Scientific Research Publishing

Advances in Reproductive Sciences, 2024, 12, 165-178
https://www.scirp.org/journal/arsci
ISSN Online: 2330-0752
ISSN Print: 2330-0744

Management of a Huge Ovarian Cyst in Pregnancy at the Douala General Hospital, Cameroon: A Case Report and Review of the Literature

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How to cite this paper: Mbi Kobenge, F., Elong, F.-A., Mpono, E.P. and Egbe, T.O. (2024) Management of a Huge Ovarian Cyst in Pregnancy at the Douala General Hospital, Cameroon: A Case Report and Review of the Literature. *Advances in Reproductive Sciences*, **12**, 165-178.
https://doi.org/10.4236/arsci.2024.123014

Received: April 30, 2024
Accepted: June 25, 2024
Published: June 28, 2024

Abstract

Background: Ovarian cysts in pregnancy are common and are usually small benign functional cysts (corpus luteum and theca-lutein cysts) that usually resolve spontaneously between 14 and 16 weeks of gestation. However, large ovarian cysts are rare in pregnancy, with an incidence of 0.2% - 2%, and most of them are benign. The first-line diagnostic modality is ultrasonography. Complications of ovarian cysts in pregnancy include miscarriage, ovarian torsion, cyst rupture, etc. Laparotomy is the treatment modality commonly used in our setting, and histopathologic diagnosis is important for the prognosis of the treatment. **Case Presentation:** MC is a 32-year-old G3P2002 married housewife of the Bakweri tribe who was referred to our department because of progressive abdominal discomfort and shortness of breath for 1 month's duration. Her medical history is consistent with two normal vaginal deliveries at term and the use of implants (for contraception) until one month prior to the index pregnancy. Her booking visit was at 16 weeks gestation at a primary (missionary) healthcare facility, and she underwent ultrasonography and was diagnosed with a singleton viable intrauterine pregnancy and a simple septate cystic mass measuring 17 cm situated on top of the uterus, appearing to originate from the left ovary. She was referred to seek the expertise of an obstetrician-gynecologist, but she came to our department at 35 weeks gestation and underwent cesarean birth at 37 weeks gestation. In the pathological review, serous cystadenoma was diagnosed, and there were no positive

findings in peritoneal cytology. **Conclusion:** The ultrasonographic diagnosis of the huge ovarian cyst in the index case was after 16 weeks gestation because of her late booking visit at 16 weeks gestation. The index case deferred referral to the obstetrician because of a lack of finances, came to our department at 35 weeks gestation because of abdominal pain that may have resulted from a torsion of the ovarian cyst, and underwent cesarean birth because of malpresentation and fear of cyst rupture during labor. We recommend cesarean section in such cases because of suboptimal antenatal care uptake and histopathology of the specimen to exclude malignancy.

Keywords

Ovarian Cyst, Ultrasonography, Magnetic Resonance Imaging, Histopathology, Pregnancy, Cesarean Section

1. Introduction

Ovarian cysts in pregnancy are common and are usually small benign functional cysts (corpus luteum and theca-lutein cysts) that usually resolve spontaneously between 14 and 16 weeks of gestation [1] [2]. These cysts are occasional findings of a first-trimester ultrasound scan [1] [3]. However, large ovarian cysts are rare in pregnancy, with an incidence of 0.2% - 2%, and most of them are benign [3] [4]. Besides, ovarian cysts that persist beyond 16 weeks of gestation are usually non-functional [1] [5] [6] [7]. The first line diagnostic modality is ultrasonography (transvaginal/transabdominal) while magnetic resonance imaging (MRI) is superior to sonography in characterizing the cystic contents (benign or malignant) and diagnosis of adnexal torsion and relation to neighboring organs [5] [8] [9]. Complications of ovarian cysts in pregnancy include miscarriage, ovarian torsion, cyst rupture, and intrabdominal hemorrhage [1] [10] [11], which can be life-threatening. The accurate and timely diagnosis of ovarian cysts is important to determine the most appropriate treatment modality: surgery (laparotomy or laparoscopy) or expectant management [12]. Histopathologic diagnosis is important for the prognosis of the treatment. We are presenting the case of a huge ovarian cyst that was diagnosed and managed at our hospital.

2. Case Presentation

MC is a 32-year-old G3P2002 married housewife of the Bakweri tribe who was referred to our department because of progressive abdominal discomfort and shortness of breath for 1 month's duration. Her medical history is consistent with two normal vaginal deliveries at term (2016 and 2019) and the use of implants (for contraception) until one month prior to the index pregnancy. She had her menarche at 12 years old with a regular cycle of 29 days, and her coitarche at 21 years old. Her last menstrual period was May 1, 2022. She is living with her husband and her two daughters, all in good health, and the rest of her

medical history is unremarkable.

Her booking visit was at 16 weeks gestation at a primary (missionary) health-care facility, and since then, she has been regularly followed up by midwives, where she underwent ultrasonography and was diagnosed with a singleton viable intrauterine pregnancy and a simple septate cystic mass measuring 17 × 16 cm situated on top of the uterus, appearing to originate from the left ovary. She was referred to seek the expertise of an obstetrician-gynecologist, but she did not do so because of a lack of finances. She continued her pregnancy follow-up with the midwives where she underwent full blood counts with a hemoglobin (Hb) range of 11.5 - 12.2 g/dL and fasting blood glucose of 86 mg/dL; syphilis, hepatitis B, and HIV were negative. A vaginal smear and urine dipstick showed no infections (Table 1).

At about 31 weeks gestation, she stated having abdominal discomfort and shortness of breath, difficulty finding a comfortable sleeping position, and feeling full after eating small amounts of food and she came to our department at 35 weeks gestation.

When we received the patient at our department at 35 weeks gestation, she was oriented in time and space; her conjunctivae were not pale. Her body mass index (calculated from her pre-pregnancy weight found in her exercise book)

Table 1. Results of paraclinical examinations of Antenatal care visits of the patient.

Variable	Result	Normal value or other findings	Estimated fetal weight (g)
Mean Hemoglobin (g/L)	11.85	12 - 16	
Range	11.5 - 12.2		
Fasting blood sugar (mg/dL)	86	70 - 100	
Prepregnancy BMI (kg/m^2)	21	18.5 - 24.9	
HBsAg	Negative	-	
HIV	Negative	-	
Syphilis serology	Non-reactive	-	
Ultrasound scan at booking visit	Singleton intrauterine pregnancy normally evolving at 16 weeks gestation	Simple septate left ovarian cyst 17 cm diameter	
Ultrasound scan at 35 weeks gestation	Singleton intrauterine pregnancy at the 75th percentile of 35 weeks gestation	Huge septate left ovarian cyst with the largest diameter at 30 cm	2400

HIV = human immunodeficiency virus; BMI = body mass index; g/L = grams per liter; Kg/m^2 = kilograms per meter square; HBsAg = hepatitis B surface antigen; cm = centimeters; dL = deciliter; g = gram.

was 21 kg/m^2. The examination of the heart and lungs was normal. The abdomen was overdistended, with a palpable, voluminous, soft cystic mass encompassing all the upper abdomen and extending to the left flank, making examination of the liver and spleen difficult. The fundal height was 30 cm, the fetus was in a transverse position, and the head was on the left side of the abdomen. The fetal heart tones were perceptible, and the fetal heart rate was 148 beats per minute (bpm). The vulva was clean, and the speculum examination was normal. The cervix was long, posterior, and closed and the presenting part was not palpable on digital vaginal examination, and there was no pedal edema at the medial part of both ankles.

A repeat ultrasound scan on arrival at our department showed a singleton intrauterine pregnancy normally evolving at 36 weeks gestation with an estimated fetal weight of 2400 g. There were no fetal anomalies detected. The placenta was posterior and homogeneous, and the amniotic fluid volume was normal. There was a huge cystic mass with intra-cystic septa appearing to arise from the left ovary, extending into the left flank and all the upper abdomen. The largest diameter of the mass was 30 cm. No Doppler studies were done in ultrasonography.

An MRI was requested but not done due to a lack of finances.

Fetal lung maturation was done with dexamethasone 12 mg, twelve hourly for 24 hours, and she underwent an elective cesarean section at 37 weeks gestation under spinal anesthesia, giving birth to a male fetus (**Figure 1**) with a 5-minute Apgar score of 10/10 after the preoperative blood tests (**Table 2**).

Table 2. Perioperative follow-up of index case.

Variables	Results	Comments or normal value
Hemoglobin level (g/L)	11.8	12 - 16
Hematocrit (%)	35.4	36 - 48
Prothrombin ratio (%)	100	85 - 100
Prothrombin time (seconds)	12.5	11.0 - 13.5
International normalized ratio	1.0	0.8 - 1.10
Birth weight (g)	2600	2500 - 4000
Aspartate aminotransferase (units/L)	15	<45
Alanine aminotransferase (units/L)	11	<56
Fasting blood sugar (mg/dL)	85	70 - 100
Blood urea nitrogen (g/L)	0.25	0.15 - 0.42
Creatinine level (mg/dL)	0.9	0.7 - 1.1
Estimated blood loss (mL)	450	-
5-minute Apgar score	10	normal

% = percent; g = gram; L = liter; mg = milligram; dL = deciliter; mL = milliliter.

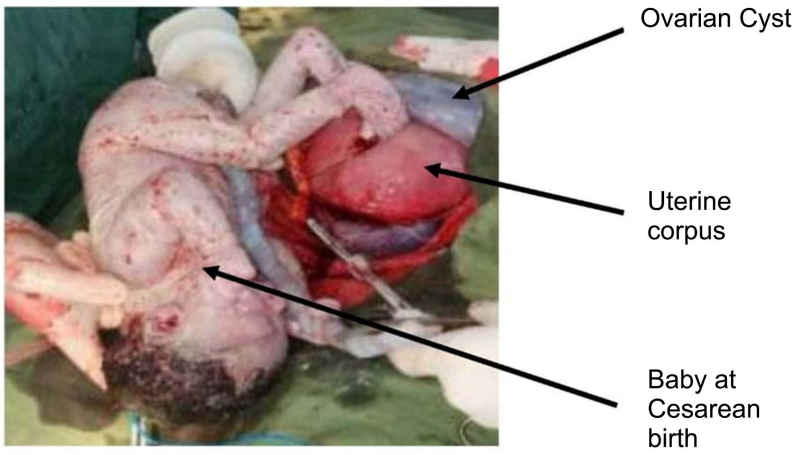

Figure 1. Cesarean delivery of foetus with ovarian mass seated at the uterine fundus.

During the cesarean section, we used a para-umbilical median incision for better access to the uterus and ovarian cyst. There was a serous peritoneal fluid that was sampled and sent for cytologic analysis. The huge cyst was exteriorized and confirmed to arise from the left ovary. However, the ovarian tissue at the proximal end of the cyst appeared healthy. There was a single twist (torsion) involving both the index ovary and the left fallopian tube, but the blood supply to the concerned ovary appeared preserved (**Figure 2**). Clampage and section at the base of the cyst (partial oophorectomy) without rupture of the left ovarian cyst were done (**Figure 3**). The remaining ovarian tissue was sutured or repaired. We also did peritoneal washing for cytology, but no frozen section was done.

The rest of the abdominal organs examined (omentum, liver, gall bladder, spleen, stomach, and intestines) appeared macroscopically normal. We did a random biopsy of the peritoneal cavity and peritoneal toileting with 1 liter of normal saline. The weight of the ovarian cyst with the liquid content was 6.5 kg and was sent for histopathology analysis including the random peritoneal biopsy samples.

The intraoperative care of the patient included administration of ceftriaxone 2 g, tranexamic acid 1000 mg after birth of the fetus, and oxytocin 10 units intravenously, then 20 units in a 500 ml dextrose solution and 400 mcg of misoprostol sublingually after delivery of the placenta. The placenta was delivered manually and hysterorrhaphy was done in two layers. The blood loss was estimated at 450 mL and the post-operative stay in the hospital was uneventful.

Intraoperatively, we administered ceftriaxone (2 g) and tranexamic acid (1 g) after the birth of the baby. We also administered a bolus of 10 units of oxytocin, then 20 units in 500 ml of a 5% dextrose solution, and 400 mcg of misoprostol sublingually after the delivery of the placenta. The placenta was delivered manually, and hysterorrhaphy was done in two layers. The blood loss was estimated at 450 mL, and the post-operative stay in the hospital was uneventful. The pathological review diagnosed serous cystadenoma and there were no positive findings in the peritoneal cytology and tissue biopsy.

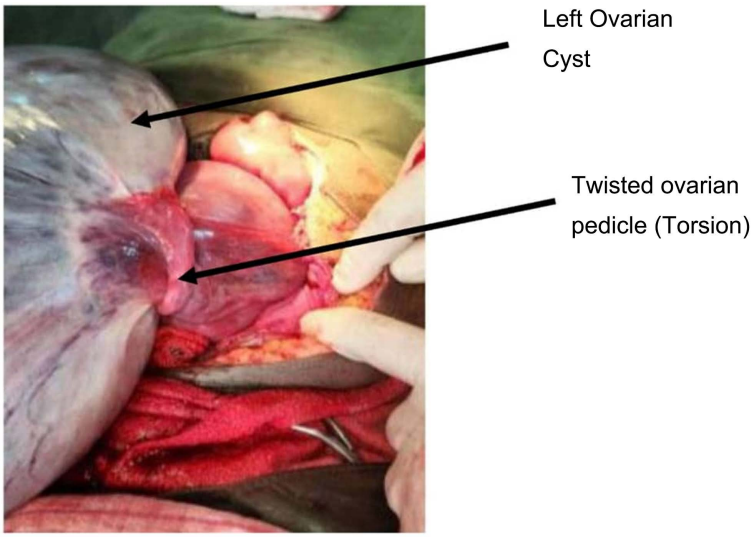

Figure 2. Torsion of the left adnexa.

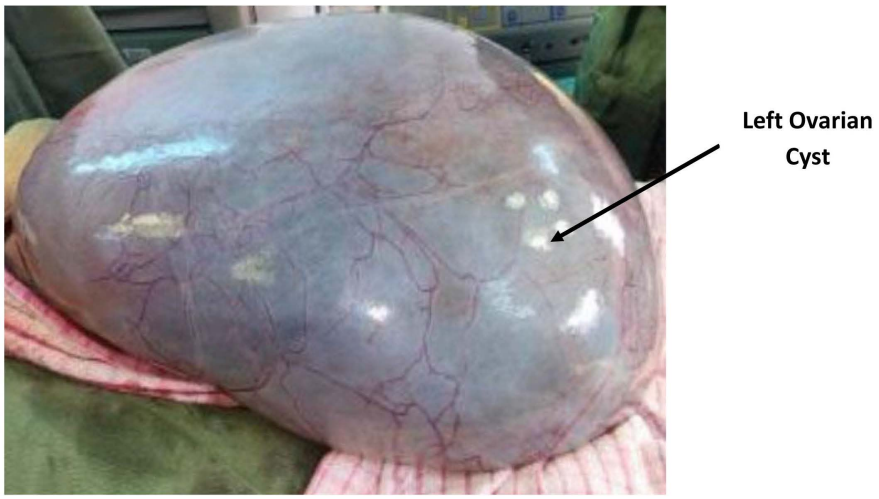

Figure 3. Post operative image of the left ovarian cyst.

3. Discussion

The incidence of ovarian cysts in pregnancy ranges from 1 in 84 to 1 in 2500 [13] while the incidence of ovarian malignancy in pregnancy is 0.85 in 10,000 pregnancies (range 0.44 - 1.71 in 10,000 pregnancies) compared to previous studies that reported an incidence of 1:12,000 - 1:47,000 [14]. Ovarian masses in pregnancy are usually diagnosed incidentally during antenatal care visits. Previously, the detection rate of such masses was low because of the lack of techniques for early detection. However, the incidence and detection rate of ovarian masses significantly increased with the application of ultrasonography in antenatal care [15] [16] [17]. However, in most low-income countries and Cameroon in particular, booking visits are usually late. A study in a semi-urban area in Fako Division, Cameroon reported that the mean gestational age at booking visits was 19 ± 4.2 weeks (8 to 31 weeks) [18], other Cameroon studies reported a ges-

tational age of initiation of antenatal care greater than 12 and 14 weeks respectively [19] [20]. As regards the index case, a booking visit to a midwife at a primary healthcare facility was at 16 weeks gestation. The importance of early diagnosis of ovarian tumors in pregnancy is to differentiate between benign and malignant tumors and ensure fetal safety and good oncological outcomes [21]. This will also help identify those tumors that could benefit from early surgical treatment from those that may necessitate expectant management till delivery.

3.1. Diagnosis of Ovarian Cysts in Pregnancy

Ovarian masses in pregnancy are usually asymptomatic. However, in some cases, they may present with lower abdominal pain. The identification of a pelvic mass during an abdominal or vaginal examination can be difficult because of the increased size/volume of the uterus. If a mass is discovered, a complete physical examination becomes mandatory where the bladder should be diagnosed empty, signs of pelvic infection should be sought, and cancer screen effected by a recto-vaginal examination and search for lymph nodes [12]. Furthermore, ultrasonography is the first-line diagnostic tool for the diagnosis and characterization of ovarian masses in pregnancy [5] [12]. This modality is readily available in many centers in Cameroon, easy to use, cheap or inexpensive, devoid of side effects, and has a high sensitivity and specificity to characterize ovarian masses. Ultrasonography could also be used to monitor the progression or regression of ovarian masses as pregnancy progresses. In addition, several scoring systems have been proposed for the diagnosis, characterization, and differentiation of ovarian masses between benign and malignant tumors like the International Ovarian Tumor Analysis (IOTA). The common features of each ovarian scoring system are size, proportion of solid tissue, papillary projections, inner wall structure, locules, wall thickness, septa, echogenicity, acoustic shadows, and the presence of ascites [22]. The added value of the Whirlpool sign visualized by moving the ultrasound probe back and forth along the ovarian ligament when torsion of the adnexa is suspected in bothGray scale and Doppler ultrasound has been reported [23] [24] [25] [26] [27]. In the index case, ultrasonography showed a huge ovarian cyst of 17 cm largest diameter with thin intracystic septa by 16 weeks' gestation with abdominal pain. The cyst was located on the uterine fundus, seemingly originating from the left ovary. Color Doppler studies of the ovarian ligament and cyst including vascularization of the septa were not done and gray scale search for whirlpool sign was not reported but the intra-operative findings in the index case included torsion of both fallopian tube and ovary (**Figure 2**). Besides, the proposed scoring systems are not commonly or completely used in Cameroon. Furthermore, it has been reported that ultrasound results may depend on the experience of the person who does the examination and the center where the examination is done [28] [29]. In addition, this patient may have been a candidate for surgery from her booking visit, but she refused referral to a tertiary healthcare facility because of a lack of finances.

When choosing a diagnostic modality in pregnancy, the effect of the test on the fetus must be taken into consideration. The computed tomography (CT) scan may not be suitable for diagnosis of ovarian cysts in pregnancy because of the adverse effects of radiation on the fetus [30]. However, magnetic resonance imaging (MRI) has been shown to be superior to ultrasound scan as regards characterization of the cystic content, or diagnosis of torsions [31] [32] [33] [34]. Besides, in a recent study, the diagnostic accuracy of ultrasound in diagnosing malignant ovarian cysts was 100%, the specificity of ultrasonography in the diagnosis of benign ovarian cysts was 78.3%. The overall accuracy was 89.3% with a positive predictive value of 57.14% and a negative predictive value of 100%. It was therefore concluded that MRI should be reserved for problem solving when ultrasound findings are inconclusive, non-diagnostic or unequivocal because of its higher cost and it is a more accurate diagnostic tool [31]. That notwithstanding, the ACOG and other international guidelines stated that although there is no evidence of prenatal risk from MRI, like teratogenesis, carcinogenesis, or acoustic danger, it is nevertheless advisable to avoid MRI in the first trimester [35]. However, in the index case MRI was requested but it was not done because of lack of finances to pay for it and MRI is not cost effective in a low-income country like Cameroon where there is a lack of health insurance coverage for most of its inhabitants and the monthly wages of civil servants range from 43, 470 XAF to 353, 526.4 XAF (US$ 73.34 to US$ 588.29) [36].

3.2. Differential Diagnosis of Ovarian Cyst in Pregnancy

As shown in **Table 3** are the sonographic, magnetic resonance imaging and pathologic finding of ovarian cysts from previous studies [21] [37].

3.3. Tumor Markers and Ovarian Tumor in Pregnancy

The use of tumor markers for ovarian cyst diagnosis in pregnancy could provide important clues for cyst diagnosis but remains controversial. Nevertheless, some tumor markers like CA 125 and alpha-fetoprotein (AFP) could be elevated during pregnancy, especially in the first trimester making it difficult to accurately diagnose a malignancy [30], therefore, having a low specificity. However. some studies have reported elevated levels of AFP at 30 weeks and 38 weeks of gestation and CA-125 [30]. Notwithstanding, we did not request these tests in the index case.

3.4. Management of Ovarian Cyst in Pregnancy

The management of ovarian masses during pregnancy has been controversial on whether to adopt a wait-and-see attitude or expectant management of surgery, However, since most ovarian cyst diagnosed early in pregnancy tend to regress during the course of the pregnancy by 16 weeks gestation, therefore tumors 5 - 10 cm in diameter without evidence supporting malignancy, expectant management was recommended, and surgery was indicated when there was an acute

Table 3. Pathological, sonographic and magnetic resonance imaging findings of adnexal masses in pregnancy.

Pathologic diagnosis of 453 adnexal masses in pregnancy [37]		Sonographic findings of adnexal masses in pregnancy [21]		Magnetic resonance imaging findings of adnexal masses in pregnancy [21]	
Variable	Number (%)	Variable	Description of findings	Variable	Description of findings
Benign adnexal masses	184 (40.62)	Functional cysts		Functional cyst	T1W1/T2W1
Mature teratoma	71 (15.67)	Corpus luteum	"Ring of fire" sign with doppler	Endometrioma	T1W1, T2W1, T1W1/T2W1
Mucinous cystadenoma	49 (10.82)	Hemorrhagic cyst	Reticular pattern with solid component	Mature cystic teratoma	T1W1
Serous cystadenoma	31 (6.84)	OHSS	"Spoke wheel" sign with markedly elongated ovary	Serous cystadenoma	T1W1, T2W1
Thecoma fibroma	8 (1.77)	Hyperetio Lutealis and theca lutein cyst	Markedly enlarged ovaries and similar to OHSS	Mucinous cystadenoma	T1W1, T2W2, CEMR
Struma ovarii	6 (1.32)	Luteoma	Hyperechoic and heterogeneous with increased vascularity	Fibroma	T1W1, T2W1, CEMR
Thecoma of the ovary	5 (1.10)	Endometrioma	Cystic and solid masses, thick and hypovascular walls, homogeneous low internal echogenicity, calcified with acoustic shadowing	Paratubal cyst	T1W1, T2W1
Fibroma	4 (0.88)	Mixed cystic teratoma	Rokitansky nodule, dermoid plug, icebeg phenomenon, dermoid mesh	Hydrosalpinx	T1W1, T2W1
Serous adenofibroma	2 (0.44)	Cystadenoma	Serous: large smooth unilocular cyst, hypoechoic thin septations, papillary projections, bilateral in 20%. A large multiloculated cyst with multiple septations and hypoechoic locules mostly unilateral	Uterine fibroid	T2W1
Malignant adnexal masses	269 (59.38)	Fibroma	Solid hypoechoic mass with edge refraction and acoustic shadowing calcifications with different degrees of vascularity	Borderline ovarian neoplasia	T1W1, T2W1
Serous cystadenocarcinoma	158 (34.88)	Ovarian torsion	Whirlpool sign with Doppler, enlarged affected ovary, anechoic or hyperechoic echogenicity. Absence of septations, solid portions or vegetation	Granulosa cell tumor	T1W1 and T2W1
Borderline mucinous cystadenoma	28 (6.18)	Hydrosalpinx	"Cog wheel" sign, "bead-on-a-string" sign	Dysgerminoma	T1W1, T2W1, CEMR

Continued

Borderline serous cystadenoma	20 (4.42)	Uterine fibroid	Hypoechoic solid mass with edge refraction posterior acoustic shadowing, cystic and calcified components inside cyst	Serous cystadenocarcinoma	T1W1
Clear cell carcinoma	15 (3.31)	Borderline ovarian neoplasm	Unilocular cyst (serous/markedly septate cyst (mucinous) ovarian crescent sign, honeycomb appearance, multiple vascular mural wall nodules, papillary projections	Mucinous cystadenocarcinoma	T1W1
Metastatic carcinoma	13 (2.87)	Granulosa cell tumor	Solid multilocular mass with heterogeneous echogenicity, hemorrhage components inside the cyst, increased vascularity on Doppler		
Endometroid carcinoma	6 (1.32)	Dysgerminoma	Multilobulated solid ovarian mass, prominent fibrovascular septations and calcifications, heterogeneous echogenicity (anechoic or hypoechoic)		
Malignant Mullerian tube mixed tumor	5 (1.10)	Malignant epithelial ovarian tumor	Serous cystic adnexal mass with heterogeneous echogenicity, multiple septations, papillary projections, thick walls, mucinous multiloculated cystic mass with heterogeneous echogenic patterns and solid portions		
Granular cell tumor	4 (0.88)				
Mixed carcinoma	4 (0.88)				
Mucinous cystadenocarcinoma	3 (0.66)				

T1W1, T1 weighted image; T2W1, T2 weighted image; CEMR, contrast enhanced magnetic resonance; OHSS, ovarian hyperstimulation syndrome. This table has been generated from references 21 and 37.

like rupture and torsion, complications caused by obstruction (e.g. hydronephrosis), risk of birth canal obstruction, and strong evidence of malignancy [1] [12]. Traditionally, the main surgical approach is by open surgery or laparotomy [12] and the recommended surgery time included 14 - 24 weeks of gestation, surgery during cesarean section, and 6 weeks postpartum [1]. However, when an acute complication occurs, surgery is indicated in any trimester. Notwithstanding, complications may arise after surgery such as miscarriages, and preterm births. Laparoscopy has increasingly been advocated and used to treat ovarian

complication cysts in pregnancy with no increased adverse outcomes reported compared with laparotomy [7] [12] [38] [39] [40]. However, this will require an experienced laparoscopic surgeon to carry out such procedures. For this case, surgery was done at 37 weeks gestation because of fetal malpresentation (transverse lie) and fear of rupture of cyst during vaginal delivery. During the cesarean section, detorsion of the twisted adnexa and left partial oophorectomy was done. The histopathology report showed serous cystadenoma, Literature reports have shown that one of the most common benign ovarian neoplasms occurring concurrently with pregnancy are serous or mucinous cystadenomas and mature cystic teratomas [37].

4. Conclusion

The ultrasonography diagnosis of the huge ovarian cyst in the index case was after 16 weeks gestation because of her late booking visit at 16 weeks gestation. The index case deferred referral to the obstetrician because of a lack of finances, came to our department at 35 weeks gestation because of abdominal pain that may have resulted from a torsion of the ovarian cyst, and underwent cesarean birth because of malpresentation and fear of cyst rupture during labor. We recommend cesarean section in such cases because of suboptimal antenatal care uptake, avoid spillage of cystic contents of unknown malignant potential at the peritoneal cavity and histopathology of the specimen to exclude malignancy.

Acknowledgements

We are extremely grateful to Prof. Fewou Ahmadou MD for the histopathology assessment and to the nurses and operating theatre team including the anesthesiologist for assistance during the surgery of the index case.

Ethical Approval

Our hospital does not require ethical approval for case reports.

Consent

Written informed consent was obtained from the patient for the publication of this case report and the accompanying images.

Authors' Contributions

Thomas Obinchemti Egbe and Fidelia Mbi Kobenge were responsible for the conception and writing the initial draft of the manuscript. Mpono Pascale and Felix Elong proofread the manuscript. Thomas Obinchemti Egbe and Fidelia Mbi Kobenge were on the surgical team. Thomas Obinchemti Egbe supervised manuscript writing. All authors have read and approved the final manuscript.

Conflicts of Interest

The authors have no conflicts of interest.

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