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Research Article

Laparoscopy Versus Laparotomy in Management of Benign Adnexal Swellings in Premenopausal Patients: A Prospective Control Study

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Abstract

Laparoscopic removal of ovarian masses is well established procedure, but controversy exists regarding the selection of ovarian masses, that can be removed by Laparoscopy. For this reason, preoperative work-up is needed to offer a reasonable degree of accuracy in evaluating the ovarian cysts. Preoperative diagnosis includes careful history taking, clinical examination, ultrasonographic scanning and measurement of CA_{125}.

This study was carried out in the Department of Obstetrics and Gynecology Hospitals from August 2016 to August 2017 and was aiming to compare laparoscopy with laparotomy in the management of benign ovarian cysts.

It included 120 patients recruited from the Outpatient Clinic of Obstetrics and Gynecology with evident diagnosis of benign ovarian cysts. The studied patients included cases having cysts with size ≤ 15 cm, smooth borders, no septa>3mm and no solid parts>25%.

Patients were appropriately prepared. Diagnostic laparoscopy was first performed confirming the benign nature of the mass and excluding other factors that may affect the safety of the procedure, then operative part was done including ovarian total cystectomy (42 cases), partial cystectomy (12 cases) and oophorectomy (6 cases). In comparison to laparotomy 39 cases had toatal or 9 cases had partial ovarian cystectomy, oophorectomy 12 cases. Histopathological examination of the cyst wall was done in all cases all proved to be beingn.

In laparoscopy groyp A The mean age (± SD) was (24,7 ± 4.9) years. 70% of patients were nullipara and 30% were multiparous women. 3cases (5%) had previous surgery.while in laparotom B group The mean age (± SD) was (31 ± 8.1) years. 60% of patients were nullipara and 40% were multiparous women. Two cases 10%) had previous surgery.

The main complaint was infertility (45%; 35% primary infertility and 10% secondary infertility), chronic pelvic pain (30%) and menstrual irregularities (10%) in comparison to laparotomy (30% primary infertility), chronic pelvic pain (35%) and menstrual irregularities (25%).

Ultrasonographic specificity was 87.5% in diagnosis of the benign of ovarian masses. Prediction of benign nature of ovarian cyst by laparoscopy had sestivity of 100% and negative predictive value of 100%.

In laparoscopy group A The diameter of the cyst (mean ± SD) was 7.1 ± 2.2 cm. The mean operating time was 55.1 ± 14 minutes, the longest operative time was that of ovarian dermoid cystectomy (73.6 ± 25.5 minutes) due to specimen retrieval from pelvic cavity.while in laparotomy group B The diameter of the cyst (mean ± SD) was6.7 ±1.7 cm. The mean operative time was 62.o± 12.7 minutes p value o.112(NS).

There was no significant relation between the diameter of cyst and length of operative time, also no significant relation between the duration of operative time and severity of pain in 1st 24 hours, postoperative recovery or hospital stay. Only one intraoperative complication occurred (bleeding from a bed of endometriotic cyst after its removal). In laparoscopy group A Postoperative febrile morbidity was low 10% of versus 25% in laparotomy patient. Postoperative pain was found early (within 24 hours) in 60% of cases and late (within days) in 40% of cases.

In laparoscopy group A Patient recovered significantly quickly, resumed oral feeding after 8.3 ± 1.7 hours, got up independently after 9.7 ± 2.5 hours, full mobilization after 7.7 ± 2.5 days and can perform their domestic work after 10.3 ± 2 days.while in laparotomy group resumed oral intake after 14.7± 4 hours, got up after (16.2±2.7 hours). only twinty precent had resumed sexual activity within two weeks.

The duration of postoperative hospital stay was short (29 ± 7.9 hours). One case of postoperative complication that was hypotension that was managed by IV fluids. Only one cases was converted to laparotomy and it was discarded from the study. No cyst recurrence was observed in a period of U/S follow-up for 3 months.

Conclusion

The role of operative Laparoscopy has become a gold standerd for the treatment of many benign gynaecologic condition offering distinct advantages of low morbidity, improved postoperative recovery.

Operative laparoscopy for evaluation and management of adnexal masses when performed by surgeon trained in advanced laparoscopic techniques is safe and effective and associated with less morbidity compared with open technique.

Introduction

Adnexal masses are frequently found in premenopausal women aged (18 y -40y). Benign neoplastic masses in the ovaries include dermoid cysts (mature cystic teratomas), endometriomas, and epithelial ovarin cysts, usually serous, rarely mucinous. Neoplastic processes in the ovary do not regress, and therefore, should be treated surgically ether by laparoscopy or laparotomy. The process of patient selection always starts with a careful history taking and thorough clinical examination, followed by measurement of CA125 and ultrasound scanning [1].

Operative laparoscopy of ovarian cyst is now a method of choice due to its advantages, most of which focus on preserving ovarian tissue and minimizing postoperative adhesions formation in reproductive age women [2].

Laparoscopy is a hybrid surgical approach that shares characteristics of both minor and major surgery. To patients, laparoscopic procedures often seem to be minor surgery because of the small incisions, relatively small amount of postoperative pain, and short convalescent period. When a laparoscopic procedure involves minimal intra-abdominal surgery (eg, diagnostic laparoscopy, tubal fulguration), both postoperative discomfort and the risk of complications may more closely resemble a minor procedure than a major procedure [3].

Laparoscopic procedures have unique risks, which are related to methods used for the placement of abdominal wall ports and to the pneumoperitoneum required for laparoscopy. The use of energy within the abdominal cavity likewise introduces risk. These risks include injury to bowel, bladder, or major blood vessels and intravascular insufflation. In addition, increased intra-abdominal pressures associated with laparoscopy increase anesthesia-related risks such as aspiration and increased difficulty ventilating the patient. Although the risk of blood loss is relatively low for most procedures, potentially massive blood loss may occur and is complicated by the fact that control of blood loss may be delayed by the time taken to perform an emergency laparotomy [4].

Ahmed et al. (2004) have limited Laparoscopic surgery to women with an adnexal mass size more than 10 cm apparently benign ovarian cyst.

In preoperative selection of candidates for laparoscopic approach to an adnexal cystic mass, every effort should be exerted in order to rule out malignancy (5). Sonography was the most frequent imaging technique used to evaluate benign ovarain cyst, followed by computed tomography and magnetic resonance imaging, laboratory testing and CA-125 in particular, can be useful in postmenopausal women. In patients of reproductive age, however, the high False - positive rate of CA-125 renders this test less clinically useful [6].

Among the different imaging techniques available today, Transvaginal Sonography (TvS) is the most cost effective, both in postmenopausal and premenopausal women. Various sonographic scoring systems have been developed in order to suggest preoperatively the benign or malignant nature of adnexal mass [7].

In fact, the transabdominal sonography may miss intracystic vegetations due to its limits in resolution power, whereas TvS may miss small vegetations, either because they are too small for resolution power of transducer or because the cyst evaluated is so large that the vegetations, if located at the pole distal to vaginal fornix, are too far from the probe to be detected [8].

Aim of the work

The aim of this study is to compare the safety, the efficacy, the operative and postoperative courses of laparoscopic management of benign adnexal swellings to their management via conventional surgery, regarding; the operating time, intra-operative complications, postoperative febrile morbidity, pain, complications, recovery and postoperative hospital stay.

Patients and methods

This study is a prospective control study was conducted throughout the period from Augest 2016 to Augest 2017. It included 120 attendant of Gynecology outpatient clinic with a diagnosis of ovarian cysts.

Inclusion criteria

- The patient should be non-pregnant premenopausal women aged from (18 years-40 years old) with history sugesstive adnexal mass that was confirmed by TVS scanning to determine the charcateric of the lesion was included.
- Clinical: Mass is cystic, mobile, unilateral, no tenderness or evidence of malignancy (fixity, hard consistency or ascites).
- Ultrasonographic: Reliable pelviabdominal ultrasound assessment should exclude hepatomegaly, ascites or enlarged Para aortic lymph node. This should be followed by transvaginal US scanning to confirm the detailed characteristic of the lesion.

- The size of the cyst should be less than 15 cm in maximum diameter ie ovarian cyst volume > 1 ml - < 10 ml.
- The lesion should be cystic in nature with distinct border without evidence of solid parts more than 25% or interacystic thick papillae more than 3mm in thickness or 3 in number.
- Internal echoes either absent or suggestive for dermoid or endometrioma.
- No associated pathology that necesstize hysterectomy.
- All patient should give consent to operative intervention either by laparoscopy or laparotomy. Also, the patient of laparoscopy should have counseled for conversion to laparotomy if laparoscopy is difficult or intraoperative complication occur.

Exclusion criteria

The following cases were primarily excluded from the study:

- History of current acute pelvic pain.
- History of previous similar condition.
- Family history of cancer breast, ovarian cancer or colonic cancer.
- Ovarian cysts > 15 cm in diameter by TVS or recurrent cysts.
- presence of signs of malignancy which include: solid area >25% of the cyst size, Presence of papillary excrescences, Presence of septa ≥ 3 mm in thickness or > 3 in number,ascites or matted bowel loops.
- Theca lutein cyst either with pregnancy or vesicular mole.
- Presence of any hepatic lesions suspecting secondaries.
- Pregnant and postmenopausal female.
- Morbid obese patient BMI more than 40%.
- Diabetic or asthmatic patients.

Randamization

Those 120 patients were assigned alternatively to one of two group study laparoscopy and laparotomy according to their order of admission. the patients included in this study will be randomly allocated into two group:

- group 1: Laparoscopy group 60 patients.
- group 2: Laparotomy group 60 patients.

the patient will be blinded to the technique for laparoscopy or laparotomy. the patient accepting randomization
All patients were subjected to:

Ethical considerations:

1. Written consent was obtained from all patient after full explanation of benefits and hazards of surgical procedure that was performed for each patient, before getting them involved in the study.
2. Both surgical procedure used in the present study has no harmful effect or threating the patient life and both of them are used in clinical practice.
3. Patients were informed about any abnormal results of procedure test performed, instructed and treated accordingly.
4. Patient had the right to refuse participation without affecting medical core expected to be offered to them.
5. Confidentiality of all data and tests of studied population were reserved.

The results were statistically analysed using SPSS computer program. The analysis was performed within the following procedures: data input, descriptive analysis and significance analysis. In all tests of significance used, values < 0.05 were considered significant and those <0.001 to be of high significance.

Results

120 patients with a diagnosis of persistent ovarian cysts were included in this study. Table (1) demonstrates the demographic criteria of those patients. No significant difference was found in the age, parity or number of pervious surgery between both groups (p value > 0.05). Regarding laparoscopy group the most frequent clinical presentation was infertility (45%) followed by chronic pelvic pain (30%) menstrual irregularities (10%), and lastly three cases (15%) were asymptomatic and were discovered by either clinical or sonographic examination. On the other side laparotomy group the most frequent presentation was chronic pelvic pain (35%), infertility (30%) menstrual irregularities (25%), and lastly two cases (10%) were asymptomatic and were discovered by either clinical or sonographic examination (table 2).

In laparoscopy group the most frequent pathology was ovarian endometrioma which represents 8 cases (40%), while the least frequent one was persistent functional ovarian cysts i.e. corpus luteum cyst (10%).

-While in laparotomy group frequent pathology was, ovarian dermoid (30%) and least frequent one was persistent functional ovarian cysts i.e. corpus luteum cyst (5%) (table 3). As regard ultrasonographic criteria No significant difference in cyst size between both group (p > 0.05).
-No cyst among all patients was found to have setpa ≥ 3 in number.
-50% of cases were echo-lucent and the other 50% were echogenic. Most of the echogenic cysts had homogenous echogenicity (80%) i.e. (16 out of 20 cases), while 20% of echogenic cysts had mixed echogenicity due to presence of solid particles (table 4).
-According to the sonographic features, ovarian cysts were considered either “probably benign” or “Suspicious” cysts.

Probably benign cyst was that which had no septa ≥ 3 mm thick, had no solid areas > 25% and its wall was < 3 mm in thickness. All suspicious cysts were operated upon by open surgery in addition to 15 probably benign cysts while all patients submitted to laparoscopic surgery had probably benign cysts. As regard the relationship between each histopathological type and its sonographic features in all patients the overall mean cyst diameter (± SD) was 6.5 ± 1.6

cm and the largest cyst size was encountered in cases of mucinous cystadenomas (8.7 ± 1.4 cm), followed by serous cystadenomas (8.1 ± 1.3 cm) and the least cyst size was that of functional ovarian cysts (retention cyst, 4.5 ± 0.4 and luteal cyst, 5 ± 0.2) (table 5).
As regard the results of intra-operative course It is noticed that:

-No statistical difference in operative time was found between both groups ($p > 0.05$).
-Most of cases in both groups (70%of laparoscopy group &65 % of laparotomy group) was managed by total ovarian cystectomy while partial cystectomy (removal of as much as possible of cyst wall and electro-coagulation of the remaining part) was done in 20% and 15% of cases of group A and group B respectively.
-Oophorectomy was performed in two cases (10%) in laparoscopy submitted patients and was done in 4 cases (20%) of group B patients.

Intra-operative complications were found in one case (5%) of laparoscopy, uncontrollable bleeding from a bed of endometriotic cyst after its removal, compared to no intra-operative complications in group B patients (0%) (table 6). It was noted that, 21 cases (out of 120) in both groups were managed by partial cystectomy and electro-coagulation of cyst wall. They all were endometriotic cysts and partial cystectomy was done due to difficulty in creating a dissection plane between cyst wall and ovarian cortex because of adhesions.

Regarding postoperative course Postoperative pain is significantly less severe among patients submitted to laparoscopy than among those submitted to laparotomy for both early pain (within 1st 24 hours postoperatively) and residual pain (the period in days required for the patient to be analgesic free).

Also, 10% of patients in group "A" versus 25% in group "B" expressed febrile morbidity postoperatively. Postoperative recovery, was significantly earlier and better in group A than in group B patients regarding ability of oral feeding, ability of getting up independently, return to full mobilization and domestic activities and return to sexual activity. Postoperative hospital stay was significantly shorter in group A than in group B patients. Less percentage of postoperative complications was encountered in group A (5%) which represents a case of superficial wound infection versus 15% in laparotomy group which represents three cases; two of them were wound infection and the third was postoperative cystitis. However, culture and sensitivity were done and all cases were successfully treated with appropriate antibiotics (table 7).

Regarding the histopathological types of ovarian cysts in this study, in group A: the most frequent one was endometriotic cyst of ovary (40%) followed by mature cystic ovarian teratoma (25%), benign serous cyst adenoma (15%), then CL cyst and retention cyst (10%) and lastly benign mucinous cystadenoma (10%). while in groupB mature cystic ovarian teratoma (30%), endometriotic cyst of ovary (25%) benign mucinous cystadenoma (20%) benign serous cyst adenoma (20%) CL cyst and retention cyst (5%).

	Laparoscopy (group A)	**Laparotomy (group B)**	**P-value**
Number	60	60	
Age *(mean ± SD)* **Range**	24.7 ±4.9 (yrs.) * (18-37)	31.1 ±8.1 (yrs.) (18-38)	0.5 4 (NS)
Parity Nulliparous Multiparous	 42 (70%) 18(30 %)	 36 (60 %) 24(40 %)	 0. 5 (NS)
Previous surgery No Yes	 57 (95 %) 3 (5 %)	 54 (90%) 6(10%)	1.0 (NS)

Table 1: Patient's demographics.

Presentation	**Total (n=120)**	**Laparoscopy (group A) (n = 60)**	**Laparotomy (group B) (n = 60)**	**P value**
Asymptomatic	15	9 (15%)*	6(10%)	1.0 (NS)
Infertility	45	27(45%)	18 (30%)	.32 (NS)
Pain	39	18 (30%)	21 (35%)	.73 NS)
Menstrual irregularities	21	6(10%)	15 (25%)	.4 (NS)

Table 2: Clinical presentations.

Pathology	Total (n=120)	Laparoscopy (group A) (n = 60)	Laparotomy (group B) (n = 60)	P value
Serous cystadenoma	21	9(15%)*	12 (20%)	1.0 NS
Mucinous cystadenoma	18	6 (10%)	12 (20%)	0.66 NS
Dermoid cyst	33	15(25%)	18 (30%)	0.72 NS
Endometrioma	39	24 (40 %)	15(25%)	0.31 NS
Corpus luteum cyst	9	6 (10%)	3 (5%)	1.0 NS

Table 3: Pathology of ovarian cysts.

Ultrasound criteria	Laparoscopy group A (n = 60)	Laparotomy group B (n = 60)	P-value
Diameter of cyst (cm) [mean ± SD]	6.3 ± 1.5	6.7 ± 1.7	0.433 (NS)
Wall thickness			
• < 3 mm	60 (100 %)**	57 (95 %)	1.0
• ≥ 3 mm	0 (0 %)	3 (5 %)	
Echogenicity			
• Echolucent	30 (50 %)	30 (50 %)	1.0
• Echogenic	30 (50 %)	30 (50 %)	
Septa			
• No	60 (100 %)	30 (50 %)	<0.001
• Yes *<3mm*	0 (0 %)	30 (50 %)	
≥3mm	0 (0%)	0 (0%)	
Solid areas			
• No	60 (100 %)	48 (80 %)	
• Yes	0 (0 %)	12 (20 %)	0.037
Probably Benign cyst	60(100 %)	45(75 %)	0.04
Suspicious cysts	0	55(91.6 %)	
- Wall size ≥ 3 mm	0	9(15 %)	1.0
- Septa ≥ 3 mm	0	0	1.0
- Solid areas	0	36(60 %)	0.1

Table 4: Ultrasound criteria.

Histopathological type/its number	Ultrasonographic criteria									
	Size (cm)	Wall thickness		Septation			Echogenicity		Solid area	
	Mean ± SD	< 3 mm	≥ 3 mm	No	Yes		Echo-lucent	Echo-genic	No	Yes
					< 3 mm	≥ 3 mm				
Endometriotic cyst (n=39)	6.2 ± 0.8	39	0	33	6	0	21	18	318	0
Dermoid cyst (n =33)	5.4 ± 0.4	30	3	18	15	0	15	18	21	12
Serous cystadenoma (n =21)	8.1 ± 1.3	21	0	12	9	0	21	0	21	0
Mucinous cystadenoma (n =18)	8.7 ± 1.4	18	0	6	12	0	0	18	18	0
Corpus luteum cyst (n =9)	5.0 ± 0.2	27	0	9	0	0	3	6	9	0
Total (n =120)	6.5 ± 1.6	57	3	618	42	0	60	60	108	12

Table 5: Relationship between Histopathological type of the ovarian masses and its sonographic features.

Item	Laparoscopy (group A) No.= 60	Laparotomy (group B) No.= 60	P-value
Operating time (mean ± sd)	55.1 ± 14.0 **(min.)**	62.0 ± 12.7 **(min.)**	0.112 (NS)
Procedure			
ystectomy	42 (70%)	39 (65%)	0.73(NS)
ystectomy	12 (20%)	9 (15%)	0.66(NS)
horectomy	6 (10 %)	12 (20%)	0.66(NS)
Intra-operative complications			
• No	57 (95 %)	60 (100 %)	1.0(NS)
	3 (5 %)	0 (0 %)	

Table 6: Intra-operative course.

	Laparoscopy (group A)	Laparotomy (group B)	P-value
Pain			
• Early (within 24 hrs by VAS) (Mean ± SD)	3.9 ± 0.7	5.1 ± 1.1	<0.001
• Residual (days)	4.1±1.7	9.7 ±3.1	<0.001
Febrile morbidity			
	54 (90 %)	45 (75 %)	<0.4 NS
	6 (10 %)	15 (25 %)	<0.4
Oral feeding (hrs)	8.3 ±1.7	14.7 ±4.0	< 0.001
Get-up out of bed (hrs)	9.1 ±2.5	16.2 ±2.7	<0.001
Full mobilization (days)	7.7±2.5	11.7±2.9	< 0.001
Domestic work (Days)	10.3±2.0	15.5±3.2	<0.001
Sexual activity			
thin 2 weeks	21 (35%)	12 (20%)	0.2 NS
weeks	39 (65%)	38(80%)	
Hospital stay (hrs)	29.0 ±7.9	64.5±17.3	< 0.001
Complications			
• No	57 (95 %)	51 (85 %)	.6 NS
• Yes	3 (5 %)	9 (15 %)	

Table 7: Postoperative course.

Discussion

Operative laparoscopy of ovarian cyst is now a method of choice due to its advantages, most of which focus on preserving ovarian tissue and minimizing postoperative adhesions formation in reproductive age women (2).

However, the size of ovarian cysts is still considered a major limiting factor for wider application of Laparoscopic surgery of benign ovarian cysts. Ahmed et al. (2004) have limited Laparoscopic surgery to women with an adnexal mass size more than 10 cm apparently benign ovarian cyst (5).

In preoperative selection of candidates for laparoscopic approach to an adnexal cystic mass, every effort should be exerted in order to rule out malignancy. Sonography was the most frequent imaging technique used to evaluate benign ovarain cyst, followed by computed tomography and magnetic resonance imaging, laboratory testing and CA-125 in particular, can be useful in postmenopausal women. In patients of reproductive age, however, the high False - positive rate of CA-125 renders this test less clinically useful (9).

Among the different imaging techniques available today, Transvaginal Sonography (TvS) is the most cost effective, both in postmenopausal and premenopausal women. Various sonographic scoring systems have been developed in order to suggest preoperatively the benign or malignant nature of adnexal mass (7).

In fact, the transabdominal sonography may miss intracystic vegetations due to its limits in resolution power,

whereas TvS may miss small vegetations, either because they are too small for resolution power of transducer or because the cyst evaluated is so large that the vegetations, if located at the pole distal to vaginal fornix, are too far from the probe to be detected (8).

In the present study, in laparoscopy group A we report 60 patients recruited from outpatient clinic with an evident diagnosis of cystic ovarian masses. The mean age of the patients was 24.7 ± 4.9 years. The most common presentation was infertility (infertilily represents 45% of cases, then the chronic pelvic pain 30%, menstrual disorders 10% and a symptomatic 15% of cases) discovered by either clinical or sonographic examination.while in laparotomy group B : The mean age of the patients was 31.8 ± 8.1 years. The most common presentation was pain (chronic pelvic pain 35%, infertilily represents 30% of cases, then the menstrual disorders 25% and a symptomatic 10% of cases).

In onother study1ry infertility represented 48.1% while Yuen et al. (1997) reported much lower incidence of infertility in their patients (7.8%) this is due to difference in selection of patients (10,11). Yuen et al. (1997) compared a randomized prospective study of laparotomy and laparoscopy of benign ovarian masses (11).

Bandera et al. (2003) reported 65% of patients having ovarian cysts were complaining of pelvic pain and 28% of them were complaining of menstrual irregularities. This result approximately near the result in this study. Predominance of infertility in this study as a most common clinical presentation 45% may be explained by the urge of infertile couple to seek medical advise, this presenting large population sample to medical evaluation (12). Another explanation may be the relatively high percentage of endometrioma which represent 40% of all types of pathology and the generally accepted relationship between endometriosis and infertility or at least their coincidence together. In this study we agree the study of Childers et al. (1996) (13).

In this study regarding laparoscopy group: 42 cases out of 60 patients were nullipara (70%), while infertility was recorded as mentioned above in 45%. This may be explained by fact that some patients were complaining of other symptoms, not infertility.

Regarding the histopathological types of ovarian cysts in this study, in group A: the most frequent one was endometriotic cyst of ovary (40%) followed by mature cystic ovarian teratoma (25%), benign serous cyst adenoma (15%), then CL cyst and retention cyst (10%) and lastly benign mucinous cystadenoma (10%).while in group B mature cystic ovarian teratoma (30%), endometriotic cyst of ovary (25%) benign mucinous cystadenoma (20%) benign serous cyst adenoma (20%) CL cyst and retention cyst (5%) that was near to result of Guerriero et al. (1996) (endometrioma 35%,dermoid cyst 21%,serous cystadnoma 19%,mucinous 15%,corpus lutum 10%), also agree with the result of Nezhatetal. (1992) (29.3%, 23%,11, 7%, 17%, 19%) respectivly (14,15).

However, Marana et al. (2004) reported higher figure of Endometriotic cysts 57%. This can be explained by higher incidence of infertility between the patients in this study and small number of cases studied (8).while other studies reported in Canis et. Al, (2001) endometrioma represent 14,4%,much lower figure was found in another study 7,6% this can be explained by A period of follow-up with or without hormonal suppression may be of value in trying to decrease the number of surgical interventions to manage ovarian cyst probably functional which might need not more than observation (18).

Regarding ovarian dermoids the result of this study were around the result reported by Marana et al. (2004) (12%), (15%) and Canis et al. (2001) (20.9%) while Bandera et al. (2003) reported slightly higher figures (28%) (8, 16, 12).

In this study, TVS was used accurately in evaluation of ovarian cyst. Its accuracy in predicting the benign nature of ovarian cysts offered specificity of 87.5% and accuracy of 93.7%. We found that the overall mean cyst diameter ± SD was 6.2 ± 0.8. The largest diameter was encountered with mucinous cystadenoma (8.7 cm), followed by serous cystadenoma (8.1 ± 1.3 cm), while the least size was with that of retention cysts (4.5 ± 0.4 cm), regarding echogenicity 100%, of mucinous cystadenoma and 54% of dermoid cyst were echogenic, 46% of ovarian endometriomas were diffusely echogenic while non of serous cystadenoma and functional cysts was echogenic. Among our patients, 78 ovarian cysts had no septa, and 42 cases had septa ≤ 3 mm in thickness and no cases had septa more than 3mm in thickness (cyst wall), all of them was found to be benign. Solid areas were found in 12 cases out of 60 patients and all of them proved to be benign ovarian dermoid. When comparing the result of TVS as regard specificity 87.5%, it was near to that of Mahdi et al. (2004) (90%), and Sassone et al. (93%), while Guerriero et al. (1996) revealed higher specificity of (98%) probably because of their use of sonographic numerical scoring systems which decrease the number of false positive suspicious cases (17,19, 14).

However, in study of Lerner et al the specificity of TVS was 77% with higher percentage of endometriomas and dermoid ovarian cysts among their patients because these cysts may have sonographic features which resemble the echopattern of suspicious cysts (mixed echogenicity and presence of solid areas) (20).

So depending on a scoring systems in U/S, diagnosis of ovarian cyst is much more valuable and accurate than depending on single U/S feature of suspicion which lead to false positve in many cases depriving the patient from the chance of laparoscopic management.

In this study, serum CA-125 was measured and analysed in all cases submitted for laparotomy and laparoscopy , which was found to be ≤ 35 IU/ml in 34 cases out of 40 patients. In 6 cases, CA-125 was > 35 Iu/ml, 5 cases out of 6 patients had serous cystadenoma and only one case had mucinous cystadenoma. However, those cases were not enough for statistical evaluation of sensitivity, specificity and predictive value of CA-125.

The mean operative time ± SD was 55.1 ± 14 minutes) in laparoscopic patients, while The mean operative time ± SD was 62± 12.7 minutes) in patient of laparotomy this result was agree with the result of Davis et al. (2001) (50.3 ± 9.8 minutes) and disagree with result of Mahdi et al. (2004), the mean ± SD of operative time in their result was 70 ± 20 minutes). Laparoscopic oophorectomy consumed more time than laparotomy in study of Yuen et al (22, 17, 11).

In this study, the mean ± SD of operative time agreed with result of Parker and Mahdi et al. and disagreed with result reported by Childers et al. (1996) (86 minutes). In this study the longest operative time in laparoscopic managment of ovarian cyst was met with managing dermoid cyst (73.6 ± 25.5 minutes) followed by mucinous cystadenoma (70 ± 12.7 minutes) then endometrioma (54 ± 10.1 minutes). Laparoscopic ovarian dermoid cystectomy may need more time at operation probably due to excessive suction and irrigation of peritoneal cavity with several litters of lactated Ringers solution to ensure perfect and complete removal of sebaceous material to avoid probable complication (23, 17, 13).

This result disagreed with the result of Nezhat et al. (1989) and Pardi et al. (1995) (24 ,25). Mean ± SD was 40 ± 0.3 minutes and 43 ±11.8 minutes respectively). This is due to introduction of Laparoscopically assisted vaginal removal of dermoid cyst. The second longest operating time in this study group was met in management of mucinous cystdenoma (70 ± 12.7 minutes), the explanation might be the same of dermoid cyst due to meticulous washing of peritoneal cavity and this agreed with the result of Davis et al. (2001) (22).

In this study, the mean ± of operative time in laparoscopic managment of ovarian chocolate cyst was 54 ± 10 minutes could be explained by more time needed for dissecting the cyst wall from ovarian cortex and dissection of adhesion that may be found between the ovary and pelvic organs.

This result agreed with result reported by Davis et al. (2001) who revealed an operating time for endometrioma to be 54.1 ± 12.8 minutes. In this study, no relation was found between the operative time of procedure and cyst size (22).

In this study, intraoperative complication was met in only one case 5%, with laparoscopic endometriotic cystectomy due to uncontrollable bleeding from the bed of cyst and it was successfully managed by laparoscopic oophorectomy. This complication was similar to the result of Davis et al. (2001) who was faced by the same complication and managed successfully by laparoscopic oophorectomy while Markman et al. (2004) reported no intraoperaive complications in Laparoscopically managed benign ovarian cysts (22, 26).

only 3 cases, with laparoscopic endometriotic cystectomy converted to lapaeotomy due to uncontrollable bleeding from the bed of cyst and it was discarded from the study.

Postoperative febrile morbidity was encountered in 10% (6 cases from 60 patients in laparoscopy group) while was encountered in 25% (5 cases from 20 patients in laparotomy group) , this result was similar to the result of Adrekani et al. (2002) who reported postoperative febrile morbidity of 9.8%, in patient managed laparoscopically. This low percentage could be explained by less tissue trauma, good suction irrigation of peritoneal cavity after laparoscopic surgery, geater mangnification of minute oozing points and better haemostasis with less possibility of wound infection amonge patients managed by laparoscopy (27).

Postoperative pain was found early with in 1st 24 hours in 60% of cases, and late pain in 40% of cases. Early postoperative pain was assessed by Visual Analogue Scale (VAS). This result agrees with that of Adrekani et al. (2002). In this study, no relation was noticed between the duration of operative procedure and the intensity of postoperative pain either early or residual. There was higher proportion of Laparoscopically managed patients 85% was analgesic free on 2 nd postoperative day. This study similar to study reported by Brosen and Sutton (1998) (28).

In this study, the patients recovered significantly more quickly, resumed oral intake after 8.3 ± 1.7 hours while in laparotomy group resumed oral intake after 14.7± 4 hours,got up independently more faster (9.1 ± 2.5 hours) while in laparotomy group got up after (16.2±2.7 hours). Also, they returned to normal activities and could perform domestic work quicker (7.7 ± 2.5 days), in comparison to laparotomy group after (11.7±2.9 days), thirty-five precent of them had resumed sexual activity within two weeks postoperatively while in laparotomy group only twinty precent had resumed sexual activity within two weeks. The above-mentioned results run in agreement with Davis et al. (2001) (22).

postoperative complications were seen in 5% of patients in thisin laparoscopy group the form of hypotension because of decreased venous return secondary to very high intra peritoneal pressure and also due to vagal stimulation which managed by loading of fluids versus 15% in laparotmy group due to hypotension and chest pain or chest infection. This results near the result obtained by Marana et al. (2004) (3%), Yuen et al. (1997) (3.9%) and Childers et al. (1996) (8%). Markman et al. (2004) reported no postoperative hypotension complication after Laparoscopic treatment of ovarian cysts (8,11,13, 26).

Regarding postoperative hospital stay, the laparoscopic managed ovarian cyst revealed short hospital stay (29 ± 7.9 hours), versus 64.5 ±17.3 in laparotomy group p value <.001.This was explained by less postoperative pain, less febrile morbidity, less postoperative complication and earlier recovery of patients, also there no relation was found between the length of operative time and duration of hospital stay. This result disagree the result reported by Yuen et al. (1997) (4.9 ± 2.2 days) and Mahdi et al. (2004) (3 ± 1.1 days) (11,17).

Davis et al. (2001) found a direct proportional relationship between hospital stay period and length of operation due to more tissue truma so increase post-operative pain, febrile morbidity and delayed resumption of oral feeding (22).

Regarding the recurrence of cyst, in this study, no recurrence was found by clinical examination and sonographic follow up at 3 months. This was comparable to that reported by Davis et al. (2001) and Mais et al. (1995) while Brosen (1994) reported 11.1% and recurrence rate of laparoscopically managed ovarian endometriosis.

Conclusion

- The role of operative Laparoscopy has become a gold standerd for the treatment of many benign gynaecologic condition offering distinct advantages of low morbidity, improved postoperative recovery.
- Operative laparoscopy for evaluation and management of adnexal masses when performed by surgeon trained in advanced laparoscopic techniques is safe and effective and associated with less morbidity compared with open technique

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