Maternal and Fetal Outcome of Pregnancies Complicated by Ovarian Tumor

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Introduction: Ovarian tumors when occur, endanger two lives, mother and that of fetus. It becomes a therapeutic challenge to evaluate the necessity of immediate intervention for maternal indication versus delaying therapy for fetal indication.[1] Majority of these cysts are benign and usually are functional cysts, dermoid or cystadenomas.[2] 2-5%of adnexal masses during pregnancy are true malignant neoplasms.[3] Ovarian cancer being the second most frequent gynaecological cancer complicating pregnancy has an average estimated incidence of 1 in 2500 deliveries.[4] Keeping in view all that, a study was conducted in Fatima Memorial Hospital to see maternal and fetal outcome of pregnancies complicated by ovarian tumors.

Objective: To determine the maternal and fetal outcome of pregnancies complicated by ovarian tumors.

Study Design: Case series descriptive study.

Setting: The study was conducted in obstetrics and gynaecology department of Fatima Memorial Hospital, Lahore.

Duration of Study: This study was conducted for one year.

Subjects and Method: All 14500 pregnant ladies, who visited antenatal clinic and emergency of Fatima Memorial Hospital Lahore for one year, were considered to sort out pregnancies complicated by a co-existent ovarian mass of > 5 cm.

Results: Of all 36 patients, included in current study, 24 had surgical and 12 had conservative management**.** Obstetric outcome revealed one preterm delivery after conservative management. Surgical intervention resulted in two abortions, two preterm and twenty term deliveries. In both groups, the ratio of abdominal and vaginal delivery was 1:2 respectively. Fetal outcome revealed only one preterm and one IUGR infant in conservative group while surgically managed group revealed two preterm infants, two IUGR and one infant with septicemia.

Conclusion: Surgical intervention is a reasonable approach to deal with cases of ovarian tumors with pregnancy, but conservative management may also have comparable obstetric outcome provided the selection criteria for patient is, asymptomatic ovarian mass of less than 8cm that is not suspected of malignancy.

Key Words: Ovarian tumors, Pregnancy, Neoplasm, Cyst, Cancer, Septicemia.

Ovary is an almond sized pelvic organ, located on each side of uterus, having a biological function of producing eggs and releasing female sex hormones including estrogen and progesterone to regulate a woman's obstetric and menstrual life. On histology, ovarian tissue is made up of three types of distinct cells.

- Surface epithelial cells.
- Germ cells.
- Stromal cells.

Like any other organ in our body, ovary may be a site of infection, inflammation, and endometriosis or ectopic pregnancy. But tumor formation is the most important pathology due to its potential of being lethal. Ovarian tumor is an abnormal mass of tissue that arises from any of residential cells of ovary and shows a biological behavior of being localized to ovarian tissues or sometimes metastasizing to different organs of our body either through lymphatic or through blood vascular system. On the other hand, pregnancy is a physiological state of Childbearing that becomes a matter of pathological concern if gets complicated by an ovarian tumor. Therefore, ovarian tumor with pregnancy is a special case not only because of dangers of surgery to fetus but also due to potential hazards of surgery, malignancy and tumor complications to mother. At the same time it becomes a therapeutic challenge for the medical team to evaluate the necessity of immediate intervention for maternal indications versus delaying therapy for fetal indication.

Expectant treatment may be preferred because of concern of fetal loss or preterm delivery after operation. While elective surgery may be recommended because of fear of malignancy, adnexal torsion, cysts rupture or hemorrhage which can cause both maternal and fetal morbidity.[5]

Therefore standard treatment for these patients is expectant until second trimester, followed by removal of any mass that persisted. This logical approach not only allows for resolution of most functional cysts but also skips the period during which pregnancy survival is dependent upon corpus luteum.[6,7]

With current ultrasound practice, an approximately one percent detection rate of ovarian mass is noted in pregnancy.[8] Of all ovarian tumors noted in pregnancy, 50 percent are less than 5 cm in diameter, whereas 25 percent are between 5 and 10 cm, and 25 percent are greater than 10

cm at the time of discovery. In addition 95% of these tumors are unilateral.

However the possible indications for removal of an ovarian tumor during pregnancy are;

1. Elimination of a possible cause of dystocia.
2. To prevent torsion, rupture or hemorrhage of an ovarian tumor.
3. To rule out malignancy.

Based upon recent data, risk of above-mentioned complications is low and the accuracy of ultrasound screening is very high, therefore expectant treatment is feasible in most cases. However there are certain cases which necessitate surgical management. What those cases are? And what effects this management strategy may have on maternal and fetal outcome?

These are the questions upon which current study is based. In fact, it is an attempt to contribute towards settlement of controversies surrounding this clinical dilemma.

Objectives:

To determine the maternal and fetal outcome of pregnancies complicated by ovarian tumors.

Material and Methods

Setting: This descriptive study was conducted at Fatima Memorial Hospital Shadman Lahore.

Duration of Study: This study was conducted for one year.

Sample Size: During one year of my study period, 14500 pregnant ladies visited antenatal clinic and emergency of Fatima Memorial Hospital Lahore. Out of which 36 pregnancies were found to be complicated by ovarian tumors.

Sample Technique: Sample was taken on random basis.

Sample Selection

Inclusion Criteria

Any woman admitted through emergency or outpatient department, having an ultrasonographically confirmed intrauterine pregnancy with an ovarian mass of more than 5 cm, at any gestational age, with whatever mode of presentation, were included in this study.

Exclusion Criteria

All non-pregnant ladies or pregnant patients with unilateral, simple cyst of < 5 cm disappearing before sixteen weeks of gestational age were excluded from this study.

Study Design

It was a descriptive study. Study population was followed in a prospective manner for one year.

Data Collection

FffgrtXX All patients with ultrasonographically confirmed intrauterine pregnancy and ovarian mass of > 5 cm were considered to be admitted in antenatal ward or in emergency, according to mode of presentation. Parameters examined included gestational age, past obstetric history, symptoms, signs, and results of investigations including ultrasonographic characteristics of ovarian mass. Management (either surgical or conservative) was planned according to clinical situation. Whatever the treatment, if pregnancy survived after admission, antenatal visits for these patients were arranged fortnightly till 28 weeks, weekly till 37 weeks and biweekly until delivery. Follow up included enquiry about symptoms and ultrasnographic characteristics of ovarian mass (to be evaluated after every 4 – 6 weeks). Maternal morbidity was assessed by duration of hospital stay, number of readmissions, nature of surgery, postoperative complications and maternal health after delivery or abortion.

Information about obstetric outcome was taken from the referring obstetrician or the pediatrician, who had examined the newborn. It included birth weight, Apgar score, gestational age at delivery and mode of delivery either vaginal or abdominal.

Results

During one year of my study period at Fatima Memorial Hospital Shadman Lahore, thirty-six pregnant ladies were found to be having a coexistent ovarian tumor. Of these thirty-six patients, four (11.1%) were diagnosed in first, twenty (55.5%) in second, and remaining twelve (33.3%) in third trimester of pregnancy. Only four of all these patients were received in emergency with acute abdomen, two were diagnosed at the time of caesarean section and rest thirty were detected as an incidental finding on obstetric ultrasonography. Surgical intervention in antenatal period was planned for twenty-four of all these patients and only twelve of all these were managed conservatively. Of all these twenty-four surgical interventions, four were done as an emergency procedure and remaining twenty as elective one.

Both of expectantly and surgically managed groups of patients were comparable in parameters like average age (29.1 vs. 28.6) parity (2.3 vs. 2.5), number of previous surgeries (0.83 vs. 0.83) and birth weight (3.1 vs. 2.5). The only parameter showing big difference between the two groups was average gestational age at diagnosis, which was 26.3 weeks in conservative and 20.6 weeks in surgically managed group.

Moreover all patients with conservative management had an average cyst size of 8.17 cm that is much smaller than those who had surgical intervention and showed an average cyst size of 13.67 cm. The comparison of this data is summarized in Table 1.

Average duration of hospital stay was 7.5 days and number of readmissions was 1.7 times in conservatively managed patients. This is less than those of surgically managed patients that revealed an average duration of hospital stay of 9.3 days and average number of readmissions for 1.9 times. The comparison of these data is summarized in Table 2.

Table 1: *Distribution of Cases by Surgery or Conservative Management.*

Parameters	Management opted	
	Conservative n = 12	**Surgical n = 24**
Age (Years)	29.1	28.6
Parity	2.3	2.5
Cyst size (cm)	8.1	13.6
Gestational Age at diagnosis (Weeks)	26.3	20.6
Previous surgery	0.83	0.83
Birth weight (Kilograms)	3.1	2.5

Table 2: *Number of Readmissions and Duration of Hospital Stay in Conservative and Surgically Managed Patients.*

Parameters	Management opted	
	Conservative n = 12	**Surgical n = 24**
Duration of hospital stay (days)	7.5	9.8
Number of readmissions	1.7	1.9

Our study group showed two main indications for surgical exploration during antenatal period and those were torsion and suspected malignancy.

Type of surgical procedure, required for standard operative intervention in each unique case was variable. Of all procedures oopherectomy with staging biopsies was the most frequently performed procedure (in 40.4% of all cases).

All surgical interventions resulted in minor post-operative complications. These complications included fever that occurred in twelve patients (33.3%), wound infection in eight patients (22%), urinary tract infection in six patients (16.7%) and septicemia in two patients (5.5%). Of all these patients, eight patients (22.2%) had a smooth postoperative course without any complication.

Surgically managed group of patients had all their babies delivered at term except two (8.3%), both delivered at 34 weeks of gestational age with average 5 minutes Apgar score of 10/10. Two (8.3%), of all these surgically managed patients, experienced abortion, at 12-14 weeks of gestation. In both of these cases preceding event was an emergency laparotomy in first trimester of pregnancy for suspected torsion. This is in comparison with conservatively managed group of patients, none of them had any abortion but only one (8.3%) preterm delivery at 36 weeks of gestation and remaining eleven were delivered at term. Comparison of this obstetric outcome is summarized in Table 3.

Table 3: *Comparison of Obstetric Outcome.*

Obstetric Outcome	Conservative management		Surgical management	
Term delivery	**No of cases**	**% age**	**No of cases**	**% age**
	11	91.7 %	20	83.4%
Pre term	1	8.3%	2	8.3%
Abortion	0	0.0%	2	8.3%
Total	12	100%	24	100%

Mode of delivery was found to be vaginal in sixteen (66.7%) of all surgically managed group of patients, while eight patients (33.3%) were delivered abdominally but for normal obstetric indications. However, conservative management endorsed abdominal delivery in four patients (33.3%) and vaginal delivery in eight (66.7%) of all these patients.

Fetal outcome revealed comparable results in both the groups there was only one (8.3%) preterm fetus delivered at 36 weeks in conservative group while surgically managed group revealed two (8.3%) preterm fetuses both delivered at 34 weeks. No stillbirth was seen in either group. However IUGR was seen in two fetuses (8.3%) of surgically managed group and one fetus (8.3%) in conservative group. All babies were born with five minutes Apgar score 10/10. And no baby showed signs of bone marrow depression or any bleeding disorder in early neonatal period in both the groups. One (4.2%) fetus showed signs of septicemia during first week in surgically managed group.

Discussion

Ovarian tumors complicate pregnancy with an average estimated incidence of 1 in 1000 deliveries.[9] In Fatima Memorial Hospital Shadman Lahore, a total of 14500 pregnant ladies were observed in one year and thirty-six pregnancies were found to be complicated by ovarian tumors with an incidence of 2.6 per 1000 deliveries This incidence is two and half times that was reported in another local study, In fact, it does not reflect the exact incidence of this rare occurrence, as this hospital provides services not only for predetermined population of Lahore city but also for patients who are referred from remote areas where, general practitioners identify these as abnormal finding not to deal with.

Before the use of ultrasonography, the incidence adnexal mass complicating pregnancy was reported to be 1 in 2200 deliveries, which again represents one fifth of the incidence reported by current study.[10,11] Most probably, it is due

to the fact that previously, diagnosis of an adnexal mass was made only when it became symptomatic or was discovered as an incidental finding on pelvic examination in early pregnancy. But, in last two decades a dramatic increase in the use of obstetric ultrasonography has undoubtedly enhanced the detection rate of asymptomatic adnexal masses, not recognized in preultrasound era.

The gestational age, at which diagnosis of an adnexal mass was made most frequently, is widely variable. Recently in a study report on 76 pregnant patients, 71.05% patients were diagnosed in first, 20% in second and 9% in third trimester of pregnancy.[12] In contrast to this observation, in our group of patients was confirmed to be having a co-existent ovarian tumor in second trimester of pregnancy in 55.5% of cases followed by 33.3% in third and 11.1% in first trimester of pregnancy. No doubt, first trimester is the best time for diagnosis of an adnexal mass as till that time, pelvic mass is confined to the pelvis and can, not only be palpated easily but can also be demonstrated on ultrasound with fair specificity. In current study, it is not the case and this gross difference is due to the unawareness of our pregnant population for early booking, who used to come for their first antenatal visit in second or third trimester of pregnancy, thus best period of detection of a pelvic mass is skipped.

In current study we have not included ovarian masses of less than 5cm, which constitutes 50% of all adnexal masses, diagnosed during pregnancy and are considered to be functional one. Therefore, current study demonstrated second trimester as the best time for diagnosis of an ovarian tumor as compared to other studies, which documented first trimester as the best one. In addition to this, third trimester may also be a critical period for diagnosis of ovarian mass, but most of these cysts have already been resolved by that time and an enlarged uterus may make its recognition difficult not only on bimanual vaginal examination but also on ultrasonography.

An international study demonstrated 25% of all pregnant ladies with an ovarian tumor to be symptomatic. In our study population, acute symptoms occurred in 11.2% of all patients, this undoubtedly demonstrated less than half of the proportion documented in the aforementioned study A reason being that most of the time, these adnexal masses become symptomatic at gestational ages when pregnancy has neither been recognized nor been suspected by non-gynecological personals, who operated upon these cases for an indication of acute abdomen without any consideration for referral to specialist center. Moreover, the term "symptomatic| is wide enough to include all symptoms ranging from mild backache to severe lower abdominal pain. Most of the studies did not demonstrate the criteria for labeling a patient to be symptomatic.

The traditional and historic teaching in obstetrics has been that any adnexal mass more than 5 cm in diameter, diagnosed during pregnancy, should have been removed as early as possible irrespective of the gestational age.[13] Later on, trends changed to wait for second trimester for doing elective surgery of an ovarian mass that persisted beyond sixteen weeks of gestational age.[14] But now, current approaches are to manage these cases expectantly, especially when mass is not suspected of malignancy. If at all surgery is to be done, it should be considered to be done through laparoscopic approach, provided all contraindications for this procedure have been ruled out.

The question, whether expectant or surgical management during pregnancy is safe, can only be answered upon by reviewing the obstetric outcome after anesthesia and operation performed during pregnancy in comparison with the obstetric outcome of expectantly managed group of patient.

Two large studies found no increase in the risk of congenital malformations and stillbirths among women operated, upon during pregnancy. However, one of these studies found an increased risk of spontaneous miscarriage (RR 2.0) among women subjected to general anesthesia and gynecological surgery in first and second trimester of pregnancy.[15]

The other study, which analyzed 5405 cases from three health care registers, 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% in general population. In both of these studies authors could not determine, what roles anesthesia, surgery or the disorders that necessitated surgery played in the adverse outcome? However, the incidences of prematurity and intrauterine growth retardation were reported to be higher in the surgical group.

In our study however, prematurity and intrauterine growth retardation were equal in both conservative and surgical group (8.3%). Another study[16] showed no increased risk of bone marrow depression, bleeding disorder, or congenital malformation in infants of these women, being managed conservatively or surgically, this observation corresponds well with our study, where no infant showed any congenital anomaly, bleeding disorder, or bone marrow depression.

In our group of patients, there did not appear any significant adverse outcome for conservative management, as all of these patients except one, were delivered at term. This observation seems to be well in correspondence with the international study.

In current study, surgical intervention during pregnancy resulted in two preterm deliveries, both at 34 weeks of gestational age. This constitutes an expected risk of 8.3% for preterm deliveries in these patients that is comparable as documented by an international study.[17] However two of all surgically managed group of patients, experienced abortion after laparotomy. In both cases of abortion, the preceding event was emergent surgical exploration for torsion of an ovarian cyst, in first trimester of pregnancy. Therefore, emergency surgery for acute gynecological indications especially in first trimester of pregnancy is an independent risk factor for occurrence of spontaneous miscarriage. Lack of expertise and improper preoperative preparation are the most possible explanations for adverse pregnancy outcome

after emergency surgery. However, case control studies are awaited to document pregnancy outcome after emergency surgery in comparison with that of elective one.

Another risk factor for adverse obstetric outcome is first trimester surgery for non-obstetric indications. This statement is supported by evidence that in first trimester, pregnancy survival is dependent upon an intact corpus luteum, removal of which may end this pregnancy in spontaneous abortion.[18] Therefore, it is suggested that elective surgery for ovarian tumors during pregnancy should not be attempted in first trimester of pregnancy especially before seven weeks of pregnancy.[19]

Conservative management of ovarian tumors during pregnancy is still controversial. The concerns regarding this approach resulted from the fear of malignancy that occurred with an average estimated incidence of 3 – 5%. At the same time, an expectantly managed ovarian tumor during pregnancy may undergo torsion or rupture resulting in still adverse obstetric outcome. Another potential hazard that has to be experienced by these patients is the risk of abdominal delivery for an impacted ovarian tumor that hindered the descent of head per vaginum.[20,21]

In present study, the risk of malignancy was found to be 11.1%, which is twice the risk that was reported in two international studies, both of these studies have demonstrated a risk of 4-5% for occurrence of malignancy in these patients. However, all these studies were based upon designs, which included all pregnant ladies with an ovarian mass of whatever size. But, our study sample excluded all those who had ovarian cyst size of less than 5 cm. and therefore, a small sample size have indirectly concentrated the occurrence of malignancy in our study population.

In all these cases, ultrasonography was found to be fairly specific in anticipating the risk of malignancy in an adnexal mass complicating pregnancy.

Another threat for expectantly managed group of patients is that of torsion. Our study population experienced this complication in four cases only, thus constituting an incidence of 11.1% that is same as was reported in an international study. All cases of torsion were recorded between 12-14 weeks of gestational age. It is well documented that before second trimester, uterus size is not enlarged enough to hinder the mobility of relatively lax and elongated adnexal ligament that may undergo torsion relatively easily. But, in second and third trimester of pregnancy, non-availability of space makes this occurrence very much unlikely. Therefore, it has been found that most cases of torsion had occurred earlier in pregnancy; this suggested that scheduling operation to remove an adnexal mass in second trimester of pregnancy appeared to have a minimal impact in preventing these occurrences.

Conservative management of an adnexal mass may sometimes end this pregnancy in abdominal delivery for an indication of obstructed labour. This is in contrast with our study results, which showed no case of such complication. The routine policy of preserving expectant management for only those who have cyst size of no more than 8 cm is the most probable explanation for non-occurrence of this complication in our study population. Therefore, in our study group, conservative or surgical management follows the same proportion for abdominal and vaginal delivery, which is in ratio of 1-2 respectively.

Other important aspects of current study include average duration of hospital stay and number of re-admissions, which were found to be decreased in cases of expectantly managed group of patients when compared with those who had surgical intervention during pregnancy.

On the balance, each of conservative and surgical management has its advantages and disadvantages. Therefore, once the diagnosis is made, its further evaluation and management will always depend upon gestational age, mode of presentation, ultrasnographic characteristics of ovarian mass, parity and wishes of patient about her future fertility.

Conclusion

The conventional method of laparotomy for any ovarian mass that persists beyond sixteenth week of gestation is a reasonable approach while dealing this therapeutic challenge. But, conservative management can also be offered without imposing any threat of adverse outcome in comparison with that of surgical approach provided the ovarian mass is neither symptomatic nor suspected of malignancy when examined by an expert ultrasonologist.

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