

COMPARISON BETWEEN LAPAROSCOPIC VERSUS OPEN OVARIAN CYSTECTOMY FOR DERMOID CYST

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Introduction

Benign cystic teratoma (dermoid cyst) are the most frequent occurring neoplasms representing 95% of germ cell tumors and 25-40% of all ovarian tumors (1).it is most common in young reproductive age (30) years, so conservative surgical excision or cystectomy is warranted .it is bilateral in about 11% of cases .the majority (60%) of dermoid cysts are asymptomatic .however 5-10 %may undergo torsion .less commonly (1-4%).they may rupture spontaneously either suddenly causing an acute abdomen and a chemical peritonitis or slowly causing chronic granulomatous peritonitis .Excision is indicated to determine the nature of suspected teratomas seen on ultrasound scan as persistent ,heterogeneous mass or due to pelvic pain with or without accident to the ovarion cyst 2

In the past 15 years laparoscopy has progressively gained popularity as a valid alternative to the usual surgical approach by laparotomy(3-4).because laparoscopy has recognized advantages over laprotomy,this approach is appealing (5-6).

However ,laparoscopy approach raises concerns .firstly, intraoperatrive rupture of a dermoid cyst ,allowing the contents to spill over bowel and peritoneal surfaces ,may lead to post operative complication such as peritonitis and adhesion formation (7-8).Interaoperative rupture during laparoscopic management of dermoid cysts appear to occur quite often (88% of cases).but very few complications have occurred because of this⁹.Extensive peritoneal was hings at the time of surgery to remove any spillage may account for this low complication rate (10-12).

Secondly recurrence may be more frequent after cystectomy performed by laparoscopy than by laparotomy(13)

It is mandatory to rule out malignancy as 2% are said to contain a malignant component usually a squamous cell carcinoma in women over 40 years old.

During pregnancy rupture is more common owing to external pressure from the expanding gravid uterus or to tratoma during delivery .A growing evidence indicates that laparoscopy in pregnancy can be performed safely provides certain precautions are taken

Since laparotomy has recognized advantages over laparoscopy such as reduced adhesion formation ,less post operative pain shorter hospital stay and quicker recovery .The articles were reviewed to compare the modalities.

Methods

Literature search was done with the following key words ,dermoid cyst ,ovarian dermoid cystectomy ,laparoscopy and laparotomy .the outcome of the search was measured for the following parameters methods of patients selection ,operative technique ,operating time,intra and post operative complications ,blood loss ,required analgesia ,home discharge time ,cost effectiveness and patients satisfaction.

Diagnosis

The median age at presentation usually is 38 yrs ,93% have unilateral cyst with mean diameter (5 cms).the clinical [presentation is pain (62%) and ovarian torsion (2%) while 17 % diagnosed incidentally during routing examination .Nearly one third of the patients have more than one presenting symptom .(15).

With the introduction of high resolution trans vaginal ultrasonography ,the diagnosis of benign cystic tratoma can be made with grater accuracy .cystic tratoma are suspected if any one of the

following three sonographic findings is present in a woman of reproductive age .A densely echogenic tubercle associated with a cystic echo pattern ,a thin echogenic band like echo or a dense echo pattern with or without a cystic component (16).A diagnosis accuracy of 97% is noted inn predicting cystic tratoma.(17)the rate of bilateral cystic tratoma is about 11%.In the past sampling of contra lateral ovary was recommended to rule out a second mature cystic teratoma.Unfortunately ,indiseriminate removal of ovarian tissues rarely leads to the identification of a tratoma . In addition potential complications of ovarian biopsy include hemorrhage ,infection ,adhesion formation and possible reduction of follicles .For these reasons careful inspection of the contra lateral ovary is recommended with diagnostic cyst aspiration followed by cystctomy if needed .(18)

Laparoscopic management of ovarian dermoid cyst

In the last decade, operative laparoscopic procedure s are being performed increasingly in gynecology In the presence of ovarian cyst ovarian cystectomy may be necessary .while performing ovarian cystectomy. The cyst is removed in tact with minimal trauma to the residual ovarian tissues .

Teratoma can often be excised intact but should the cyst ruptures the resulting contamination would be grater than if the cyst were opened and aspirated .An important step is the atraumatic development of the plane between tne cyst wall and ovarian tissues ,which is accomplished using hydro dissection..

An 18-20 gauge needle is introduced through an accessory trochar sleeve ,or a 7.5 inch spinal needle is introduced through the abdominal wall into the space between the cyst wall and the ovary .the plane is further development using the suction irrigation as a blunt probe .after the cyst is removed ,the base of the capsule is irrigated and coagulated either with co2 laser or bipolar . A grasping forceps helps to approximate the ovarian edges. If ovarian edges overlap ,the defect is left to heal without suturing because adhesions are most likely to follow the use of sutures .if the edges of the ovarion capsule do not spontaneously approximate low power laser applied to the inner surface will invert them .In rare instances one or two in monofilament absorbable sutures may be needed to approximate inside the ovarian edges .The sutures are placed inside the ovary to decrease formation of adhesions.(19)

The literature is reviewed as follows

Factors that increase the risk of leakage during surgical removal of benign cystic teratoma.The contents of mature cystic teratoma can be a potent irritant resulting in chemical peritonitis and thus adhesion formation .According to the above study the likelihood of success of removing the benign cystic teratoma intact was unrelated to age ,preoperative or surgical technique .There are no differences among cystectomy performed by laparotomy in surgeon experience or the presence of adhesions . However surgeons with more laparoscopic experience (>35 laparoscopies /years) were less likely to have intraperitoneal leakage. compared to surgeons with less experience(<20/yrs) at cystectomy .These finding suggest that laparoscopic experience can reduce the risk of leakage at cystectomy .The current study suggests that cystectomy by laparotomy is highly insentive to surgeons experience as measured in years .Post graduate years offer no relative benefit to preventing benign cystic teratoma leakage at laparotomy however laparoscopic experience is highly predictive of success at laparoscopic cystectomy according to different studies rate of leakage from cystic teratoma during laparoscopy is between 13-100% and 40% to 0 % during open procedure .

At laparotomy intraperitoneal leakage during ovarian cystectomy can be minimized by exteriorizing the ovary and placing packs prior to ovarian capsules incision .a similar approach can be taken at laparoscopy with placement of the ovary into a bag prior to cystectomy .some authors argue that copious irrigation with reducer or prevent the risk of peritonitis at laparoscopic cystectomy .For this reason, dermoid cysts have been managed laproscopically

without regard to cyst leakage (21). The laparoscopic approach to larger benign cystic teratoma cysts (>10 cms diameter) may provide some technical difficulties to specimen removal. Commercially available endobags often do not open to beyond 6-10 cms in diameter. Some others suggest laparoscopic assisted colpotomy to retrieve cyst (22) or aspirating and irrigating the cyst fluid until the fluid clears. While comparing short time morbidity and the long time recurrence rate of ovarian and dermoid cysts formation in woman treated conservatively by laparoscopy with the outcome in woman treated by laparotomy the following were observed (23). The mean diameter of the cyst in women who had a laparotomy was larger than in woman who had laparoscopy (9 cms versus 6cms). More women in laparoscopy group had bilateral cysts (16%) while 5% in the laparotomy group. Operating time was shorter in laparotomy group (90 mins) and (102mins) in laparoscopy group. Blood loss was 85 mls in laparotomy group but only 20 mins in laparoscopy group and hospital stay is shorter in laparoscopy group as compared to laparotomy. Conversion of laparoscopy to laparotomy cured in 11% of cases mainly due to cyst size. Re-intervention rate was 7% in the laparoscopy group and 0% in the laparotomy group at two years. Recurrence rate was defined as a surgical re-intervention for a dermoid cyst confirmed by histology. Recurrences were on the same side as the initial surgery and this raises concern about the surgical technique used. This may be due to potential difficulty of completely peeling off the cyst wall. The shorter interval of less than two years and the fact that these cysts may grow slowly and without clinical symptoms together suggest that apparent recurrence may result from incomplete removal. The author concluded that in order to remove the cyst completely care should be taken to remove the cyst wall down to the ovarian hilum. Merely simply cauterizing the deeper area without removing the cyst wall is likely to increase the risk of persistence or recurrence. Another explanation may be that the second dermoid cyst may be missed during laparoscopic surgery. Furthermore the size of the original cyst did not predict the recurrence rate.

Ovarian dermoid cystectomy by laparoscopy is associated with a longer operating time than by laparotomy and this is due to learning curve (24). During this time the operator's skills improve and eventually operating time becomes shorter.

While managing 30 patients with dermoid cysts by laparoscopy surgery and 42 via open technique, Pang Lili concluded the efficiency and safety of laparoscopic surgery in the management of ovarian dermoid cyst. The advantages such as short hospital stay, less blood loss, lack of intra and post-operative complications, less cost as well as quicker return to normal activities and patients' satisfaction were shown in his study.

To minimize the spillage contents of dermoid cyst during laparoscopic cystectomy after separation from the ovary, the cyst was placed into an impermeable bag. The bag was removed using the largest trocar port. When the opening of the bag was completely out of the port, the contents of the cyst were drained in the bag before complete removal. If spillage occurred, lavage of the peritoneal cavity was performed until the irrigation was clear (26).

Despite the fact that laparoscopic management of dermoid cyst is cost-effective and safe there are certain limitations of laparoscopy procedure (27)

Limitations of laparoscopy

1. first and foremost, absence of three-dimensional vision, which decreases depth perception.
2. absence of tactile sense – which is especially important in detecting malignancies and assessing the degree of adhesions.
3. increased dependence on proper surgical instrumentation
4. need for the highly skilled training required for advanced laparoscopic surgical procedures.
5. increased dependence on patient positioning, making it inappropriate for patients who tolerate the lithotomy position.
6. requirement for general anesthesia and steep Trendelenburg positioning which makes patient

ventilation more difficult .patients with compromised pulmonary function particularly those who are obese may not tolerate prolonged laparoscopic surgery as well as laparotomy.

7. laparoscopy doesn't permit the surgeon to explore the bowel and the retroperitoneal space as extensively as does laparotomy and is probably less safe and less effective for treating bowel and ureteral adhesions.

8.unsuitability for patients with large ,solid ovarian masses like ovarian fibromas ,,which must be removed through an enlarged secondary incision when they can't be removed vaginally

9 in women with ovarian cancers, potential for intraoperative leakage of fluid from the cyst (which can worsen the prognosis),incomplete tumor removal ,incomplete surgical staging ,delay in definitive treatment and port site implantation.

10 increased risk of cyst rupture.

11 possible increased risk of trocar site tumor implantation because of the positive intraperitoneal pressure required for laparoscopy

Although few absolute contraindications exist for laparoscopy several risk factors are described below .

Risk factors

Obesity

Obesity is a well recognized factor that increases the risk of any abdominal surgery for laparoscopy increased weight takes on a special significant .woman with a body mass index *(BMI) greater than 25 kg/m² are classified as overweight and those with a BMI greater than 30 kg/m² are considered obese .In such woman every aspect of laparoscopy becomes risky and difficult .Placement of laparoscopic instruments become difficult and require special technique .Bleeding from abdominal wall vessels is more because these vessels become more difficult to locate .Many intra abdominal because procedures become increasingly difficult because of a restricted operative field.

Secondary to retroperitoneal fat deposits in the pelvic side walls and increases bowel excursion into the operative field .It is difficult to place many obese patients in a steep trendelenburg position because of ventilation considerations .The laparoscopic procedures are better in obese patients as several reports suggest that there in a reduced rate of wound infection and wound dehiscence as compared to open.

Age

Older patients are at increased risk of having any concomitant disease processes that effects their perioperative morbidity and mortality. Intraoperative cardiac streee related to anesthesia and the surgery itself may lead to sudden cardiac decompensation based on arrhythmias, ischemia infarct.

Of special importance is the increased susceptibility of elderly patients to hypothermia which may increase the risk of cardiac arrhythmias and prolong recovery time .

Previous abdominal surgery

One of the most important risk factors is previous abdominal surgery .The risk of adhesions of omentum and bowel to the anterior abdominal wall after previous abdominal surgery is greater than 20 % .because laparoscopy involves the insertion of Sharp instrument in to the abdominal cavity a reasonable assumption is that laparoscopic surgery would increase the risk of bowel injury .thus strategies have been developed to reduce the risk of bowel injury in patients with previous history of abdominal surgery .The most common of these strategies is the use of an open techniques for insertion of laparoscopic trocar as first advocated by bowel hasson .Open technique reduce the risk of bowel injury at the site of entry Modification with open technique

have employed blunt entry of the peritoneal cavity with a hemostat to avoid grasping and incising the bowel. For the patient who have previous surgery at the lower abdomen, the introduction of trocar and veress needle at Palmer's point is recommended (one to two cms, below costal margin in mid clavicular line on the left side). A nasogastric tube should be inserted to evacuate the gastric contents.

Anesthetic risk factors

The patients should be seen preoperatively by the anesthesiologists for optimum pre-anesthetic preparations. One of the most important factors is the time since patient is (N.P.O) (nil per oral) because both general anesthesia and increased intra-abdominal pressure increase the risk of regurgitation and resultant aspiration. The optimum gastric emptying time is 6 hours. In case of emergency agents are administered to reduce gastric acidity such as antacids or histamine receptor antagonists, or the use of drug that increase gastric emptying such as metoclopramide.

Heart disease

Preoperative anesthetic evaluation includes to exclude any cardiac disease or to take precautions should the patient suffer from any cardiac arrhythmias, Congestive cardiac failure or any cardiac infarct or blocks. Cardiologists should evaluate the patient as laparoscopic associated metabolic and respiratory acidosis and hypothermia may result in arrhythmias even predisposing patients thus increasing the ischemia even further. Further the patients with ccf (congestive cardiac failure) should be evaluated carefully because due to decrease venous return, there is decrease in cardiac output.

Pulmonary disease

Any patient with a significant history of pulmonary problems should be evaluated pre-op by both pulmonologist and an anesthesiologist. When given an option laparoscopic procedures are preferable. The relative decreased post operative pain following laparoscopy may result in less ventilatory compromise than laparotomy causing fewer problems in patients with atelectasis or pulmonary failure in those with borderline pulmonary function.

Special care should be taken in patients with pulmonary disease. Hypercarbia and decreased ventilation associated with laparoscopy may be deleterious in pulmonary disease with chronic respiratory acidosis. In rare cases, pneumothorax and pneumo mediastinum have been described as complications of abdominal insufflation. In patients with compromised pulmonary functions even a small intravasation of CO₂ could result in significant pulmonary decompensation (28)

Laparoscopic ovarian dermoid cystectomy vs. open procedure in pregnancy

The incidence of surgery during pregnancy is 0.75% (29). The majority of such cases are still approached via laparotomy due to concern about injury during laparoscopic trocar insertion or about high intraperitoneal pressure associated with pneumoperitoneum. A number of studies have documented the safety of laparoscopic cholecystectomy during pregnancy (30-34). A growing body of evidence indicated that laparoscopy for gynecologic and obstetric indication can be performed safely during pregnancy (35). Study by James F Carter concluded that there is no difference existed in birth weight, gestational length, growth restriction infant survival or malformations when laparoscopy was compared with laparotomy except hospital stay. One day for laparoscopic day and 4.4 days for laparotomy patients. During surgery laparotomy patients were placed in the dorsal supine position with a leftward tilt. All laparoscopic patients were placed supine with a leftward tilt and sequential compression devices. Placement of trocar must be modified depending on uterine size and gestational age. Trocar size (5mm to 12mm) should also be modified for gestational age. The author uses an open technique for initial trocar placement. If the uterus is 18-20 wks pregnant or greater, the initial trocar placed above the

umbilicus by using a 5mm trocar via the open technique or radial dilation(versa step) instruments. The remaining trocar are placed under direct visualization varying from 5mm to 12 mm on the affected side .In no case more than 4sites were used including the laparoscope .If the uterus is <18 weeks size ,the initial trachar placement is in the umbilicus not subumblicus .the initial trachar varied from 3mm to 10 mm .Intra abdominal pressure was monitored and care was taken not to exceed 12 mm of hg to ensure adequate venous return and minimize pressure on inferior vena cava .uterine manipulation was kept to a minimum Copious irrigation was used .if the patient was >12 wks size ,indomethgcin was used p/r 50 mg single dose .All laparotomy patients had general anesthesia and a midline abdominal incision. In the hands of skilled surgeons operative laparoscopy is performed safely with minimal hospital stay ,Safe laparoscopic access is paramount and the author suggested hasson techniques for entry the trochar .Modification of trocar sites must be individualized ensuring an effective procedure with minimal uterine manipulation .The location of these trocars relative to the enlarged uterus is key to success .smaller trocars should be used (2-3mm).minimizing co2 insufflations to maximize cardiac output, maternal hepatic flow and minimize fetal acidosis is paramount ,Therefore 10-12 mm of Hg pressure .Continuous communication with the anesthetist combined with sequential compression devices lateral tilting of the patient and routine Foley's catheter is mandatory .Though operating time is longer ,patient benefit from shorter hospital stay and sub subsequent successful pregnancies .

safety and risks of laparoscopy in pregnancy (36)

According to Tulandi the safest time to perform laparoscopic surgery is second trimester it can be complicated by injury to the gravid uterus .During pregnancy open in Laparoscopic approach is recommended Laparoscopic management of ovarian teratomas was managed safely by JedrzeJezak P. in second trimester of pregnancy (37)

Management in pediatric and adolescence

Age group

The advent of smaller laparoscopic instruments has made it possible to perform laparoscopic surgery in young children .In pediatric and adolescent girls operative intervention for an ovarian cyst is significantly more likely to result in ovarian conservation when performed in the presence of a gynecological surgeon.(38)

Conclusion

Literature was searched to compare laparoscopic dermoid ovarian cystectomy versus open technique .it was concluded that laparoscopic procedure is safe and cost effective .the patient had less morbidity both intra and post operative period .there was less hospital stay and reduced rate of infection rate .also there was less post operative pain requiring less analgesia and more patient satisfaction .also resumption to normal activities was earlier .the conversion rate in different studies was about 11% and it was due to technical difficulties due to enlarged cyst size .however spillage rate of cyst contents is more in laparoscopy procedure and care should be taken to safeguard against this .it is mandatory to irrigate the pelvic cavity with large amount of warm normal saline till the saline extracted from the pelvic cavity is clear at the end there was no case of peritonitis in laparoscopy as well as open group .The increased time taken for laparoscopic procedures may be due to the learning curve.

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