

# Symptomatic Ovarian Cyst In Pregnancy -Laparoscopic Assisted Ovarian Cystectomy —An Alternative, Qualitative, Feasible, Safe Option.

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## Abstract

Study objects:

To assess the feasibility and safety of laparoscopic approach for symptomatic ovarian cyst in pregnancy.

Design:

This is a retrospective analysis of symptomatic ovarian cysts in pregnancy of four pregnant women managed by Laparoscopic Assisted Cystectomy.

Setting:

Melaka General Hospital, Melaka, Malaysia - A Teaching tertiary hospital for under and postgraduate students . Patients: Four ante-natal patients with symptomatic ovarian cysts of different sizes ranging from 12 weeks to 26 weeks in 1st and 2nd trimester of pregnancy from August 2005 to May 2007.

Intervention:

Laparoscopic Assisted Cystectomy in pregnancy. Measurements and Main results: Out of 4 four cases, two in first trimester of pregnancy about 9-11/52 (nine to eleven weeks) size presented with acute abdomen. Others were in about 14 to 18 weeks with recurrent pressure symptoms contributing to continuous lower abdominal pain and urinary obstruction. The size of cysts varied from 12 weeks to 26 weeks of pregnancy with clinical diagnosis of serious cyst adenoma in 2 cases and dermoid cyst in another two cases. All patients were duly counseled about the probable anesthesia risk and also the benefits and risks of the open versus laparoscopic approach. Under general anesthesia all case were successfully operated maintaining 10 mm Hg intra abdominal pressure without any Trendelenburg position. Mean blood loss was less than 50 cc with average operating time less than 50 minutes. Mean hospital stay was about 36 hours. There was no miscarriage or preterm labour. All except one (caesarean section) had spontaneous uneventful vaginal delivery with normal apgar score without any gross abnormality. On follow-up, both mothers and babies are well. Histopathology reported benign serous cystadenoma in two cases and mature dermoid cysts in other cases. No evidence of malignancy seen. On follow up all babies had normal growth chart. Conclusion: Laparoscopic Assisted Ovarian Cystectomy in pregnancy in selected cases is a feasible, safe, qualitative and an alternative option.

## INTRODUCTION

Ovarian cysts are fluid-filled, sac-like structures within an ovary. Study on epidemiology reveals the incidence of all types of ovarian cysts during pregnancy one out of 600 (ref1) and in most cases are benign cysts out of which mature cystic teratoma deserves 50% of the cases, followed by benign cyst adenomas (20%), functional cysts (13%) and ovarian cancer (0.6%) while symptomatic Ovarian tumors associated with pregnancy ranges from 1:81 –1:2328 (ref2).

Adnexal masses in pregnancy are now relatively better

appreciated due to the advent and access of high resolution transvaginal ultrasonography. Majority of adnexal masses are asymptomatic and spontaneously resolve prior to the sixteenth week of gestation while persistent, painful and progressive ovarian cysts imparts dilemma in the management as they can cause complications for the mother and fetus (ref3). The appropriate choice of treatment is still in controversy for the asymptomatic ovarian mass in pregnancy (ref4). A major quantum of them is usually managed conservatively with attention to clinical features monitoring and serial ultra sonographic measurement and of course with

necessary appropriate counseling. Surgical intervention either by laparotomies or recently by laparoscopy – minimum invasive procedure-is preferred by some obstetricians with a view to eliminating the potential risk of neoplasia and anticipating complications like twisting, torsion etc in later phase of gestation. While conservatives argue surgery as an over enthusiastic management emphasizing on the physiological aspect of usual vanishing of functional ovarian cysts at about 16weeks of gestation and intra and post operative morbidities relating to both fetus and mother. In selected cases, ultrasound-guided fine needle aspiration (FNA), together with cytological evaluation of the aspirate, laparotomy or laparoscopic cystectomy approach may be considered suitable for the optimal treatment of adnexal masses.

In the present study the author reports the management and the outcome on a series of FOUR cases of symptomatic and progressively increasing ovarian cysts diagnosed and treated by laparoscopic assisted ovarian cystectomy during the first and second trimesters of pregnancy

## RESULTS

This is a retrospective study at Melaka General Hospital, Melaka, Malaysia – a teaching tertiary Hospital. Our intention was-”To assess the feasibility and safety of laparoscopic Assisted Cystectomy for symptomatic ovarian cyst in pregnancy.”

Four Antenatal patients with symptomatic ovarian cysts of different sizes ranging from 9 weeks to 26weeks during 1st and 2nd trimester of pregnancy from Aug’2005- May’2007 were reviewed. (Table1). All cases were admitted with abdominal pain –Three (75%) presented with features suggestive of acute abdomen and one (25%) with chronic abdomen. The average age at presentation was 28years. Primi-gravida and second Gravida amounted 25% each while Two (50%) were Gravida3Para2. Three patients (75%) in the first trimester and one case (25%) in the second trimester were admitted .75% had no antecedent surgical procedure except 1st case that had an emergency lower segment caesarean section for fetal distress fourteen months back.

Trans-vaginal and trans-abdominal ultrasound showed all pregnant cases with live fetus without any pouch of Douglas collection (fig1, fig2, fig3, fig4, fig5, fig6, fig7). All ovarian cysts were more than five centimeters in dimensions and regular, unilocular, without any excrescences or solid

components. Ultra sonographic appearances suggested Dermoid (50%) and Serous cyst in other 2(50%) patients. Tumor Marker (though not so specific ) like CA125, alfafetoprotein were less than normal in all cases. With clinical diagnosis of Benign ovarian cyst in pregnancy, one (25%) case (1st case) was managed conservatively from seventh week of gestation up to fourteenth week when surgical man oeuvre was advised considering progressive , painful nature of the cyst. Other three cases (75%) of ovarian cysts in pregnancy in this series were operated without conservative treatment as they presented with acute abdomen. All pregnant patients were counseled in detail about the benefits and risks of surgery both to the mother and fetus and also the pro and cons of laparotomy versus laparoscopy (especially extracorporeal cystectomy) with general anesthesia. All opted and consented for laparoscopic interferences. Necessary preoperative investigations were found normal and all were fit for General Anesthesia.

Under General Anesthesia and with lithotomic position all patients were dressed with 5% povidone iodine solution, draped accordingly and followed by bladder catheterization. Fetal heart was checked in all cases prior to anesthesia and all along monitored. Verres needle was preferred in all cases and according to the per abdominal size of the gravid uterus including the mass, site of Verres insertion was varied—like 1st case six centimeters above the umbilicus (midline) (fig8, fig9, fig10), 4th case about five centimeters below the left ninth costal cartilage at mid-clavicular line (Palmer’s point) (fig 11) and 2nd, 3rd cases just two centimeters above umbilicus (table2). The assistant actually grasped gently the mass and by tilting the operating table about 15-20 degree to the ipsilateral side of the mass a potential safe space was generated for the subsequent verres insertion. The usual prototype precautions were adopted for insertion of Verres needle and pneumo-peritoneum with carbon dioxide with the only specification to maintain intra abdominal pressure up to 10-12mm Hg and avoiding Trendelenburg position. 5mm telescope was introduced at Verres insertion point and detail intra abdominal structures were viewed in 2nd and 3rd cases while it was impossible to visualize all organs and pouch of Douglas in the 1st and 4th cases because of large ovarian cyst and gravid uterus (fig12). Especially in 4th case (fig13) there was literally no space between the cystic mass and the diaphragm and diaphragmatic excursion was compromised for which the intra abdominal pressure was bound to be reduced to 8 (eight) mmHg. Under direct telescopic vision and with empirical approximation of the said cyst to the

abdominal wall by the assistant, a second five mm port was inserted without any injury either to the cyst or to any intra abdominal organs. Minimal POD collection was found in 2nd and 3rd case and none in 1st and 4th care. About one hundred milliliters of normal saline was poured into the peritoneal cavity and aspirated from pouch of Douglas for cytological evaluation in all cases. Macroscopically Dermoid and Serous Cyst were anticipated in 1st, 2nd and 3rd, 4th cases respectively. Gravid uterus, opposite ovary, fallopian tubes, liver, gall-bladder, undersurface of diaphragm were normal in all cases. Adhesions were encountered in 1st case only and optimal adhesiolysis was required. The 2nd case was twisted about one and half round without any gangreous feature. Per rectal gentle manipulation and cautious untwisting revealed healthy tissues. All the cyst walls were perforated with three in one needle (diathermy, saline instillation and suction instrument) and intra cystic contents were aspirated avoiding spillage (fig14). In 1st case five mm port was replaced by ten mm as the intra cystic contents were thick, hairy and with tooth and cartilages. Maximum care was taken not to touch the gravid uterus and not to stretch the adjacent structures. After suction of cystic contents, a third port was introduced at opposite portion of abdominal pariety to 2nd port and the opening of the cyst was grasped by a Babcock forceps hence avoiding any spillage later. In 4th patient we utilized only two ports (fig15) instead of the usual three and the 2nd port was ten millimeter. Later the cyst was pulled out under direct telescopic vision without stretching to the corresponding ligaments (fig16) and the intra abdominal pressure was reduced to five millimeter of Hg. Extracorporeal cystectomy was performed successfully in all cases (fig17, fig18, fig19) and the edges of ovarian tissues were approximated with 3-0 vicryl with adequate haemostatis and replenished back to the abdominal cavity under direct telescopic vision and pneumo-peritoneal pressure was increased up to ten millimeter of Hg. Peritoneal cavity was flushed with about three liters of normal saline and aspirated out with a view to eliminating any inadvertent cystic leakage.

Thorough inspection of intra abdominal organs including gravid uterus revealed no injury, no bleeding or oozing. Pneumo-peritoneum was stopped and abdominal gases were sucked out and the respective port sites were approximated with 3-0 sub-cuticular vicryl and dressing served (fig20, fig21) Vaginal manipulation was not done in any case. No tocolytics (intra or postoperative) were administered. Average blood loss was less than fifty milliliters and mean

operating time was less than fifty minutes. There was no intra operative complication. One dose of antibiotic (ceftriaxone one gram) was given preoperatively. The fetal heart was monitored all along the procedure and was found to be within normal limit in all cases. Operated cysts were sent for histo-pathological reporting. Postoperative follow up (tab3) was uneventful in all cases. All except One (25%) cases required only one dose analgesic (one dose of Inj. Tramal). No tocolytics were needed. Total mean hospital stay was 2.7days. No miscarriage or preterm labor was encountered. Almost all pregnant ladies were able to return back to work within one week of postoperative period. Histopathology reported Mature cystic teratoma in two (50%) (fig22) and Serous cyst adenoma (fig23) in other 50% cases without any features of malignancies.

## **DISCUSSION AND LITERATURE REVIEW**

Diagnosis of ovarian mass in pregnancy is better appreciated due to the access of high resolution transvaginal ultrasonography while the therapeutic management of adnexal masses especially ovarian cyst in pregnancy is still in a dilemmatic debate (ref5). With the availability of the access to routine obstetric ultrasound examinations, ovarian cysts are now more commonly diagnosed during pregnancy and their management is still a challenging clinical issue among the obstetricians. Emerging evidence suggests that if surgery is necessary, then it is preferable to perform an elective laparoscopic procedure at 16 - 23 weeks' gestation. According to the recent epidemiological studies on ovarian cysts during pregnancy one out of 600 is, in most cases, benign neo-formations. The most frequent histological type reported is mature cystic teratoma (50% of the cases), followed by benign cyst adenomas (20%), functional cysts (13%), and ovarian cancer (0.6%) (ref6). Most adnexal masses are asymptomatic and spontaneously resolve before the 16th week of amenorrhea. On the other hand, some cases are persistent forms which can cause complications for the mother and fetus (ref 7, ref 8).

In the past asymptomatic ovarian masses were usually detected during routine abdominal examination or in course of caesarean section. While symptomatic cases with features suggestive of acute abdomen was usually managed with laparotomy and accordingly untwisting cystectomy or oophorectomy was performed but with the usual morbidity and consequently an unappreciable scar.(ref9). Very few Obstetricians currently perform fine needle aspiration with cytology examination of the aspirate and subsequent

monitoring of ultrasound measurement (ref10). The widespread use of early-pregnancy ultrasound with due preference to trans-vaginal route has dramatically facilitated to evaluate the adnexal masses accurately during early gestational period (ref11). Now problem peeped up both for the dealing physician and for the expectant family for the anticipated further management.

Expectant family members, with literature they ascribe from the internet, are worried about the affect of cyst to mother and fetus. While doctors usually counsel them—"Although the majority of these cystic masses are asymptomatic, apparently benign and resolve spontaneously by 16 weeks (corpus luteum cysts), in some cases clinical complications may occur and compromise the pregnancy outcome". In particular, due to the anatomical, hormonal and vascular changes, a higher incidence of torsion (7.0–28.0%), rupture (1.3–3.7%) and infection (1.2–2.4%) of ovarian cysts has been reported in pregnant patients. Nevertheless, it has been suggested that tumor spillage following cyst perforation could possibly worsen patient prognosis. However, the positive predictive value of sonography in the evaluation of benign adnexal cysts is remarkably high.

Moreover, since the introduction of high-resolution trans-vaginal sonography for the assessment of ovarian disease the diagnostic accuracy has increased noticeably. Thus, excluding the borderline malignancies on the basis of sonographic criteria alone, the presence of a malignant ovarian cyst may be reasonably excluded. The existing criteria after exclusion of neoplastic masses relate to conservative management with anticipating complications attributable to the presence of the adnexal mass itself and their possible effects on pregnancy. The conservative management usually refers to serial clinical features monitoring with repeated ultra-sonono- graphic measurements.(ref11). CA125 testing routinely not follows and though MRI is preferable to CT scanning, but both modalities should be avoided in the first trimester (ref12).

On the other hand, surgical management of ovarian cysts implies a potential risk for both the mother and the fetus and therefore should not be considered as a routine procedure in 2nd and 3rd trime stars of pregnancy (ref13).

Reducing ovarian volume and pressure by cyst aspiration might be sufficient to resolve torsion and/or rupture of the cyst and could result in a prompt resolution of symptoms. However, very few studies have evaluated the therapeutic

value of this procedure during pregnancy and thus its role still remains controversial (ref14). Surgical procedures in selected cases are necessary to avoid later complications. The usual indications are acute abdomen, progressive, painful and persistent nature of the cyst with obstructive features and also expectant mother's request. In view of the benefits of safety, operative morbidities, less cosmetic scar, less hospital stay and consumer's acceptance, laparoscopic surgery in selected cases is preferable and also an alternative approach (ref15). Focusing on laparoscopic maneuvers usually three techniques till date

Available — One group adopt laparoscopic assisted cystectomy (extracorporeal), second category rely on whole procedure intra abdominally (ref16). While third group perform Gasless laparoscopic cystectomy (ref17).

Now questions arise about the anesthetic complications and intra operative injuries based on increased size of gravid uterus, Trendelenburg position, the compromised diaphragmatic excursion after pneumo-peritoneum and carbon dioxide toxemia. With the availability of modern non teratogenic anesthesia(ref18), acceptable intra abdominal pressure selection (10-12 mmHg) and optimal Trendelenburg position, the laparoscopic procedure in pregnancy especially in 2nd trimester (ref19) also in 1st trimester is a safe alternative of course by expert laparoscopic team (ref20). Intra operative injuries can be avoided by proper selection of cases, supra umbilical or Palmer's point port with assistant's protection to the gravid uterus, careful handling of internal structures especially gravid uterus and by extracorporeal cystectomy. Non advertent spillage should be thoroughly washed and aspirated and sent for cytology evaluation (ref21). The heart rate of the fetus should be monitored just before and after surgery (ref22). During pregnancy, the enlarged uterus imparts a compromised space reduction for the first port insertion and exerts an anxiety for the direct perforation to the gravid uterus. In our series three out of four cases we preferred supra umbilical port site and Palmer's site in one. In all cases Verres needle was utilized. Intra abdominal CO2 pressure was all along maintained at 10- 12mmHg without any Trendelenburg position. Intra operatively the enlarged gravid uterus obviates the postero-lateral laparoscopic views. In our cases we adopted ipsilateral reclination of about 15—20 degree and assistant's grasping of the mass to augment our surgical field and to gain a desirable space for the first Verres and first trocar insertion. The visualization of

the adnexal mass is often difficult as it is frequently prolapsed and sometimes impacted in the Douglas pouch. Per rectal gentle man oeuvre assists us in locating, mobilizing and fixing the impacted ovarian cyst. Usually three ports are needed for laparoscopic cystectomy but in one of our cases we successfully completed the extracorporeal procedure utilizing only two ports. In our case series of laparooscopic assisted cystectomy, no cases were complicated with miscarriage or preterm labor. Intra and post operative morbidities are significantly less with this assisted technique most probably due to relatively less intra operative manipulations and reducing the intra abdominal pressure from ten to five millimeter of Hg after evacuation of the cyst. The limited analgesic use, the reduced post-operative pain, the rapid recovery, the appreciation of a cosmetic scar and early resume to work after laparoscopic assisted surgery is noteworthy and favorable for pregnant cases. The use of laparoscopy for the management of adnexal masses in pregnancy has met justified criticism concerning theoretic risks for the mother and fetus due to the lack of controlled evaluation. However, the low percentages of surgery during pregnancy makes it highly unlikely that a randomized prospective study - large enough to detect the differences in major outcome variables such as congenital malformations, fetal losses, premature births, prenatal and maternal complications - could be performed.

**Figure 1**

**TABLE 1**

criteria	1 <sup>st</sup> case	2 <sup>nd</sup> case	3 <sup>rd</sup> case	4 <sup>th</sup> case
Patient's age	32	24	26	30
Gravida status	G2P1	G1	G3P2	G3P2
Gestation at admission	7wk	9wk3days	9wk6days	16wk2days
Gestation at operation	14wk4days	9wk3days	9wk6days	16wk2days
Previous surgery	LSCS	NIL	NIL	NIL
Presenting features	Chr.abdominal pain	Acute abdomen	Acute abdomen	Acute abdomen
Scan findings	Dermoid	Dermoid	Serous cystadenoma	Serous cystadenoma
Cyst size at operation	10.6x8.8cm	8x7.5m	12.5x14.3cm	20.7x12.5cm
POD collection	Nil	Minimal	Minimal	Nil
CA125 level	11	21	17	19

**Figure 2**

**TABLE 2**

Category	1 <sup>st</sup> case	2 <sup>nd</sup> case	3 <sup>rd</sup> case	4 <sup>th</sup> case
Anesthesia	GA	GA	GA	GA
Per abdomen size	26wk	14wk	16wk	26wk
1 <sup>st</sup> veress site	sul	sul	sul	palmars
Abdominal pressure-mmHg	10	10-12	10-12	10
Uterine size	14wk	10wk	10wk	16wk
Ovarian cyst size	About12week	9x10cm	10x8cm	About 10week
POD collection	Scanty	<100cc	<100cc	scanty
Adhesions	moderate	nil	nil	nil
Injury adjacent structures	NIL	NIL	NIL	NIL
Blood loss in cc	<70	<40	<40	>50
Spillage	NIL	NIL	NIL	NIL

**Figure 3**

**TABLE 3**

Criteria	1 <sup>st</sup> case	2 <sup>nd</sup> case	3 <sup>rd</sup> case	4 <sup>th</sup> case
Analgesia	2doses	1dose	1dose	1dose
Tocolytics	nil	nil	nil	nil
Hospital stay	36hrs	26hrs	28hrs	21hrs
Resume to work	1WK	1WK	1WK	1WK
Antenatal follow up	UE	UE	UE	UE
Histopathology report	MCT	MCT	SCA	SCA
Miscarriage/PTL	nil	nil	nil	nil
Delivery	LSCS	SVD	SVD	SVD
Apgar score 1/5minute	9/10	9/9	9/9	9/10
Follow up M/B	UE	UE	UE	UE

ABREVIATION(table):

Pt—patient

Wk---week

D-----days

LSCS- Lower segment caesarean section

Ac abd- Acute abdomen

Ch abd pain- Chronic abdominal pain

Ser—Serous

GA-General Anesthesia

SUL-Supra umbilical line

PP-Palmer's point

Hrs-Hours

UE- Uneventful

MCT-Mature cystic teratoma

SCA -Serous cyst adenoma

PTL-Preterm labor

SVD-Spontaneous vaginal deliveries

M&B-Mother and Baby

In conclusion, considering the increased rate of open operative complications during pregnancy the role of proper surgical intervention should be re-evaluated. Although our series is small, we believe that, in selected cases, this minimally invasive technique adopting extracorporeal cystectomy proved to be safe, well-tolerated, highly effective and good consumer acceptability.

## CONDENSATION

In selected cases, Laparoscopic assisted cystectomy in pregnancy may be considered as a safe, alternative and feasible qualitative option.

Abbreviations:

FNA: Fine Needle Aspiration

CA-125: Carcino Antigen 125

AFP-alfafetoprotein

POD: Pouch of Douglas

Inj.: Injection

MRI: Magnetic Resonance Imaging.

MIS-minimum invasive surgery

Tab-table

Fig-figure

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