI showed a smooth, thin-walled polycystic mass measuring 36×21×14 cm, without solid components. Surgery was performed with a provisional diagnosis of ovarian cyst. A small (5 cm) midline incision was made, and the cyst was decompressed using the S.A.N.D. balloon catheter (Figs. 4, 5). Needle puncture resulted in drainage of 9,500 ml of a clear mucinous fluid without spillage into the peritoneal cavity. The tumor was seen to arise from the right ovary. The patient
underwent right oophorectomy with tumor removal. The final pathologic diagnosis was MCA. The patient’s postoperative recovery was uneventful. There has been no evidence of recurrence 6 years after surgery with regular follow-up.

**Discussion**

Benign and malignant ovarian neoplasms are rare in children, with the incidence estimated at 2.6 cases per 100,000 girls and the majority of such neoplasms arising from germ cells\(^8,^{10}\). Less than 20% of ovarian tumors in children arise from the surface epithelium of the ovary\(^10\), with MCAs falling into this category of benign ovarian tumors. The peak incidence of ovarian MCAs occurs in women aged 30–50 years of age\(^11\). Approximately 95% of MCAs are unilateral and typically comprise multiple smooth-walled cysts of various sizes\(^12\). In general, ovarian masses tend to present with acute or chronic abdominal pain and abdominal distension\(^5,^8\). Because of the slow growth of MCAs, the symptoms tend to be milder and less specific\(^8,^{13}\). Macroscopically, they may reach huge sizes\(^9\), although size alone is not an indicator of malignancy\(^9\). Mucinous tumors are divided into benign, borderline, and malignant types\(^11,^{12}\), and 77–87% of all mucinous neoplasms are benign\(^9\).

Laparoscopy has become an accepted method of management for ovarian cysts, and its role is expanding. It offers distinct advantages, including improved postoperative recovery, and reduced morbidity and cost\(^11\). However, giant ovarian cysts that extend to the umbilicus and fill the abdomen risk perforation during trocar insertion and may limit the working space during laparoscopy, especially in children\(^14\). Mittal et al\(^11\) reported successful laparoscopic management of a large MCA of the ovary, but to the best of our knowledge, no reported MCAs have been excised by laparoscopic surgery in children. Laparotomy in such cases requires a larger incision, and in the present two cases, the oophorectomies were performed after drainage of the cysts by minilaparotomy. The puncture and aspiration of the tumor allowed us to perform oophorectomy through a minimal incision. In case 1, laparoscopic examination was useful to detect the origin of the cyst. If the surgeon is endoscopically experienced, a laparoscopic treatment may be considered, although the risk is tumor spillage. Therefore, we punctured the cysts under direct vision with a specially designed double-balloon catheter for aspiration to minimize such risks. This technique allowed the cysts to be decompressed under direct vision without spillage into the peritoneal cavity.

A S.A.N.D. balloon catheter has two balloons at the tip. Immediately after puncturing the cyst, the distal balloon is inflated, and then the proximal balloon is inflated while the distal balloon is retracted. The punctured cyst wall is sandwiched between two inflated balloons, thus preventing spillage into the peritoneal cavity while decompressing the cysts. This balloon catheter was originally designed by Ikuma and associates\(^15\) for aspiration of cyst contents in a laparoscopic cystectomy of benign ovarian cysts, and has recently been used for surgery\(^16\). In recent years, the minimal invasive surgery has become a widespread
practice. Both laparoscopic surgery and open minimal invasive surgery have been developed for children due to the smaller abdominal cavity.

When the risk of malignancy is high, this technique seems inappropriate. In cases where radiographic examination of a cyst determines a solid or complex mass with irregular borders, thick septations, and/or papillary projections, malignancy is a strong possibility and greater care should be taken. In our cases, there were no findings supporting malignancy. Therefore, the excisions after drainage were planned.

The prognosis for patients with ovarian mucinous tumors is excellent, because malignancy occurs in only 5–10% of cases. However, the possibility of recurrence should be considered, even with benign cysts, thus careful follow-up is important for patients following treatment for MCA.

In summary, we report two cases of giant ovarian MCAs in children that were excised after drainage of the cysts by minilaparotomy. Laparoscopy is difficult for giant ovarian tumors because of the risk of rupture and the limited working space. The excision of giant ovarian cysts by conventional laparotomy requires a larger incision. Minilaparotomy such as reported here is therefore useful because it generally causes less postoperative pain and a minimal abdominal scar. This simple and minimally invasive technique is thus potentially applicable to children with giant ovarian MCAs.

References

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