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Clinicopathological Analysis of Adnexal Masses Detected During Pregnancy and Caesarean Section in a Tertiary Care Centre: A Retrospective Study

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ABSTRACT
Pregnancy introduces unique challenges, including adnexal masses that can impact maternal and fetal health. To analyse the clinical and pathological features of adnexal masses detected during pregnancy and caesarean sections. This retrospective observational study, conducted at the Amrita Institute of Medical Sciences from 2016-2023, aims to analyse the clinic-pathological features of adnexal masses, particularly those >4 cm. A total of 35 patients with adnexal masses were identified among 11,425 deliveries during the study period June 2016-2023 (0.3%). The mean age of presentation was 29.8, with more than half in their first pregnancy. The majority (77.1%) of masses were benign but four malignancies and one borderline were reported. The acute complications included torsion (17%) and haemorrhage (2%) all of which were managed through antenatal intervention, laparotomy or laparoscopy with a good pregnancy outcome. Though most of the adnexal masses can be managed conservatively, surgical intervention and histological examination in symptomatic and suspicious cases suspected of malignancy remain the treatment of choice even during pregnancy. Adnexal mass, gestational age, international ovarian tumor analysis, malignancy, ovarian cyst, pregnancy.

INTRODUCTION

Pregnancy is a profound and transformative phase in a woman's life, marked by intricate physiological and anatomical changes to accommodate the developing fetus. While the majority of pregnancies progress smoothly, certain conditions, such as adnexal masses, introduce unique challenges[1,2]. Adnexal masses encompass a broad spectrum of lesions originating from the ovaries, fallopian tubes or surrounding tissues. The accurate identification of these masses is critical as untimely interventions or delays in management can significantly impact both maternal and fetal well-being[2,3].

Managing adnexal masses during pregnancy demands a delicate balance, considering factors like mass type, size, gestational age and the overall health of the patient. Striking this balance is essential to avoid unnecessary surgical interventions that might jeopardize the pregnancy while ensuring timely action when required. Understanding the implications of adnexal masses during pregnancy is crucial for providing comprehensive and evidence-based care[3,4]. The incidence of adnexal masses during pregnancy is estimated to be 0-2% depending on the stage of pregnancy with a 1-6% malignancy rate the vast majority of these masses are benign[3-5].

The recent literature also highlights the well-tolerated use of laparoscopy for the antenatal removal of suspicious or symptomatic masses and that expectant management of asymptomatic masses does not increase the risk of adverse pregnancy outcomes[7]. This research aims to delve into the clinicopathological features of adnexal pathology during pregnancy, focusing on cases detected during routine antenatal care and those incidentally discovered during caesarean sections. Spanning seven years at a tertiary care center the study seeks to shed light on the incidence of adnexal masses during pregnancy, their potential impact on maternal health and fetal development and the association between pregnancy outcomes and adnexal masses[4-8].

MATERIALS AND METHODS

The Department of Obstetrics and Gynaecology at the Amrita Institute of Medical Sciences conducted this retrospective observational study from 2016-2023 June. The primary objective was to comprehensively analyse the clinical and histopathological characteristics of patients with adnexal masses detected during pregnancy, particularly those exceeding 4 cm in size. The study also encompassed cases where adnexal masses were incidentally discovered during caesarean sections. Out of 11,425 deliveries, 35 patients with adnexal masses were identified.

Inclusion criteria:

- Patients with adnexal masses >4 cm detected during routine antenatal care
- Patients presenting with acute abdominal pain and an acute abdomen with an ovarian cyst
- Incidentally detected adnexal masses during caesarean sections

Exclusion criteria:

- Patients with adnexal cysts $\leq$3 cm in size
- Patients with incomplete medical records

All relevant data were collected from electronic medical records and labour registers in a pre-designed proforma, which included demographic characteristics such as age, parity, pregnancy trimester, features of adnexal masses, clinical presentation, symptoms, pregnancy complications, intervention details, type of intervention and histopathology. All the data was entered into Microsoft Excel and kept confidential. Ethical clearance was obtained from the Institute Ethics Committee.

Data analysis: Data were collected from electronic medical records, case files and labor records and subsequently entered into an Excel file for analysis. The statistical analysis aimed to provide a comprehensive overview of the clinicopathological features of adnexal masses during pregnancy. The mean age and standard deviation (SD) were calculated to understand the demographic distribution.

RESULTS

Baseline characteristics of the study subjects Of the 11425 antenatal patients delivered during this study period, 35 were evaluated for adnexal mass and recruited for the study (0.3%). The findings of this study, encompassing a cohort of 35 patients, provide a demographic snapshot that reveals a mean age of 29.8 years with a standard deviation of 5.7 years. The youngest participant was 22 years old, while the oldest was 47 years old. Most of the adnexal mass was found in the age group of 22-35 years. The majority of them were primi gravida 19 (54.3). The majority of them were in the 1st trimester 21 (60%) mean (SD) The gestational age of the study subjects was 14 (10) (Table 1)

The majority of the study subjects didn't present any symptoms. 19 (54.2%) and 16 (46%) of the study subjects presented various symptoms the most common being acute abdominal pain (35%) followed by gastric discomforts like distension and vomiting (20%). One unusual symptom for vulval and facial oedema and ascites was reported following an insect bite and during abdominal ultrasound, both ovaries

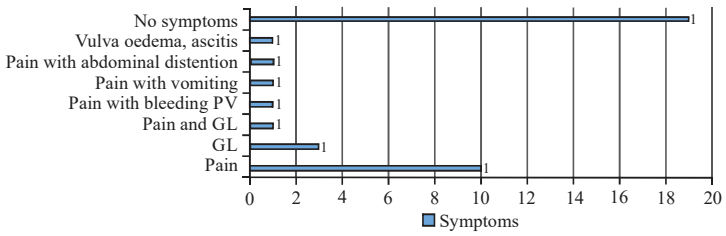

Fig. 1: Stymptoms

Table 1: Characteristics of women operated for adnexal masses in a tertiary care hospital from (n = 35)

Variable	Characteristics	N (%)
Age	22-27yrs	15(42.9)
	28-35yrs	15(42.9)
	35 years above	5(14.3)
Mean age	29.8±5.7 Minimum age 22 and maximum 47 years	
Parity	Primi	19(54.3)
	Multi	16(45.7)
Gestational Age	1st Trimester	21(60)
	2nd trimester	9(25.7)
	3rd trimester	5(14.3)
Mean GA	14±10 Lowest GA 4weeks and maximum 37 weeks	

Clinical presentation of women with adnexal masses(n = 35)

Table 2: Clinical and histopathological characteristics adnexal masses (n = 35)

Variables	Characteristics	N(%)
Adnexal masses size	7.4±2.5, maximum size 14.3 and minimum size 4 cm	
Change in mass	Increased	5(14.3%)
	No change	28(80%)
	Reduced	2(5.7%)
Side affected	Right side	17(48.6%)
	Left side	10(28.6%)
	Bilateral	8(22.9%)
Type of Mass	Benign	27(77.1)
	Malignant	4(11.4%)
	Border line	1(2.9%)
Ultrasound characteristics	Simple (40%)	14(40%)
	Complex (33%)	18(51.4%)
	Solid (3%)	2(5.7%)
Histopathology		
Epithelial Ovarian	Serous	5
	Mucinous	1
Germ cell	Dermoid	9
	Dysgerminoma	1
Tumour like	Endometriosis	3
	Corpus leuteal cyst	1
	follicular cyst	2
Others	Para-ovarian	3
	Para-tubal /Hydrosalpinx	1
		1
Malignancies	High-Grade Serous Cystadenocarcinoma	2
	Dysgerminoma	1
	Microinvasive serous carcinoma	1

were enlarged to 12 cm. She was managed conservatively with steroids Fig 1. The mean size of the adnexal mass was 7.4±2.5 cm, with a maximum size of 14.3 cm and a minimum size of 4 cm. Seventeen percent of masses exhibited an increase in size and 5% showed a reduction in size. The majority of the cases presented adnexal mass on the right side (48.6%) followed by the left side (28.6%) and bilateral (22.9%). Most of the adnexal mass was benign (77.1%) and four lesions were malignant. Four malignancies were reported, including two high-grade serous cystadenocarcinomas, one each of germ cell tumors, and one serous borderline with micro-invasion.

Ultrasound showed 40% simple, 33% complex and 3% solid cysts. Histopathology revealed nine dermoids, one serous borderline, one endometriosis, one hemorrhagic cyst and one mucinous borderline. Of the symptomatic patient's majority presented with abdominal pain. 22.9% of them experienced complications; the most common complication was a torsion in six patients. In the assessment of acute events in a total of 8 cases, various conditions were

Table 3 Maternal and fetal complications

Variables	Characteristics	N (%)
Common Symptoms	Abdominal pain	8
Back pain	3	
Pressure symptoms	3	
Gastric symptoms	4	
Ascites and Edema	1	
Complication	Yes	8(22.9%)
No	27(77.1%)	
Maternal Comorbidity	Preeclampsia	1
Diabetes	2	
Carcinoma breast	1	
PPROM and chorioamnionitis	1	
Chron's disease	1	
Bronchiectasis	1	
Acute symptoms	Torsion	6
Hemorrhage	1	
Enlargement	1	
Fetal Complications	Incomplete miscarriage	1
Sacrococcygeal Teratoma	2	
Trisomy	1	
Fetal growth restriction	2	
Prematurity	2	

Table 4: Timing Interventions and type of surgical procedure

Variables	Percentage
Type of procedure	
Cystectomy	62.86
Ovariotomy	8.57
Staging laparotomy	11.83
Ovarian biopsy	5.43
Conservative	6.51
Lost follow up	4.80
Mode of delivery	
LSCS	57.1
Vaginal	31.4
Termination of pregnancy	11.4

observed. Torsion occurred in 6 cases, with 5 cases identified as antepartum torsion and one case as postpartum torsion. Additionally, 1 case involved hemorrhage, and there was 1 case each of enlargement. Pregnancy was terminated in four patients on account of a diagnosis of malignancy, trisomy 21 for the baby, an inevitable miscarriage after laparoscopy, and one evacuation done for a missed miscarriage Table 3 and 4.

Table 4 shows the examination of different types of procedures across a total of 35 cases. Various interventions were identified. The most common procedure was cystectomy, accounting for 22 cases (62.86%) followed by ovariotomy with 3 cases (8.57%) staging laparotomy with 4 cases (11.43%) and ovarian biopsy with 2 cases (5.71%). Furthermore, 3 cases (8.57%) involved conservative management, while 1 case (2.86%) was lost to follow-up. More than half are delivered by caesarean, most common indication being breech (6) and previous caesarean (6).

DISCUSSION

Advancements in ultrasound technology have increased the detection of adnexal masses during pregnancy. This study, focusing on antenatally and intraoperatively detected masses >4 cm, aims to provide a comprehensive understanding of the clinicopathological features and outcomes associated with these masses. Comparisons with existing literature reveal varying prevalence rates and detection methods, emphasizing the need for standardized protocols in reporting and managing adnexal masses during pregnancy. Of the 11425 antenatal patients delivered during this study period, 35 were evaluated for adnexal mass and recruited for the study (0.3%). de Haan *et al*.[5] study shows that the incidence of adnexal masses during pregnancy is estimated to be 0-2%. Aggarwal and Kehoe conducted a review spanning from 1984-2009, shedding light on the impact of ultrasound examinations on the detection of adnexal masses during pregnancies. Their findings revealed a notable increase in detection rates, escalating from 0.04–1.32% (1/76–1/2,328) to 1.14–5.23% (1/19–1/88) with the implementation of ultrasound[9]. The majority of these masses, commonly sized below 5 cm, were identified as functional cysts a phenomenon often associated with spontaneous resolution by the 2nd trimester (Cheng Yu *et al*.[10]. Since this study focused on cases that were >4 cm, operated mostly on symptoms and suspicion of malignancy the small masses, which were more likely to be functional, were excluded. This underscores the pivotal role of ultrasound technology in enhancing the early identification of adnexal masses during pregnancy, allowing for timely monitoring and intervention when necessary[10].

The results of our study offer a nuanced perspective on adnexal masses detected during pregnancy, shedding light on various demographic, clinical and histopathological aspects. The demographic snapshot indicates a mean age of 29.8 years among the 35 patients studied. Adnexal masses are commonly identified early in pregnancy. The mean size of the masses is 7.4 cm. In a recent 2021 study the prevalence of malignancy varied across different cystic groups, with 0% in simple cysts, 27% in unilocular and

multilocular cysts and 35% and 70% in multilocular solid groups, respectively. This classification was based on the International Ovarian Tumor Analysis (IOTA) criteria, as proposed by Testa *et al*.[11]. Remarkably, our study detected malignancy in both simple and complex cyst groups, with all three out of four cases accurately identified. This aligns with findings from Rabiej-Wronska *et al*. suggesting that the simple rule of IOTA is effective in accurately classifying ovarian masses in pregnant patients as benign or malignant[12].

Our study found that 8% of adnexal masses were incidentally identified during caesarean sections, indicating that the majority were detected antenatally. This aligns with findings by Cheng Yu and Jie Wang, who reported only 29.78% antenatal detection, suggesting over half of masses were diagnosed incidentally during caesarean sections[13]. These results highlight diverse challenges in antenatal adnexal mass detection, emphasizing the importance of screening adnexa during early pregnancy scan and efforts should be made to visualise the adnexa in every scans if possible. The characteristics of adnexal masses offer insights into their clinical manifestations and management. Notably, for 80% of the patients the size remained the same, potentially indicating the static nature of these masses during pregnancy. Nearly half of the patients (46%) reported symptoms, emphasizing the clinical relevance of these masses. Additionally, complications were observed in 22.9% of cases, underscoring the need for careful monitoring and timely intervention.

The distribution of adnexal masses side by side provides valuable information on the anatomical localization of these masses. The prevalence of 48.6% on the right side, 28.6% on the left and 22.9% bilateral suggests a relatively balanced distribution, reinforcing the need for a comprehensive approach to diagnostic and management strategies.

The histopathological results categorize the masses as benign and malignant. A substantial majority (77.1%) of the masses were benign, with dermoid being the most prevalent histopathological type (36%). The presence of malignancy in around 12% of cases, including high-grade serous cystadenocarcinomas, germ cell tumors and microinvasive serous carcinoma, underscores the importance of correlating ultrasound features like complexity of cyst and histopathology evaluation for appropriate management decisions without delay.

The histopathological categories offer a deeper understanding of the nature of these masses. Dermoid masses emerge as the most common (36%) followed by serous masses (28%) endometriosis, mucinous and reduced masses, each constituting 8-12% and 8%, respectively. The diversity in histopathological findings highlights the heterogeneous nature of adnexal masses during pregnancy. According to a study in, 40% of masses detected were dermoid on histopathology and 8.5% of cases (3-35) were malignant, which is consistent with our study, including borderline ovarian lesions[14].

The data suggests a diverse range of interventions in managing adnexal masses during pregnancy and Caesarean sections. The prevalence of emergency interventions, both antenatal and postpartum, highlights the critical nature of certain cases. The relatively high percentage of open procedures, especially when combined with MTP, may indicate the need for more invasive interventions in complex situations.

The predominance of cystectomy indicates that the removal of cysts is a primary focus in the management of adnexal masses. The diversity in procedure types reflects the complexity of cases encountered, ranging from conservative approaches to more extensive surgeries like staging laparotomies. The proportion of lost follow-ups underscores the challenges of ensuring continuous patient engagement and monitoring.

The results contribute significantly to the existing body of knowledge by offering a detailed characterization of adnexal masses during pregnancy. The high prevalence of benign masses, coupled with the diversity in histopathological types, underscores the complexity of managing these cases. The findings underscore the need for tailored approaches to diagnosis, intervention and follow-up, considering the diverse clinical and histopathological presentations of adnexal masses during pregnancy.

With changing time advancement in imaging and awareness might have picked up more adnexal pathologies recently, which might indicate that at least some lesions might have missed or under reported in the past. Incomplete medical records might have contributed to some biases. Cases are managed by different practitioners, so lack of uniformity in tackling the masses based (Naqvi and Kaimal) on size, nature and mode of surgery. Like adnexal masses detected incidentally during caesarean, at least few the patients who had adnexal masses which might have missed had delivered vaginally also might have[15].

Further investigations with larger sample sizes and longitudinal follow-up will enhance our understanding of the natural course and outcomes associated with adnexal masses in pregnancy. This study sets the stage for future research endeavour's aiming to improve the clinical care and outcomes for pregnant individuals confronted with adnexal masses.

CONCLUSION

Adnexal masses during pregnancy present diverse challenges, requiring a delicate balance between

timely interventions and avoiding unnecessary surgical procedures. This study contributes valuable insights into the clinicopathological features and outcomes of pregnancy complicated by adnexal masses and might provide a valuable reference for managing pregnancy and to make informed decision emphasizing the importance of multidisciplinary approach for especially for complex masses on imaging for optimal patient care. Adnexal masses during pregnancy were only rarely associated with adverse fatal outcome in terms of preterm birth and spontaneous miscarriage.

REFERENCES

1. Hakoun, A.M., I.A. Shaar, K.J. Zaza, H.A.A. Shaar and M.N.A. Salloum, 2017. Adnexal masses in pregnancy: An updated review. Avicenna J. Med., 7: 153-157.
2. Yacobozzi, M., D. Nguyen and D. Rakita, 2012. Adnexal masses in pregnancy. Seminars Ultrasound, CT MRI, 33: 55-64.
3. Leiserowitz, G.S., G. Xing, R. Cress, B. Brahmbhatt, J.L. Dalrymple and L.H. Smith, 2006. Adnexal masses in pregnancy: How often are they malignant? Gynecologic Oncol., 101: 315-321.
4. Hoover, K. and T.R. Jenkins, 2011. Evaluation and management of adnexal mass in pregnancy. Am. J. Obstet. Gynecol., 205: 97-102.
5. Haan, J.D., M. Verheecke. and F. Amant. 2015. Management of ovarian cysts and cancer in pregnancy. Facts. Views. Vis. Obgyn., 7: 25-31.
6. Glanc, P., S. Salem and D. Farine, 2008. Adnexal masses in the pregnant patient. Ultrasound. Q., 24: 225-240.
7. Gluntoli, R.L., R.S. Vang and R.E. Bristow, 2006. Evaluation and management of adnexal masses during pregnancy. Clin. Obstet. Gynecol., 49: 492-505.
8. Goh, W., J. Bohrer and I. Zalud, 2014. Management of the adnexal mass in pregnancy. Curr. Opin. Obstet. Gynecol., 26: 49-53.
9. Aggarwal, P. and S. Kehoe, 2011. Ovarian tumours in pregnancy: A literature review. Eur. J. Obstet. Gynecol. Reprod. Biol., 155: 119-124.
10. Yu, C., J. Wang, W. Lu, X. Xie, X. Cheng and xiao li, 2018. Analysis of adnexal mass managed during cesarean section. Adv. Clin. Exp. Med., 28: 447-452.
11. Testa, A.C., F. Mascilini, L. Quagliozzi, F. Moro and G. Bolomini et al., 2020. Management of ovarian masses in pregnancy: Patient selection for interventional treatment. Int. J. Gynecologic. Cancer, 31: 899-906.
12. Rabiej-Wronska, E., M. Wiechec, K. Pitynski, E. Wiercinska and A. Kotlarz, 2022. Ultrasound differentiation between benign versus malignant adnexal masses in pregnant patients. Ginekologia. Polska, Vol. 93 .10.5603/gp.a2021.0176.
13. Ye, P., N. Zhao, J. Shu, H. Shen, Y. Wang, L. Chen and X. Yan, 2019. Laparoscopy versus open surgery for adnexal masses in pregnancy: A meta-analytic review. Arch. Gynecol. Obstet., 299: 625-634.
14. Türkçüoglu, I., M.M. Meydanli, Y. Engi?n-Üstün, Y. Üstün and A. Kafkasli, 2009. Evaluation of histopathological features and pregnancy outcomes of pregnancy associated adnexal masses. J. Obstet. Gynaecology., 29: 107-109.
15. Naqvi, M. and A. Kaimal, 2015. Adnexal masses in pregnancy. Ovid Technologies (Wolters Kluwer Health), Clin. Obstet. Gynecol., 58: 93-101.