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Operative Laparoscopy in Treating Benign Ovarian Cysts

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Abstract

This study was undertaken to evaluate the clinical usefulness of operative laparoscopy in treatment of benign ovarian cysts. A retrospective study was carried on 468 operative laparoscopy cases performed from September 1995 to September 1998 at Yonsei University College of Medicine, Department of Obstetrics and Gynecology. Patient characteristics, specimen pathology, perioperative morbidity, and perioperative complications were reviewed. The percentage of operative laparoscopy increased steadily from 20.7% in 1996, 33.9% in 1997, to 49.7% in 1998. The mean age of patients was 33.66.5 (mean ± SD) years and the mean hospital stay was less than 2 days. Types of surgery performed were cystectomy (n=234), salpingo-oophorectomy (n=126), oophorectomy (n=63), and fulguration (n=45), in decreasing order. Depending on the pathology of the ovarian cyst, the mean operation time was in the range of 80 to 110 minutes. Perioperative complications included 5 cases of subcutaneous emphysema, 10 cases of abdominal wall hematoma, 7 cases of trocar site bleeding, 3 cases of bowel injury, and 1 case of bladder injury. In conclusion, operative laparoscopy in treating benign ovarian cysts provides advantages such as less need to perform laparotomy, smaller skin incision, less perioperative discomfort, minimal tissue handling and trauma, and shorter hospital stay. Nevertheless, the risk of unrecognized ovarian malignancy cannot be absolutely excluded, therefore careful patient selection is mandated.

Key Words: Operative laparoscopy, benign ovarian cysts

INTRODUCTION

The field of operative laparoscopy has experienced tantamount advances in operation technique and instruments, therefore replacing exploratory laparotomy in the management of benign gynecological diseases.[1] Operative laparoscopy encompasses many advantages such as smaller skin incision, less blood loss during operation, less pain after operation, shorter hospital stay, and shorter period of recovery after the operation.[1,2] In particular, benign ovarian cysts are one of the most common indications of operative laparoscopy, in which its efficacy has been proven.[2] In spite of the increasing popularity of operative laparoscopy in the field of gynecologic surgery, a pitfall exists in cases of underdiagnosed ovarian malignany resulting in improper treatment.[3] With this background, we surveyed 468 patients who underwent operative laparoscopy from September 1995 to September 1998 at Yonsei University College of Medicine, Department of Obstetrics and Gynecology.

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MATERIALS AND METHODS

Study population

Medical charts were studied for 468 patients underwent operative laparoscopy from September 1995 to September 1998 at Yonsei University College of Medicine, Department of Obstetrics and Gynecology with the indication of benign ovarian tumors. Preoperatively, the size and characteristics of the ovarian mass were confirmed by pelvic examination and ultrasonography, and the value of tumor markers such as CA-125 was ascertained. All the patients undergoing operative laparoscopy were informed about the operative procedure, possible intra and postoperative complications, and the possibility of exploratory laparotomy. Informed consent was obtained from all patients.

Materials

Operative instruments included CO_2 insufflator,

Table 1. Comparison of Case Numbers between Laparoscopy and Laparotomy over 3 Years

Duration	Laparoscopy	Laparotomy	Total	Laparoscopy/Total (%)
Sep. 1995 -Aug. 1996	92	353	445	20.7%
Sep. 1996 -Aug. 1997	149	291	440	33.9%
Sep. 1997 -Aug. 1998	227	230	457	49.7%

suction and irrigator, endoscopic camera (Wolf, Knittlingen, Werburg, Germany), Trocar and its sheath (Ethicon, Somerville, New Jersey, U.S.A.), grasping forceps, scissors, dissectors, Endo-GIA (US surgical, Norwalk, Conneticut, U.S.A.), Harmonic scalpel (Ethicon, Somerville, New Jersey, U.S.A.), Endoloop, and Endopouch.

Operative procedures

With the patient in lithotomy position and under general anesthesia, the abdomen, perineum, and vagina were prepped, painted with povidone-iodine, and draped in the usual manner after urinary catheterization. The uterine manipulator was inserted through the uterine cervix for convenient handling of the uterus. A 1 cm curvilinear incision was made in the skin of the lower umbilical depression with a scalpel. A Verres needle was inserted and advanced into the abdominal cavity at an angle of about 45 to 60 degrees. The abdomen was insuflated with CO_2 gas of about 2 liters to form an artificial pneumoperitoneurm reaching about intraperitoneal pressure of 8−12 mmHg. The Verres needle was removed and the trocar of the laparoscope was then inserted through the same incision site with a twisting motion. The trocar was removed and the laparoscope was inserted. Depending on the pelvic condition, varying numbers of trocar sites were made in the area of the lower abdomen. With the aid of a uterine manipulator, the condition of the pelvic cavity including pelvic masses were assessed with caution. During the operation, the bleeding sites were controlled with either monopolar or bipolar electric cautery. The endoloop and endo GIA were used as indicated. Ovarian cystectomy, oophorectomy, or salpingo-oophorectomy was performed on a case by case basis. Harmonic scalpel was used for the excision of ovarian tumor.

Table 2. Age Distribution

Age (Years)	No. of case	%
11−20	9	2
21−25	90	19
26−30	63	13
31−35	144	31
36−40	81	17
41−45	54	12
46−50	27	6
Total	468	100.0

The surgical specimen was obtained through the trocar puncture site either directly or using an endopouch for the prevention of specimen spillage in the peritoneal cavity, culdotomy site. If the specimen was very large, it was excised in pieces and removed through a 30 mm trocar. After operative laparoscopy, prior bleeding and suture sites were rechecked, and then the pelvic cavity was cleansed by saline irrigation. While removing the trocar, the peritoneal puncture site was rechecked for bleeding.

RESULTS

The total number of patients who underwent operations due to ovarian tumor from September 1995 to September 1998 was 1,342. Of these patients, 20.7% took operative laparoscopy in the first year, 33.9% in the second year, and 49.7% in the third year of this study, showing a steady increment (Table 1). The mean age of patients taking operative laparoscopy was 33.66.5 years (Table 2). The most common pathology of the ovarian cyst obtained through operative laparoscopy was endometrioma being 61.5%,

dermoid cyst 25.0%, functional cyst 7.9%, serous cystadenoma 3.4%, mucinous cystadenoma 1.0%, fibroma 0.8%, and borderline ovarina tumor 0.2%. No case of ovarian malignancy was observed (Table 3).

Comparing various characteristics according to the pathology of ovarian cyst, there was no difference in the mean age, but the parity was lower in cases of endometrioma, suggesting the possibility of infertility with patients having endometrioma. Most operative laparoscopy was undertaken in ovarian tumors of less than 8 cm in diameter. The diameter was smallest in cases of endometrioma, but no statistical significance was noted. The operation time was longest in cases of endometrioma, probably due to adhesion formation, and accordingly the mean hospital stay was the longest in endometrioma (Table 4).

Considering the types of operative laparoscopy undertaken, 50.0% was ovarian cystectomy, 13.5% was oophorectomy, 26.9% was salpingo-oophorectomy, and 9.6% was fulguration. Ovarian cystectomy was the preferred method in cases of endometrioma, whereas salpingo-oophorectomy was most commonly performed in cases of dermoid cyst (Table 5). In performing ovarian cystectomy, the cyst was carefully separated from the normal ovarian tissue, avoiding its rupture as much as possible. Unfortunately, due to previous adhesion formation, this separation process was not that easy in cases of endometrioma, resulting in cyst rupture. In cases of cyst rupture, the spilled material was suctioned and the capsule of the cyst was carefully reviewed to rule out ovarian malignancy.

Table 3. Pathology of Ovarian Cyst

Pathology	No.
Endometrioma	288 (61.5%)
Dermoid	117 (25%)
Functional	37 (7.9%)
Serous cystadenoma	16 (3.4%)
Mucinous cystadenoma	5 (1.0%)
Fibroma	4 (0.8%)
Borderline	1 (0.2%)
Malignancy	0

Table 4. Comparisons according to the Pathology

	Endometrioma	Dermoid	Mucinous	Serous	Borderline
N	288	117	5	16	1
Age (years)	32.9±1.2	33.6±2.9	34±1.9	37±2.9	29
Parity	0.5±0.2	1.3±0.4	1.5±0.5	1.3±0.5	0
Size (cm)	5.3±0.3	6±0.6	7±0.5	7±0.6	6
Unilateral : Bilateral	77 : 23	7 : 3	4 : 1	13 : 3	–
Op. Time (min)	103±8.0	83±6.8	97±5.8	95±5.9	–
Blood loss (cc)	113.8±15.1	67.8±16.6	128±17.5	131±10.2	–
Hospital stay (days)	2±0.3	1.1±0.1	1.5±0.1	1.5±0.2	–
Conversion (%)	6%	0	0	0	–

Mean±SD.

Table 5. Types of Operation

	N (%)	Endometrioma	Dermoid	etc
Cystectomy	234 (50%)	195	27	12
Oophorectomy	63 (13.5%)	42	18	3
Salpingo-oophorectomy	126 (26.9%)	39	72	15
Fulguration	45 (9.6%)	12	–	33

Table 6. Complications of Laparoscopic Surgery

Complications	No.
Subcutaneous emphysema	5
Abdominal wall hematoma	10
Trocar site bleeding	7
Bowel injury	3
Bladder injury	1

The obtained surgical specimen was retrieved outside the pelvic cavity directly through the trocar puncture site, but in 82 cases of dermoid cyst, an endopouch was used to avoid specimen spillage. The culdotomy site was also used to obtain the specimen in 17 cases, while in 18 cases with very large ovarian tumors, the specimen was excised in pieces and retrieved through the 30 mm trocar sites. The operative complications included 5 cases of subcutaneous emphysema, 10 cases of abdominal wall hematoma, 7 cases of trocar site bleeding, 3 cases of bowel injury, and 1 case of bladder injury (Table 6). All cases of abdominal wall hematoma were repaired under laparotomy setting, and all of the bowel and bladder injuries were treated with primary suture without remaining sequalae.

DISCUSSION

With advances in operative laparosocpy instruments, operation techniques, and accumulated experience, several study results have been reported for the operative laparoscopy in the treatment of adnexal masses.[1-5] In 1910, a Swedish doctor named Jacobaeus looked into the abdominal cavity with a cystoscope and named it "laparoscopy". With the developing technology of light sources and CO_2 gas supply, Semm et al. systematized operative laparoscopy and named the procedure "Pelviscopy".[4] The real advancement in the field of operative laparoscopy came in the 1980s with the development of technology, therefore replacing previously held laparotomy to operative laparoscopy.

The procedures that can be performed under operative laparoscopy include ectopic pregnancy in the adnexa, adnexal masses such as benign ovarina cysts and endometrioma, adhesiolysis, tubal reconstruction, myomectomy, and retrieval of foreign bodies in the pelvic cavity. Among the above-mentioned procedures of operative laparoscopy, adnexal masses are one of the most commonly held indications, and at the same time it encompasses many controversies. The reason may be explained by the uncommon but fatal consequences of ovarian malignancies discovered after operation. Therefore, for the safe and proper application of operative laparoscopy, careful history taking, thorough physical examination, ultrasonography, Doppler ultrasonography, and tumor markers such as CA 125 should be not omitted before the operation.[6-11] De Wilde et al. pointed out the importance of thorough observation during the operation and routine examination of the specimen in frozen section to rule out the possible existence of malignancy.[12] Although the gross appearance is benign, about 0.4% has been reported to be malignant.[12] Maiman et al. proposed relative contraindications of operative laparoscopy including previous history or previous family history of ovarian cancer, breast cancer, endometrial cancer, and colon cancer.[5]

Ultrasonography can be another useful tool in differentiating benign and malignant adnexal lesion. Irregular borders, solid areas, papillae and thick septa are some of the characteristics suggesting malignancy in the ultrasonographic image of adnexal lesion.[6] Using transabdominal ultrasonography, the bladder has to be filled to create an acoustic window, and the images obtained are comparatively obscure resulting in a low sensitivity in predicting malignancy. In transvaginal ultrasonography, the transducer is comparatively close to the lesion examined, therefore creating a high resolution image.[8] Adding color flow Doppler study, the accuracy of predicting malignancy can be improved with statistical significance.[9] Hermann et al. reported the sensitivity of predicting benign ovarian cysts to be 92−96% using transvaginal ultrasonography and color flow Doppler.[6]

Various tumor markers have been used in the field of gynecology. For the screening of serous epithelial tumors, CA 125 is known to be the most useful marker, and combined with ultrasonography, the negative predictive value may reach 100%.[7] Unfortunately, in cases of pregnancy, endometriosis, adenomyosis, myoma, teratoma, and pelvic inflammatory disease, elevation of CA 125 is also noted, resulting in a high false-positive rate. The value of CA 125 is more important in postmenopausal women, nevertheless, it can also be used in premenopausal women for differentiating benign from malignant adnexal lesions, as well as setting the baseline value and follow-up.[13]

Parker et al. have reported the pelvic examination findings of malignant ovarian tumor to be fixed, bilateral, and irregular-surface adnexal masses accompanying ascites.[11] De Wilde et al. pointed out the importance of ovarian tumors of greater than 8 cm diameter as having a strong suggestion of malignancy.[12]

Cystectomy, oophorectomy, salpingo-oophorectomy, aspiration, and window formation are some of the

methods performed in the treatment of ovarian masses, but Fromholt Larsen et al. suggested the danger of performing aspiration and window formation because of the possibility of ovarian malignancy in grossly benign-looking adnexal masses.[14] Hsiu et al. reported a case in which metastatic ovarian malignancy was found in the trocar puncture site.[15] Benign teratomas encompass the risk of chemical peritonitis when the inner materials are spilled in the pelvic cavity, but using the endopouch, this spillage can be protected and lavage with saline might also be helpful in preventing chemical peritonitis.[16]

There have been many studies performed so far on the effect of capsule rupture in 5-year survival of ovarian malignancies, and many reports have confirmed that immediate operative care may help to avoid the hazardous effects of capsule rupture.[17-19] Meticulous evaluation of ovarian malignancy before operation, adequate usage of aspiration and frozen section during the operation, and immediate transition to exploratory laparotomy in suspected malignancy may prevent mistreatment of malignant ovarian cancer.

Operative laparoscopy is gaining its popularity in the field where laparotomy was routinely done in the past. There are many advantages of operative laparoscopy compared to laparotomy; less wound scarring having an advantage from on esthetic point of view, less blood loss during operation, less pain after operation, reduced hospital stay, and shorter time required for recovery are some of the well-known advantages of operative laparoscopy. The most important requirement for operative laparoscopy is the acquired experience of the surgeon, and the learning curve adequately represents the treatment success and postoperative complication in respect to the experience of the surgeon. Therefore, the surgeon should be well trained, with the required knowledge and experience, and selecting cases properly could maximize the positive effects of operative laparoscopy. Operative laparoscopy in treating benign ovarian cysts can be considered an effective, safe, and efficient technique. For screening of malignant lesions, ultrasonography and tumor markers should be evaluated.

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