

# Laparoscopic Management Of The Persistent Adnexal Mass In Pregnancy: Is It Safe?

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## Abstract

**Objective:** To evaluate and compare the surgical management and outcome of the laparoscopic removal of persistent adnexal masses during pregnancy with laparotomy.

**Study Design:** The records of all pregnant women undergoing adnexal surgery were reviewed between January 1995 and June 1999. A total of 58 cases were recorded.

**Results:** A total of 11 cases underwent laparoscopic management of their persistent adnexal mass and 47 underwent laparotomy. Age, parity, history of previous abdominal surgery, weight, gestational age, size of cyst, gestational age at delivery, rate of caesarean section, birth weight were no different in these two groups. The patients who underwent laparoscopy had a significantly longer operating time (82 vs. 51.1 minutes), shorter hospitalisation (2.1 vs 6.7 days) and less need for parental analgesics (9.1% compared 83.0 %). One recorded case of abortion occurred in the laparotomy group. Histological diagnoses were comparable with cystic teratomata, endometriotic cysts and benign ovarian cyst adenomas being the most common in both groups.

**Conclusion:** Laparoscopic removal of the persistent ovarian mass may be safely performed in pregnancy and offers shorter recovery time and better patient satisfaction compared to the traditional laparotomy.

## SUMMARY CAPSULE

Laparoscopic management of adnexal masses in pregnancy during the second trimester is safe and better tolerated than the conventional laparotomy approach.

## INTRODUCTION

Is interventional laparoscopy indicated and safe when performed in pregnant women? This is a critical question. Recent studies have demonstrated that selected laparoscopic procedures can be performed safely during pregnancy (1), (2), (3), (4).

An adnexal mass may be discovered in pregnancy in 1 in 160 to 1 in 1300 women (5), (6). Persistent tumours are removed to rule out malignancy, avoid possibility of torsion, rupture or infection during pregnancy and also to avoid obstruction during labour. The standard approach to the removal of an adnexal mass during pregnancy is by laparotomy. Previously most surgeons considered pregnancy to be a relative contraindication to operative laparoscopy.

The reasons whereby laparoscopy has been approached with caution are the associated high level of technical ability needed to perform such surgery in a limited operative field

and because concern that the surgical procedure might endanger the baby. This is primarily due to the technical difficulties that would be encountered during operative laparoscopy in the presence of an enlarged uterus and the impact that prolonged pneumoperitoneum may have on the fetus.

A four and a half year case control study was undertaken to compare the safety and efficiency of the laparoscopic management of adnexal mass with that of open laparotomy in pregnant patients.

## MATERIAL AND METHODS

The medical records of all pregnant women undergoing adnexal surgery at KK Women's and Children's Hospital, a tertiary referral center for obstetrics and gynaecology, between January 1995 and June 1999 were reviewed. Patients were divided into two groups: those who underwent laparoscopic procedures and those in whom conventional laparotomy was performed.

The data collected for comparison were patients age, parity, gestational age at diagnosis, gestational age of operation, weight of patient, mean operating time, length of

hospitalisation, need for parenteral analgesics, obstetric outcomes and birth weight.

Statistical analysis was performed by means of the SPSS software programme with t-test and Fisher's Exact tests, where  $p < 0.05$  was considered significant.

In all cases of the laparoscopic management of adnexal masses, an open laparoscopy technique was adopted. A vertical intraumbilical incision was made and the skin's edges retracted with small retractors. The subcutaneous adipose tissues were reflected to expose the linea alba. The exposed deep fascia was lifted and grasped with two clamps. The fascia was held forcibly upwards and incised for approximately 1 cm. Two absorbable sutures were passed one through each fascial edge and tagged. The sutures were held upwards and an opening is then created through the peritoneum. A 10mm cannula together with the laparoscope was introduced into the peritoneal cavity. The fascial sutures were then tied snugly around the trocar to prevent escape of the insufflating gas. The abdomen was insufflated with CO<sub>2</sub> to a maximum pressure of 12mmHg. Additional lateral ports were placed, as needed slightly above the level of the uterus in the right and left lower quadrants. Bipolar coagulation was the mainstay of haemostasis

The entire abdomen was systematically inspected including the ovarian mass, contralateral ovary, pelvic peritoneum, paracolic gutter, liver surface, diaphragm, bowel surfaces and omentum.

## RESULTS

11 women had laparoscopic removal of adnexal mass during pregnancy compared to 47 cases for which a laparotomy was performed. Both groups of women were comparable in age, parity, body weight, past surgical history, cyst size, gestational age of diagnosis and operation. The results are summarised in Table 1.

**Figure 1**

Table 1: Pregnant patients undergoing Laparoscopic Surgery or Open Laparotomy

	Laparoscopy n = 11	Laparotomy n = 47
Age (mean $\pm$ SD)	26.82 $\pm$ 2.64	30.36 $\pm$ 5.08
Parity (mean $\pm$ SD)	0.64 $\pm$ 0.81	0.68 $\pm$ 1.18
History of Previous Abdominal Surgery	1 (9%)	5 (10.6%)
Weight (kg)	56.0 $\pm$ 5.1	56.61 $\pm$ 10.3
Gestational Age (wks) at Diagnosis	27. $\pm$ 2.5 (range 8 - 15)	12.03 $\pm$ 5.6 (range 4 - 31)
Gestational Age (wks) at Operation	14.53 $\pm$ 0.5 (range 14 - 15)	16.00 $\pm$ 6.7 (range 8 - 31.5)
Size of Cyst (cm)	7.72 $\pm$ 1.79 (range 5 - 10)	6.3 $\pm$ 2.5 (range 2 - 15)

Amongst the eleven cases of laparoscopy, three were performed as an emergency procedure as they presented with an acute abdomen. Two patients had a twisted dermoid cyst and one patient had a ruptured endometriotic cyst. Cystectomies were performed in all eleven patients. One of the patients required a mini-laparotomy to decompress and deliver the mass and keeping intraperitoneal spillage to a minimum.

A comparison of operating time, length of hospitalisation and the need for parenteral analgesia was analysed (Table 2).

**Figure 2**

Table 2: Comparison of operating times, duration of hospitalisation and pain relief

	Laparoscopy n = 11	Laparotomy n = 47	
Mean Operating Time (min)	82 $\pm$ 33.89	51.1 $\pm$ 21.44	p < 0.05 Independent t- test
Length of Hospitalisation (days)	2.18 $\pm$ .75	6.7 $\pm$ 1.7	p < 0.0001 Independent t- test
Need for parental analgesia	1 (9.1%)	39 (83.02%)	p < 0.0001 Fisher's Exact test

Obstetric outcomes of all patients are shown in Table 3. There were no preterm deliveries in both groups. Although in the laparotomy group there was one patient who aborted at 20 weeks when she presented with leaking liquor.

**Figure 3**

Table 3: Comparison of obstetric outcome

Obstetric Outcome	Laparoscopy n = 11	Laparotomy n = 47
Normal Term Vaginal Delivery	9 (91.8%)	35 (74.5%)
Abortion	0 (0%)	1 (2.1%)
Caesarean Section	2 (18.2%)	11 (23.4%)
Mean Birth Weight (gm)	2818.45	3030 p > 0.05

All specimens were sent for histological diagnosis. (Table 4)

**Figure 4**

Table 4: Histological diagnosis

Histological Diagnosis	Laparoscopy n = 11	Laparotomy n = 47
Endometriotic Cyst	2 (18.2%)	9 (19.1%)
Teratoma	5 (45.5%)	14 (29.8%)
Benign Serous Cystadenoma	1 (9.1%)	7 (14.9%)
Benign Mucinous Cystadenoma	2 (18.2%)	6 (12.8%)
Corpus Luteal Cyst	1 (9.1%)	7 (14.9%)
Fibroma	-	1 (2.1%)
Fimbrial Cyst	-	1 (2.1%)
Malignant Tumour	-	1 (2.1%)
Others (Broad Ligament Cyst)	-	1 (2.1%)

## DISCUSSIONS

Adnexal masses in pregnancy requiring surgical intervention occur with an incidence ranging from 1 in 81 to 1 in 2500 (7). In K K Women's and Children's Hospital, Singapore, where a total of 68,247 deliveries were recorded between January 1994 and June 1998, there were a total of 58 cases of adnexal masses in pregnancy which underwent surgical intervention (11 cases via laparoscopic approach and 47 cases via laparotomy). The incidence therefore was 8 in 10,000 deliveries.

The traditional and historic teaching in obstetrics has been that any adnexal mass more than 5 cm in diameter diagnosed in pregnancy should be removed (3). Persistent masses are removed often to rule out malignancy, avoid torsion or rupture during pregnancy and to prevent the mass from obstructing delivery. The likelihood of malignancy occurring is in the range of 2 – 5 % (9), (10). Current management strategies involve observation of cysts not suspicious of malignancy until the second trimester; this is when the underlying risk of spontaneous abortion is significantly reduced and when the pregnancy is no longer dependent on the corpus luteum (11). Furthermore, this would allow for the

spontaneous regression of benign cysts like corpus luteal cysts and other functional cysts.

The question of whether interventional laparoscopy during pregnancy is safe can only be answered upon reviewing the reproductive outcome after anaesthesia and operation performed in pregnancy. Two large studies (12), (13) found no increase in the risk of congenital malformation and stillbirths among women operated on during pregnancy. However, one of these studies found an increased risk of spontaneous abortion (risk ratio 2.0) among women subjected to general anaesthesia and gynaecologic surgery during the first and second trimester (12). The other study, which analysed 5405 cases from three Swedish health care registries, found that for women subjected to surgery during pregnancy, the risk of delivery before 37 weeks was 7.5% compared with the expected risk of 5.1% (13). The authors could not determine what roles anaesthesia, the surgery or the disorders that necessitated surgery played in the adverse outcome. The incidence of prematurity and intrauterine growth restriction were reported to be higher in the surgical group too. In our group of patients, there did not appear any significant adverse outcome although one patient suffered an abortion after her laparotomy.

Laparoscopic management of adnexal masses in pregnancy is still controversial. The concerns regarding this approach result from the fear of injury to the enlarged gravid uterus resulting in leakage of amniotic fluid, bleeding and abortion. The relative lack of operating space makes the procedure technically difficult, as excessive manipulation of the pregnant uterus is undesirable. Furthermore, laparoscopic removal of an ovarian cyst is more likely to result in cyst rupture than if it is removed by laparotomy (3). More importantly, the effects of the pneumo-peritoneum on the fetus have not been fully investigated. For obvious reasons, prospective studies on humans have not been performed. Extensive animal studies were performed by several authors. It is well established that the increased intra-abdominal pressure associated with a pneumo-peritoneum can lead to a decrease in venous return with a concomitant decrease in cardiac output. This can lead to fetal acidosis and hypoxia. In addition, carbon dioxide can be absorbed across the peritoneum and can lead to fetal acidosis. Hunter and colleagues meticulously investigated the physiological impact of a CO2 pneumo-peritoneum in these clinical settings. (14) Their conclusions were that a CO2 pneumo-peritoneum created minimal impact on the patient and the fetus when using intra-abdominal pressure of 15mmHg or

less.

A recent study by Curet et al (<sup>15</sup>) also demonstrated that if an intra-abdominal pressure less than 15mmHg of CO<sub>2</sub> were used, it did not affect the outcome or morbidity of the procedure. Other alternatives to CO<sub>2</sub> insufflation like N<sub>2</sub>O (<sup>14</sup>) or abdominal suspension devices (<sup>16</sup>) have been suggested but many of these remain as anecdotal reports without substantiation by proper studies.

The efficiency and safety of laparoscopy in the management of adnexal masses in pregnancy compared to the traditional method of laparotomy is elucidated in our study. There were no significant differences in the peri-operative and post-operative morbidity and mortality but the proven advantages of minimally invasive surgery including decreased pain, shorter hospitalisation and quicker return to regular activity was clearly demonstrated (Table 2). Although the length of operation was significantly prolonged in the laparoscopy group ( $p < 0.05$ ), the authors feel that this may be in line with the “learning curve” that most new procedures encounter. Our preliminary results proving that patients required shorter hospitalisation and decreased usage of parenteral narcotics can have added benefits in the context of pregnancy. This may mean less fetal depression secondary to decreased narcotic use (<sup>17</sup>), (<sup>18</sup>), a lower rate of incisional hernias (<sup>17</sup>), quicker return of gastrointestinal tract activity, decreased rate of premature delivery because of reduced uterine manipulation (<sup>4</sup>), (<sup>17</sup>). In our series of eleven patients, there were no complications recorded. Furthermore, early mobilisation may reduce the risk of thromboembolism.

The authors feel that many of the initial reservations about the use of laparoscopy in pregnancy can easily be overcome. Open laparoscopy should be employed to avoid the risk of injury to the pregnant uterus by either the Verres needle or the trocar cannula. Although the placement of primary trocar through the left upper abdomen and midline supra-umbilical region could be employed (<sup>1</sup>), (<sup>19</sup>), they are still inserted blindly and run the risk of injury to the enlarged uterus and adnexal mass. Placement of accessory trocars must be performed under direct visualisation and exact sites individualised to allow easy manipulation of the adnexal pathology. The use of the head down position or lateral tilt is enough in most instances to expose the adnexal mass. Furthermore, the pregnant uterus tends to displace the adnexal mass towards the top of the uterus (<sup>2</sup>).

Spillage of cyst contents and possible subsequent chemical peritonitis can be avoided by either adopting the

laparoscopic bag retrieval technique (<sup>20</sup>) or controlled aspiration of cyst contents before performing the cystectomy in selected cases. However, five separate studies on the laparoscopic management of adnexal masses in 168 women with benign cystic teratomas reported only two instances of chemical peritonitis (<sup>21,22,23,24,25</sup>). We find that in our study, amongst the nineteen cases of teratomas in our series, (five in the laparoscopy group and fourteen in the laparotomy group); there were no reported cases of chemical peritonitis following the operations although the percentage of rupture was between 20 – 75% (three in the laparoscopy group and three in the laparotomy group). Performing copious irrigation of the pelvis and upper abdomen at the time of laparoscopic surgery appears to limit the risk of chemical peritonitis.

There was no difference in the obstetric outcome between the groups of patients that underwent laparoscopy with those that had a laparotomy. The Caesarean section rate was lower (18.2% compared with 23.4%) in the laparoscopy group but not statistically significant. The mean birth weights of the babies were also comparable. Abdominal deliveries were performed for the usual obstetric indications.

Our data shows that laparoscopy can be safely carried out in the second trimester of pregnancy with good obstetric outcome. With constant improvement of techniques and instruments, the laparoscopic approach to persistent adnexal masses in pregnancy is gradually becoming more acceptable. In addition, patients had significantly less pain, a quicker recovery and shorter hospitalisation. However, to ensure the safety of the fetus and mother, we recommend that the procedure be performed by experienced surgeons adopting careful operative techniques. Surgery should be done in the second trimester and careful inspection of peritoneal cavity with copious lavage and examination of contralateral ovary should be performed in all cases. Our initial experience has been satisfactory and further study of this approach is warranted.

## References

1. Howard MF, Vill M. Laparoscopic adnexal surgery during pregnancy. J Am Assoc. Gynaecol. Laparoscopy 1994; 2 : 91 - 93 .
2. Yuen PM, Chong AMZ. Laparoscopic management of adnexal mass during pregnancy. Acta Obstet Gynaecol Scand 1997; 76 : 172 - 176
3. Parker WH, Childers JM, Canis M et al. Laparoscopic management of benign cystic teratomas during pregnancy. Am J Obstet. Gynaecol. 1996; 174 : 1499 -1501.
4. Curet MJ, Allen D, Josloff RK et al. Laparoscopy during pregnancy. Arch Surg 1996; 131 : 546 - 550 .
5. Sunoo C, Terada K, Kanereryoto L et al. Adnexal mass in

- pregnancy : occurrence by ethnic group. *Obstet Gynaecol.* 1990; 75 : 38 - 40.
6. Hess L, Peaceman A, O'Brien W, et al. Adnexal mass occurring with intrauterine pregnancy: report of fifty four patient requiring laparotomy for definitive management. *Am J Obstet Gynaecol.* 1988; 158 : 1029 - 1034.
7. Kohler Mf. The adnexal mass in pregnancy. *Postgrad Obstet Gynaecol.* 1994; 14 : 1 - 5.
8. Grimes WH, Bartholomew RA, Calvin ED et al. Ovarian Cyst complicating pregnancy. *Am J Obstet Gynaecol* 1954; 68 : 594 - 605.
9. Struyk APHB, Treffers PE. Ovarian tumours in pregnancy. *Acta Obstet Gynaecol Scand.* 1984; 63 : 421 - 424.
10. Tawa K. Ovarian tumours in pregnancy. *Am J Obstet Gynaecol.* 1964; 90 : 511 - 516.
11. Roberts JA. Management of gynaecological tumours during pregnancy. *Clin. Perinatol.* 1983; 10 : 369 - 374
12. Duncan P, Pope W, Cohen M, Greer N. Fetal risk of anaesthesia and surgery during pregnancy. *Anaesthesiology* 1986; 64 : 790 - 794.
13. Mazze R, Kallen B. Reproductive outcome after anaesthesia and operations during pregnancy : a registry study of 5405 cases. *Am J Obstet Gynaecol.* 1989; 61 : 1178 - 1185.
14. Hunter JG, Swansrom L, Thronburg K. Carbon Dioxide pneuo-peritoneum induces fetal acidosis in a pregnant ewe model. *Surgical Endoscopy.* 1995;9 : 272 - 279.
15. Curet MJ et al. Effect of CO2 pneumo-peritoneum in pregnant ewes. *J Surg Res.* 1996; 63 (1) : 339 - 344.
16. Hart RC, Tamoden A, Fitzgibbons RJ et al. Open Laparoscopic cholecystectomy in pregnancy. *Surg. Laparoc. Endosc.* 1993; 3 : 13 - 16.
17. Marrell DG, Mullin JR, Harrison PB. Laparoscopic cholecystectomy during pregnancy in symptomatic patients. *Surgery* 1992; 112 : 856 - 859.
18. Bennett TL, Estes N. Laparoscopic cholecystectomy in the second trimester of pregnancy : a case report. *J. Reprod. Med.* 1993; 38 : 833 - 834.
19. Yuen PM, Rogers MS. Laparoscopic removal of ovarian masses using zipper storage bag. *Acta Obstet Gynaecol Scand.* 1994; 73 : 829 - 31.
20. Canis M, Mage G, Pouly J et al. Laparoscopic diagnosis of adnexal cystic masses : a 12 year experience with long term follow-up. *Obstet Gynaecol.* 1994; 83 : 707 - 712.
21. Peterson W, Prevost E, Edmunds F et al. Benign cystic teratomas of the ovary : a clinico-statistical study of 1007 cases with a review of the literature. *Am J Obstet Gynaecol.* 1955; 70 : 368 - 382.
22. Reich H, McGlynn F, Sekel L et al. Laparoscopic Management of ovarian dermoid cysts. *J Reprod. Med.* 1992; 37 : 640 - 644.
23. Chen J, Ho E, Chen M. Operative Laparoscopy in benign cystic teratomas of ovary. *China Med. J.* 1992; 50 : 194 - 197.
24. Nezhat C, Winer W, Nezhat F. Laparoscopic removal of dermoid cyst. *Obstet. Gynaecol.* 1989; 73 : 278 - 280.

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