

Laparoscopic Ovarian Cystectomy (Puncture or Not Puncture the Cyst Wall)

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Abstract

Objective: To compare ovarian cystectomy with puncture cyst wall to that with intact one as regard to histopathology, operative time, complications, and postoperative period .

Design: Prospective randomized study

Setting: laparoscopy unit of Zagazig University Hospitals

Patients: One hundred nulliparous women subjected for laparoscopic ovarian cystectomy for cystic benign lesions with no suspicion of malignancy. Benign nature of the cysts was suggested via ultrasonographic picture, Doppler studies, and tumor markers namely CA-125.

Methods: All cases were subjected to laparoscopic ovarian cystectomy via laparoscopy with two techniques [1] group A patients where attempts were made to remove the cyst intact without rupture [2] group B where cyst wall was punctured and aspiration of its fluid before cystectomy Both groups were compared regarding the histologic nature of the cysts, operation time, operation difficulties encountered, and early postoperative complications if present.

Results: The Commonest ovarian cysts encountered in women subjected in this study were functional cysts (corpus luteum and follicular cysts), dermoid cysts, and endometriomas with insignificant difference in histopathological type between both groups. The mean operative time was significantly longer in patients where cystectomy were tried with intact cyst wall with higher frequency of inadvertent rupture than when ovarian cystectomy was done after puncture aspiration of cysts contents. Postoperative recovery and complications were not statistically significant in both groups studied.

Conclusion: Laparoscopic ovarian cystectomy was easier and faster when performed after cyst puncture and aspiration comparing to cases in which trials were made to remove the cyst intact.

Keywords: Ovariancysts; Laparoscopy; Cystectom

Introduction

Until the early 1980s, intra-abdominal endoscopic procedures in gynaecology were used mainly for diagnostic purposes. Instrumental and technical developments have transformed this diagnostic procedure into a broad spectrum of intra-abdominal endoscopic surgery which could replace most of the traditional gynaecological abdominal operations [1,2]. As the list of laparoscopic procedures grows constantly, it appears that any abdominal or pelvic surgical procedure can be done laparoscopically if the surgeon is persistent and innovative [3] Although there is clear advantage of this

type of surgery in terms of duration of hospitalization and recovery, there is also a feeling that even in experienced hands endoscopic procedures can take considerably longer to perform than open surgery [4]. The expression 'foreveroscopy' has even been used by some. Ovarian cysts and tumors of the ovary are estimated to occur at a rate of approximately 2-5 cases per 100,000 female per year [5]. functional ovarian lesions (FOL), such as follicular and corpus luteum cysts are common due to anovulatory cycles where these represent about 45% of all adnexal pathology .Collectively

teratomas constitute half of all ovarian neoplasm and only 1% of these are malignant immature teratoma furthermore, up to 12% of cases involve both ovaries, bringing into question recommendation of salpingo-oophorectomy, for these lesions in young age risking their long-term fertility [6].

Ovarian lesions come to surgical attention in a variety of ways; some are detected incidentally during ultrasound examination, whereas others present themselves insidiously as painless abdominal swellings. Most patients suffer from acute or chronic abdominal pain. Acute symptoms may be caused by torsion, bleeding or rupture of large cyst. More rarely, there may be symptoms of virilization [7]. Even if frequent, their management (surveillance medical therapy or surgical enucleation) is not clear especially in early reproductive age. Laparoscopy had been used with increasing frequency in the management of ovarian masses over the last years, the reported benefits of the laparoscopic approaches are reduction on operative morbidity, hospital stay and recovery time [8,9]. However, the procedure has rarely extensively described, it is generally summarized as a stripping procedure without any details [10]. Nevertheless, a good laparoscopic techniques and safe adequate surgical managements are required to ensure optimal patients care. The aim of this study was to compare between two laparoscopic techniques for ovarian cystectomy one with intact cyst wall and one with puncture the cyst in relation to histopathology, operative time, complications, and postoperative period in a randomized and prospective manner.

Patients and Methods

This study was carried out in laparoscopy unit of Zagazig University Hospitals between December 2015 to November 2017. 100 nullipara patients were referred to laparoscopy unit of Zagazig University Hospitals, represented by ovarian cyst either symptomatic or discovered accidentally during work up of infertility and referred for cystectomy. A written informed consent was signed from all patients included in this study. After appropriate counseling about type of laparoscopic procedure, the possibility of accidental cyst puncture during removal and the expected difficulties or complications that could be encountered with laparoscopic approach and that laparotomy may be carried out if malignancy was suspected, patients were allocated into two groups using a sealed envelope method

Group A: comprised fifty nullipara patients where cystectomy were tried with intact cyst wall.

Group B: Comprised fifty nullipara patients where cystectomy were tried after either intended or accidental (inadvertent) puncture of the cysts.

The study protocol was approved by the local ethical and research Committee of Zagazig University Hospitals.

Exclusion criteria

Cyst size >10 cm in maximal diameter as measured by transvaginal ultrasonography (TVS).

Suspected to be malignant by ultrasonographic criterias like: indistinct border, presence of irregular solid parts, thick septa, or ascities.

Mixed ovarian cyst, especially if there were numerous papillary formation and numerous vessels with low resistance index (RI), except for dermoid cysts, which may have the appearance of echogenic material in a non dependent area, or a highly echogenic area inside a cyst[11].

Also, if suspected malignant by diagnostic ovarian tumour marker (CA 125). Cases with unilocular asymptomatic cyst under 7 cm in diameter and normal TVS picture were managed expectantly for 3 months, followed up with repeated TVS to avoid unnecessary surgical intervention if the cyst had disappeared. Ovarian cysts were evaluated by laparoscopy if by the end of the three months follow up period there is a failure of the cyst to resolve or decrease in size spontaneously or if the cysts diameter increased in size or changed contents by TVS examination, or there was severe persistent abdominal pain and complications such as torsion, hemorrhage or infection.

The laparoscopic procedures were performed under general anesthesia with endotracheal intubation. All the procedures were carried out with the patients in the supine position with Foley Catheter N 16 was inserted.

A 10 mm canula was inserted subumbilically for the Zero degree telescope attached to camera and video monitor system. A satisfactory pneumoperitoneum was established with a continuous Co2 insufflations and maintained at an intra-abdominal pressure of 14 mm Hg, the patient was then placed in trendelenberg position and tilted to the side opposite to the ovarian cyst.

A 10mm and a 5mm trocars and canulae were inserted under direct vision to avoid vascular and intestinal injuries. The largest trocar in the side opposite to the ovarian cysts, and the smallest at the midline of the lower abdomen. The level of the secondary trocars placement were chosen individually to allow easy access to the ovarian cysts. In patients with bilateral ovarian cysts, additional 5mm Cannula was inserted under direct vision in the other side at the same level.

First, a peritoneal fluid sample or peritoneal washing by warm ringer solution for cytological examination were aspirated from the Douglas pouch. In group B, where cystectomy were done after puncture the cyst wall, with an a traumatic forceps placed on the utero-ovarian ligament, the ovary was grasped and stabilized, then the puncture was performed perpendicularly to the ovarian surface on antimesenteric border of the ovary, with care to minimize spillage. Small cysts were aspirated with a needle connected to 50 ml syringe, cysts more than 5cm were punctured with a 5mm conical trocar and emptied with an aspiration lavage device 5mm in diameter. The cyst fluid is examined microscopically and sent for cytological examination. Then, interior cyst wall was carefully inspected to exclude malignancy.

The cyst wall which is white colour can be separated from the normal ovarian tissues which is red colour by stripping procedures. The ovarian defect in both groups were left without suture and the edges were inverted by coagulation of the inner surface of the edges of the defect. The cyst was retrieved into an endoscopic bag, the retrieval bag was removed from the abdominal cavity through the 10-mm port and were prepared for histopathological examination.

Operating time was defined as the time of the first surgical incision to the time of the last stitch. Febrile morbidity was defined as temperature > 38 °C on two occasions 24 hour apart.

A standard analgesia was prescribed to all patients on demand. Oral intake as resumed as soon as the patient desired and could tolerate it. All patients were followed up for 2 months in the outpatient clinic. Statistical analysis were performed with use of the student t (test) for continuous variables and X2 analysis for discrete variables with the use of statistical package for social science for windows (SPSS, Chicago) were appropriated. Data were presented as the mean (M) ± SD. A (P value) of < 0.05 was considered significant.

Results

The mean age and body mass index were similar in both groups. History

of previous laparotomy were five cases in (group A) versus three cases in (group B). TVS reveled unilateral ovarian cyst in 48 cases in (group A) versus 44 cases in (group B) and Bilateral ovarian cysts in 2 cases (group A) versus 6 cases in (group B) (Table 1). The maximal diameter of all ovarian cysts were < 10 cm in both groups. The major histopathological types were functional ovarian cysts 22 cases (44%) in (group A) versus 30 cases (60%) in (group B) with mean operative time [90.57min (±15.8) }versus [63.2 min (±11.8)] in (group A) and (group B) respectively, (P <0.01) (Table 2).

The major histopathological types were functional ovarian cysts 22 cases (44%) in (group A) versus 30 cases (60%) in (group B) with mean operative time [90.57min (±15.8) }versus [63.2 min (±11.8)] in (group A) and (group B) respectively, (P <0.01) (Table 3)

Table 1: Demographic data of the study groups Meanvalues (± SD) N: Number; %: Percentage

Data	Group A (n=50)	Group B (n=50)
Age(mean) (Years) ±SD	22.4 (±2.1)	22.8 (±2.6)
BMI* (mean) ± (SD)	23.8 (±4.1 4)	24.4 (± 3.41)
Previous Laparotomy N° (%)	5 (12%)	3 (6 %)
Unilateral ovarian cysts N° (%)	48 (96%)	44 (88%)
Bilateral ovarian cysts N° (%)	2 (4 %)	6 (12%)

* BMI=Body mass index (Kg/m2)

Table 2: Clinical presentations of the ovarian cysts in the both Groups N: Number; %: Percentage

Presentations	Group A , and Group B (n=100)
Asymptomatic	28 (28%)
Symptomatic	72 (72%)
Dysmenorrhea	31 (43.1%)
Chronic pelvic pain	15(20.8%)
Menstrual disturbances	24 (33.3 %)
Acute pelvic pain	2 (2.8 %)

Dermoid cysts were the second common histopathology detected in 13 cases (26%) in (group A) versus 10 cases (20%) in (group B) with mean operative time [140.62 min (±22.1)] vs. [103.9 min(±14.9)} (Table 3) , Endometriotic cysts detected in 12 cases (24%) in (group A) versus 3 cases (24%) in (group B) with mean operative time [130.20min (±14.9)] vs. [92.59 min (±12.3)] in (group A) and (group B) respectively (P <0.02) (Table 3).

The minor histopathology detected were simple serous cystadenoma in 3 cases (6%) in (group A) versus 2 case (4%) in (group B) with mean operative

time [115.10 min (±17.9)] vs. [87. 1min (14.8)] in group A and B respectively P<0.02. (Table 3). The frequency of inadvertent rupture of the cysts wall was very high in (group A) 13 cases (26%) most of them were due to tense cysts. cases were included in group B (Table 4). Postoperative abdominal pain, shoulder tip pain (STP) which need analgesia and febril morbidity were present in (group A) more than in (group B) with no significant difference (Table 4). Two months follow up to both groups in outpatient clinic showed no significant complaint, complication or recurrence to the cyst.

Table 3: Histopathology of the specimens and related operative time Number; %: Percentage p<0.05 =significant

Histopathology	Group A(n=50)		Group B (n=50)		P value
	N (%)	Mean operative time (± SD)	N (%)	Mean operative time (± SD)	
Functional ovarian cysts	22 (44%)	90±0.57min (15.8)	30 (60%)	63.2 min (±11.8)	0.0>
Dermoid cysts	13(26%)	140.62 min (±22.1)	10 (20%)	63.2 min (±11.8)	<0.02
Endometriotic cysts	12(24%)	130.20min (±14.9)	8 (16%)	92.59 min (±12.3)	< 0.01
Simple serous cystadema	3(6%)	92.7 min (±11.8)	2 (4%)	75.22 min (±13.4)	0.02>
Total Cases completed laparos copically	50(100%)	115.10 min (±17.9)	50 (100%)	87. 1min (14.8)	< 0.01

Group A: ovarian cystectomy with intact wall

Group B: ovarian cystectomy after puncture cyst wall * P value< 0.05 is significant.

Table 4 : Intraoperative and postoperative complications N: Number; %: Percentage p<0.05 =significant

Complications	Group A (n=50)	Group B (n=50)	P value
Intraoperative Inadvertent rupture of the cyst.	13 (26%)	-----	
Postoperative Complications			
Abdominal pain	16 (32%)	8 (16%)	0.06
Shoulder Tip pain (STP)	6 (12%)	4 (8%)	0.5
Febrile morbidity	14(28%)	8 (16%)	0.07
Urinary complains	2 (4%)	1 (2%)	0. 5

Discussion

Ovarian lesions may be totally asymptomatic and revealed by TAS or TVS [2]. Also may be associated with menstrual irregularities, abdominal pain, pelvic discomfort, and urinary frequency or constipation [12]. The pre-operative diagnostic work-up of ovarian pathologies includes ultrasound scan and blood sample for tumor markers. The diagnosis is greatly aided by the use of imaging; the widespread availability and US has resulted in higher detection rate of functional cysts [13].

Hemorrhage in an ovarian lesion can lead to a diagnostic dilemma, in fact a patient where an ovarian lesion appeared ultrasonographically as a complex or solid mass is considered as highly suspicious of malignancy my resulted from a hemorrhagic corpus luteum cyst after surgery. Difficulties in identifying lesion histology before surgery is due to the fact that one histological lesion corresponds to several US pictures and Vice versa. Moreover sometimes, even macroscopically, it may be difficult to define the exact nature of a lesion [14].

Even if their frequency is probably underestimated, functional ovarian cysts represent the most common ovarian lesion in young age women (17.1-43%) of all surgically treated ovarian abnormalities in this age group [11]. In this study the major histopathology detected in the specimens laparoscopically retrieved were functional ovarian cysts (follicular or corpus luteum cysts) which were (44%) and 60% in both (group A) and (group B) respectively. With mean operative time [90.57min (±15.8) and [63.2 min (±11.8)] respectively and the differences were statistically significant (P<0.01).

Different previous studies reported that, the main histopathology detected in ovarian abnormalities in similar study were follicular cysts in (10-17.2%) and corpus luteum in (14.2- 26.4%) [15].

Teratomas constitute half of all ovarian neoplasms and only 1% or these are malignant immature teratomas and up to 12% of cases involve both ovaries [6]. In the current study dermoid cysts were present in 13 cases (26%) in (group A) versus 10 cases (20%) in (group B).

Also in (group B) the mean operative time in both endometriotic cysts and simple serous cystadenoma were less than in (group A) and the differences were statistically significant ($P < 0.01$) and ($P < 0.02$) respectively.

(Table 3) Laparoscopic surgery is becoming the gold standard in the diagnosis and treatment of benign cystic masses in adenxia. However, the laparoscopic approach remains controversial since large cystic masses must be reduced in size for extraction, because of the risk of dissemination, a careful preoperative selection is still recommended by most authors before a laparoscopic approach. In recent years, following the experience, laparoscopy has been used widely.

Conservative treatment consists in of enucleating of the cyst with ovarian reconstruction so as to preserve reproductive function as far as possible [11]. Laparoscopy is associated with fewer adhesions than conventional open surgery but most surgeons still preferring laparotomy for large cysts due to technical difficulties and the possibility of malignancy [13].

All procedures in this study were performed by two equally experienced laparoscopists. It is generally believed that laparoscopic management of ovarian cyst increase the risk of rupture of the cyst and spillage of cyst contents, despite this fact up to 60% of ovarian cysts, other than endometrioma, can be removed intact by laparoscopy [16], on the other hand, people seldom talk about the risk of rupturing the ovarian cyst when they are removed through laparotomy, although there is a definite risk [17,18]. Another study found that when cystectomy is performed laparoscopic ally without prior aspiration, intact rates up to 80% have been reported depending on the under lying disorder and the operators experience [19].

In this study the inadvertent rupture rate of the cysts during laparoscopic cystectomy with intact cyst wall was 65% which is actually very high, most probably due to tense cyst wall, adhesions and previous inflammation which make difficult cleavage plane (Table 4).

However, the percentage of inadvertent rupture is low with advanced team surgeons. The routine use of a bag-retrieval technique allows removal of the cyst without spillage, which is particularly important in dermoid cysts, because the cyst contents may cause chemical peritonitis followed by extensive adhesions, formation [20].

Laparoscopic surgery generally requires a long operating time because of the difference in the surgical techniques, the need to change instruments frequently, and more important, the time for specimen retrieval.

In this study there was significant differences in the operating time between the two groups with significant prolongation of the mean operating time in laparoscopic cystectomy without puncture, (Table 3). This runs in agreement with others who found that the operating time for cystectomy without puncture is more longer than cystectomy after puncturing the cysts wall [21]. Nevertheless non closure techniques of the ovarian defect saved time in this works because ovarian wall closure is unnecessary after laparoscopic cystectomy to make postoperative adhesions to minimal as previously reported [22].

Finally, in this study the post operative abdominal and shoulder tip pain and analgesic requirements were less in cases where puncture and aspiration of the cyst contents before cystectomy were done than when the cyst was removed intact.

Conclusions

Functional ovarian cysts and dermoid cysts represent the most common ovarian lesions in young age women. Laparoscopic ovarian cystectomy is much easier and faster after puncture rather to try to remove the cyst intact.

Future Directions and Recommendations

Due to remarkable development in laparoscopic surgery as less invasive surgery over conventional laparotomy, I hope it could be available at every

hospital, gain considerable popularity in the medical profession and promote the level of experience to all staff to manage adnexal cysts by Laparoscopic assisted colpotomy to extracte the retrieved specimen

Instead of option (puncture or not).

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