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Short communication

Transumbilical single-site laparoscopy takes the advantage of ultraminilaparotomy in managing an extremely large ovarian cyst

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ABSTRACT

Objective: The purpose of this article is to describe a new minimally invasive technique for an extremely large ovarian tumor.
Materials and Methods: From July 2010 to June 2011, three patients with large pelvic cystic tumor which extended up to or beyond the level of the umbilicus were recruited. All these patients were managed through a transumbilical 2-cm ultraminilaparotomy protected by the Alexis wound retractor and then combined with a single-port laparoscopy, which was accessed through three 5-mm cannulas fixed on the glove fingers. In ultraminilaparotomy mode and protection of spillage the tumor fluid was sucked out, and then the collapsed ovarian tumor was exteriorized for enucleation and repair. Finally the laparoscopic mode resumed for check-up and complete surveillance of the whole abdominal cavity.
Results: The procedures were completed uneventfully in all three patients, with a small amount of blood loss and shortened operation time. We found this approach offers the advantages of attentive prevention of tumor spillage and wound contamination over traditional laparoscopy, and a better cosmetic outcome and more comprehensive ability to manage the associated pathologies outside the reach of pure ultraminilaparotomy.
Conclusion: This application not only provides both advantages of ultraminilaparotomy and laparoscopy but it also overcomes the limitations of both approaches. Therefore, it is the surgical approach of choice for a patient bearing an extremely large ovarian cystic tumor.

Introduction

Traditional multiport laparoscopy has been a gold standard in the operation of benign ovarian tumors. However, in the management of an extremely large ovarian tumor, concern of cancer dissemination still exists because tumor capsules would sometimes rupture during manipulation, with inevitable spillage of tumor content. Single-port laparoscopic surgery is designed to perform a laparoscopic surgery with all the instruments in a single port, which goes through a 2-cm incision hidden in the umbilicus; this is to minimize the number of abdominal wounds while preserving the ability to operate within the whole abdomen. In other words, single-port laparoscopy can combine the advantages of both laparoscopy and ultraminilaparotomy in some selected situations. Based on this concept, we hypothesized that an extremely large ovarian tumor with cystic content would be ideally managed by combining the characteristics of ultraminilaparotomy and laparoscopy.

Materials and methods

From July 2010 to June 2011, patients with large pelvic cystic tumor extended up or beyond the level of umbilicus and required surgery in Chang Gung Memorial Hospital were recruited (Fig. 1A). The preoperative studies included, but not limited to, image studies of grey-scale and color duplex ultrasonography, computed tomography (CT) scan, and/or magnetic resonance imaging (MRI),

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biochemical studies of tumor markers, among others.[1] Only the patients with tumors that had tentatively benign characteristics would be included. Pregnant patients or those with malignancy were excluded in the present study.

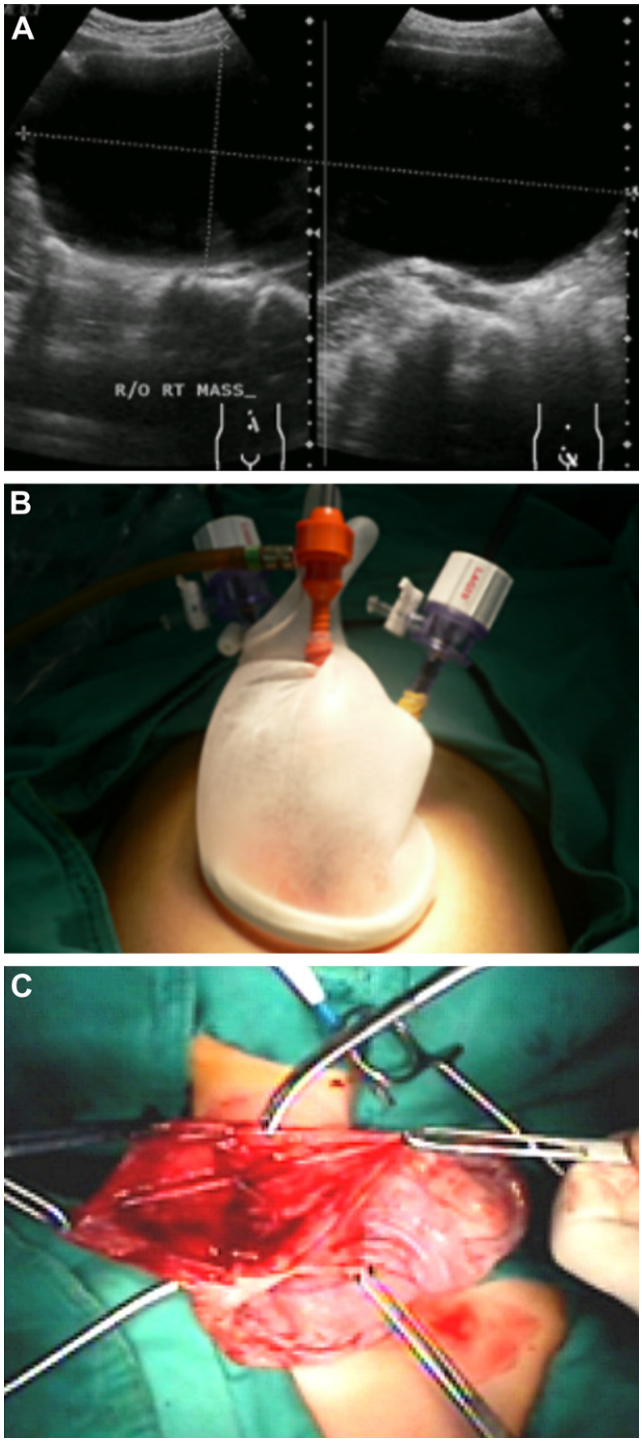

Fig. 1. (A) Ultrasonogram of a large cystic tumor that extended from the level of the pubic bone to above the umbilicus; (B) transumbilical single-site laparoscopy was performed first to exclude the possibility of frank malignancy; (C) ultraminilaparotomy mode was started by taking out the disposable glove. Under the protection of the wound retractor, the large cystic tumor was decompressed and taken out of the abdomen for enucleation and suture repair.

Surgical procedures

Under general anesthesia with endotracheal intubation, patients were placed in a lithotomy position with their legs bandaged and supported in the stirrups. The operation was begun in a 2-cm vertical incision in the umbilicus. The underlying abdominal wall was grasped by forceps and dissected by the scalpel to the peritoneal cavity. A small Alexis wound retractor (Applied Medical Resources Corp., Rancho Santa Margarita, CA, USA) was then inserted to maximize and protect the wound and the single-port laparoscopy was performed according to Kim et al[2]; in brief, a disposable surgical glove was draped around the rim of the wound retractor with three 5-mm cannulas introduced through the thumb, the middle, and the little fingers of the glove, respectively (Fig. 1B). After adequate pneumoperitoneum, a 30-degree telescope was first inserted through and a thorough survey was performed on the visible part of the tumor and peritoneum surface to exclude the possibility of frank malignancy. Then, the disposable glove was temporarily removed to expose the ovarian tumor under the umbilicus. In ultraminilaparotomy mode, a purse-string suture around 0.5 cm was made on the surface of the huge cyst, and an incision was made within the purse-string to insert the suction tip and drain out the serous content. After decompression with special care of avoiding any leakage, the ovary was taken out of the pelvis and followed by tumor enucleation and suture repair, under the protection of the wound retractor to avoid contamination of the spilled content, if any (Fig. 1C).

After the restoration of the remaining ovary, the disposable glove with cannulas was reapplied on the Alexis retractor, the pneumoperitoneum reestablished, and the single-site laparoscopic procedures resumed. The whole abdominal and pelvic cavity beyond the reach of the ultraminilaparotomy was checked and managed in the laparoscopic mode if any pathologies found. Finally, the procedures ended up with removal of the wound retractor and closure of the abdominal wall.

Results

Three patients with age ranging from 22 to 36 years and body mass index from 22 to 23.2 kg/m^2 were included to undergo the surgery. The demographic background, intraoperative data, and pathologic reports are given in Table 1.

All the tumors measured >25 cm in diameter. For a unilateral large cystic tumor, the operation time was around 1–2 hours. However, in Patient 2, there was a contralateral 8-cm endometrioma that was managed completely with single-port laparoscopy, causing a longer operation time of nearly 3 hours. There was no intraoperative or postoperative complications. The estimated blood losses were <50 mL and change of postoperative hemoglobin was less than −1.5 g/dL. The patient required only minimal oral analgesics postoperatively and recovered well. On follow-up examinations 1 week and 2 months after the operation, all patients demonstrated good healing of the umbilical wound.

Discussion

The present report demonstrated an approach combining both the characteristics of ultraminilaparotomy through the umbilicus and the advantages of single-port laparoscopy to deal with a large ovarian tumor extending almost to or beyond the level of umbilicus. This application offered the advantages of shorter operation time with attentive prevention of tumor spillage and wound contamination than the traditional laparoscopy, a better cosmetic outcome, and more comprehensive ability to deal with the associated pathologies outside the reach of pure ultraminilaparotomy.

Table 1
Demographic data and surgical outcomes.

Case no.	Age (yr)	Parity	C/S	BMI	Operation indication	Operation method	Operative time (min)	Blood loss (mL)	Hb change (g/dL)	BT	Pathology	Length of stay (d)
1	22	0	0	23.2	Right ovarian tumor (28 × 12 cm)	Enucleation	55	20	−1.1	No	Serous cystadenoma	3
2	36	2	1	22.0	Bilateral ovarian tumor (right: 26 × 24 cm, left: 8 × 6 cm)	Enucleation Adhesiolysis	169	30	−0.9	No	Endometriosis	3
3	29	0	0	22.5	Right ovarian tumor (28 × 26 cm)	Enucleation Adhesiolysis	137	20	−1.3	No	Endometriosis	3

BT = blood transfusion; BMI = body mass index; C/S = cesarean section; Hb = hemoglobin.

In the prevention of tumor cell spreading, we managed the ovarian cyst by sucking out the contents in a well-prepared setting of ultraminilaparotomy mode, including the purse-string sutures around the hole for suction of the content, as well as the indwelling of Alexis retractor to protect the surface of wound, to minimize the possibilities of contents dissemination and contamination. We also enucleated the large ovarian cyst with repair in the ultraminilaparotomy mode so that the operation time was obviously shortened. However, we did not choose to manage this case with merely a traditional ultraminilaparotomy, which was performed either with a 3–4-cm midline vertical or a modified Pfannenstiel incision.[3] Obviously, a 3–4-cm hole in the abdominal wall offers only a very limited range of inspection and approach without the assistance of laparoscopy, no matter where the incision wound is located. However, while ultraminilaparotomy was combined with the conception of single-port laparoscopy, the skin incision could be minimized to $\leq$2 cm and shifted to the umbilicus, which offered a much better cosmetic result and less postoperative pain, as one study found even less postoperative pain in the transumbilical single-port laparoscopy than in the traditional multiport laparoscopy.[4] Moreover, as single-port laparoscopy was successfully applied in treating ectopic pregnancies, benign adnexal, and uterine diseases,[2,5–7] it is feasible to extend the scope of the ultraminilaparotomy. In the practical experience in this case, the single-port laparoscopy provided detail inspection of the whole pelvis and surgical correction if any pathology or adhesion existed.

The application of this technique would be indicated only when the tumor is large enough in size. In our experience, the maximal diameter of a tumor should be 18 cm at least or equal to the level of 2 cm below the umbilicus. At this level, the tumor can be seen and palpable when the abdominal cavity is entered and be manipulated for volume reduction under a well-protected ultraminilaparotomy mode. In addition, if the tumor is free of adhesion, it can be easily exteriorized for operation. However, if adhesion exists, adhesiolysis can be performed with the single-port laparoscopy whenever the adhesion site can be reached after a partial reduction of volume and closure of the hole with the purse-string sutures on the cyst, then the remaining procedures can be completed either with ultraminilaparotomy or laparoscopy.

In conclusion, ultraminilaparotomy, which is protected with the Alexis wound retractor, can prevent unintended tumor rupture, content spillage, and wound contamination, while single-post laparoscopy offers better surveillance and operation ability in the whole abdomen. The single-post laparoscopy based on the transumbilical ultraminilaparotomy not only provides both advantages of ultraminilaparotomy and laparoscopy, but it also overcomes the limitations of both approaches. Therefore, for a patient bearing an extremely large ovarian cystic tumor, the single-post laparoscopy based on the transumbilical ultraminilaparotomy is an excellent surgical approach.

Disclosure

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References

1. Jacobs I, Oram D, Fairbanks J, Turner J, Frost C, Grudzinskas JG. A risk of malignancy index incorporating CA 125, ultrasound and menopausal status for the accurate preoperative diagnosis of ovarian cancer. *Br J Obstet Gynaecol*. 1990;97:922–929.
2. Kim TJ, Lee YY, Kim MJ, et al. Single port access laparoscopic adnexal surgery. *J Minim Invasive Gynecol*. 2009;16:612–615.
3. Wang PH, Liu WM, Fuh JL, Chao HT, Yuan CC, Chao KC. Comparison of ultraminilaparotomy for myomectomy through midline vertical incision or modified Pfannenstiel incision – a prospective short-term follow-up. *Fertil Steril*. 2009;91:1945–1950.
4. Yim GW, Jung YW, Paek J, et al. Transumbilical single-port access versus conventional total laparoscopic hysterectomy: surgical outcomes. *Am J Obstet Gynecol*. 2010;203:26e21–26.
5. Fagotti A, Fanfani F, Marocco F, Rossitto C, Gallotta V, Scambia G. Laparoendoscopic single-site surgery (LESS) for ovarian cyst enucleation: report of first 3 cases. *Fertil Steril*. 2009;92:1168. e1113–1166.
6. Savaris RF, Cavazzola LT. Ectopic pregnancy: laparoendoscopic single-site surgery – laparoscopic surgery through a single cutaneous incision. *Fertil Steril*. 2009;92:1170. e1175–1177.
7. Escobar PF, Bedaiwy MA, Fader AN, Falcone T. Laparoendoscopic single-site (LESS) surgery in patients with benign adnexal disease. *Fertil Steril*. 2010;93:2074. e2077–2010.