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Case Report

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A Massive Ovarian Mixed Germ Cell Tumour Mimicking Severe Pre-eclampsia in an Adolescent Pregnancy: A Case Report

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HIGHLIGHTS

- Tumour mimics severe preeclampsia
- Pregnancy masks malignancy diagnosis
- Imaging enables early detection
- AFP difficult during pregnancy
- Teamwork improves maternal outcomes

Key Words:
Immature teratoma
Mixed germ cell tumour
Pregnancy
Adolescent
Pre-eclampsia
Fertility-sparing surgery

ABSTRACT

Introduction: Co-existence of a malignant ovarian germ cell tumour with advanced pregnancy is rare and poses significant diagnostic challenges. Physiological changes of pregnancy, along with the mechanical and biochemical effects of a large adnexal mass, may mimic acute obstetric conditions and delay diagnosis. **Case presentation:** A 17-year-old primigravida at 27 weeks 3 days of gestation presented with progressive abdominal distension, orthopnoea, and oliguria for 10 days. She had hypertension (150/90 mmHg) with 2+ proteinuria, suggestive of severe pre-eclampsia. Imaging (ultrasound and MRI) revealed a large solid-cystic pelvi-abdominal mass (167 × 210 × 100 mm) with fat, calcifications, ascites, and bilateral pleural effusion. Cytology of ascitic and pleural fluid was negative for malignancy. Tumour markers showed markedly elevated AFP (2382 ng/mL) along with raised LDH, CA-125, and CEA. After receiving antenatal corticosteroids and magnesium sulphate, she had a spontaneous preterm vaginal delivery of a live female neonate (935 g). Subsequently, fertility-sparing staging laparotomy with left salpingo-oophorectomy, omentectomy, pelvic lymph node sampling, and peritoneal washings was performed with complete macroscopic cytoreduction. **Result:** Histopathology confirmed a mixed germ cell tumour comprising 90% grade 3 immature teratoma and 10% yolk sac tumour, classified as FIGO stage IA (pT1aN0). Postoperative tumour markers showed a rapid decline. The patient was started on adjuvant multi-agent chemotherapy along with a GnRH agonist for ovarian protection. **Conclusion:** A large adnexal germ cell malignancy can mimic hypertensive disorders of pregnancy, leading to diagnostic delays. Early use of imaging, appropriate interpretation of tumour markers in pregnancy, and a multidisciplinary approach are crucial for timely diagnosis, effective oncological management, and favorable maternal and neonatal outcomes.

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INTRODUCTION

Ovarian germ cell tumours (OGCTs) constitute approximately 5% of all ovarian malignancies but represent the most common ovarian cancers in adolescents and young women, reflecting their origin from primitive germ cells and their predilection for early reproductive age groups [1]. These tumours encompass a heterogeneous group of neoplasms, including dysgerminoma, yolk sac tumour, immature teratoma, and mixed germ cell tumours, each with distinct biological behaviour and histo-pathological features [2]. Among these, immature teratoma is the second most frequent malignant subtype and is characterised by the presence of immature or embryonal tissues, particularly of neuroectodermal origin, mixed with mature elements derived from all three germ layers [2,6].

The coexistence of malignant OGCTs with pregnancy is exceedingly rare, with reported incidences ranging from 1 in 12,000 to 1 in 47,000 pregnancies [3,4]. This rarity, combined with the overlapping clinical and biochemical features of pregnancy and malignancy, often poses a significant diagnostic challenge. A large and rapidly enlarging pelvic-abdominal mass may exert mechanical effects such as inferior vena caval compression, renal vascular compromise, and lymphatic obstruction, leading to clinical manifestations including hypertension, oliguria, ascites, and pleural effusion. These features can closely mimic severe pre-eclampsia, potentially delaying the recognition of an underlying neoplasm [3,4].

Radiological evaluation plays a crucial role in differentiating adnexal masses during pregnancy. Ultrasonography remains the first-line modality, while magnetic resonance imaging (MRI) provides superior soft tissue characterisation without ionising radiation. Features such as fat components, calcifications, and complex solid-cystic architecture are suggestive of teratomatous elements [6]. However, the interpretation of tumour markers in pregnancy remains particularly challenging. Alpha-fetoprotein (AFP), a key marker for yolk sac tumours, is physiologically elevated during pregnancy due to fetal production, thereby limiting its specificity and necessitating cautious interpretation using gestation-adjusted reference ranges [5].

Management of OGCTs in pregnancy requires a carefully coordinated multidisciplinary approach involving obstetricians, oncologists, radiologists, and neonatologists. The primary goals are to achieve optimal maternal oncological outcomes while ensuring fetal safety and preserving future fertility whenever feasible. Fertility-sparing surgery, typically involving unilateral salpingo-oophorectomy with comprehensive surgical staging, is considered the standard of care in early-stage disease and has demonstrated favourable outcomes [7,8]. In advanced or high-risk cases, adjuvant multi-agent chemotherapy is indicated, and the use of gonadotropin-releasing hormone (GnRH) agonists may offer additional protection of ovarian function during systemic treatment [9].

CASE PRESENTATION

Clinical presentation

A 17-year-old female (G2A1), with a history of first-trimester spontaneous abortion, was referred to the Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences (AIIMS), Raipur, at 27 weeks 3 days of gestation. She reported a ten-day history of progressive abdominal distension, decreasing urine output, and orthopnoea.

On examination, she was pale, with bilateral pedals and vulval oedema. The blood pressure was 150/90 mmHg on admission and rose to a peak of 160/110 mmHg; urinalysis showed 2+ proteinuria. The abdomen was tense and distended, with shifting dullness consistent with gross ascites. The abdominal mass clinically obscured the gravid uterus; fetal heart rate was 140 beats per minute on bedside ultrasonography. The combination of new-onset hypertension, proteinuria, oliguria, and generalised oedema raised an initial suspicion of severe pre-eclampsia complicated by massive third spacing. Preoperative photographs show marked abdominal distension due to a pelvic-abdominal mass and ascites, obscuring the gravid uterus (**Figure 1**). After delivery, a contrast-enhanced computed tomography (CECT) of the thorax and abdomen was obtained for surgical planning. It confirmed a large, well-defined multiloculated mass with predominantly solid components, internal fat density, and coarse calcifications, consistent with a teratomatous lesion. Repeating cytology of post-delivery ascitic and bilateral pleural effusion samples was again negative for malignancy.

Operative findings

A staging laparotomy was performed on 7 November 2025 through a vertical midline incision. Intra-operatively, a large solid-cystic mass arising from the left adnexa was identified, with prominent surface vascularity and dense adhesions to the omentum, and mass effect on adjacent bowel. The contralateral right adnexa, liver surfaces, and diaphragmatic peritoneum were free of macroscopic disease. Intraoperative delivery of the solid-cystic mass via midline laparotomy incision (**Figure 2**). Intraoperative view showing bowel displacement and preserved contralateral adnexa (**Figure 3**). A fertility-sparing left salpingo-oophorectomy was performed. The procedure was completed with infracolic omentectomy, bilateral pelvic lymph node sampling, and peritoneal washings to complete surgical staging. Complete macroscopic cytoreduction was achieved. Close-up of tumour surface showing vascularity, cystic areas, and aspiration of reactive peritoneal fluid (**Figure 4**).

Pathology

The excised specimen measured 26 × 20 × 11 cm. Intra-operative frozen section showed tissues derived from all three germ cell layers, including cartilage, skeletal muscle, and squamous epithelium, together with clusters of undifferentiated small round

cells forming rosettes. Gross specimen showing heterogeneous solid-cystic mass with vascular solid areas and pale cystic regions (**Figure 5**).

Final histopathological examination confirmed a mixed germ cell tumour comprising grade 3 immature teratoma (90% of tumour volume) and yolk sac tumour (10%). The omentum, bilateral pelvic lymph nodes and peritoneal washings were free of tumour. The tumour was staged as FIGO stage IA (pT1aN0). Low-power photomicrograph showing mixed germ cell tumour with immature neuroepithelium and mature elements (H&E) (**Figure 6**).

High-power photomicrograph showing immature neuro-epithelial rosettes, consistent with grade 3 immature teratoma (H&E) (**Figure 7**).

Post-operative course and adjuvant treatment

The post-operative course was uneventful. Serial tumour marker measurements demonstrated a rapid post-operative decline (**Table 1**). After review by medical oncology, the patient commenced on a GnRH agonist (leuprolide acetate) for ovarian protection, followed by multi-agent adjuvant chemotherapy directed at residual microscopic yolk sac tumour.

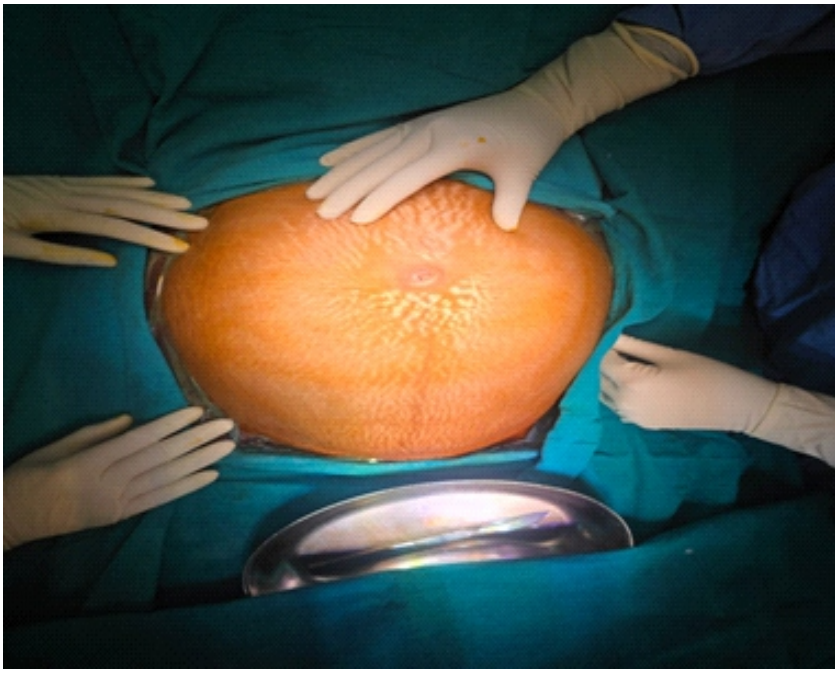

Figure 1: Pre-operative clinical photographs show marked abdominal distension secondary to the pelvi-abdominal mass and gross ascites, with the gravid uterus clinically obscured

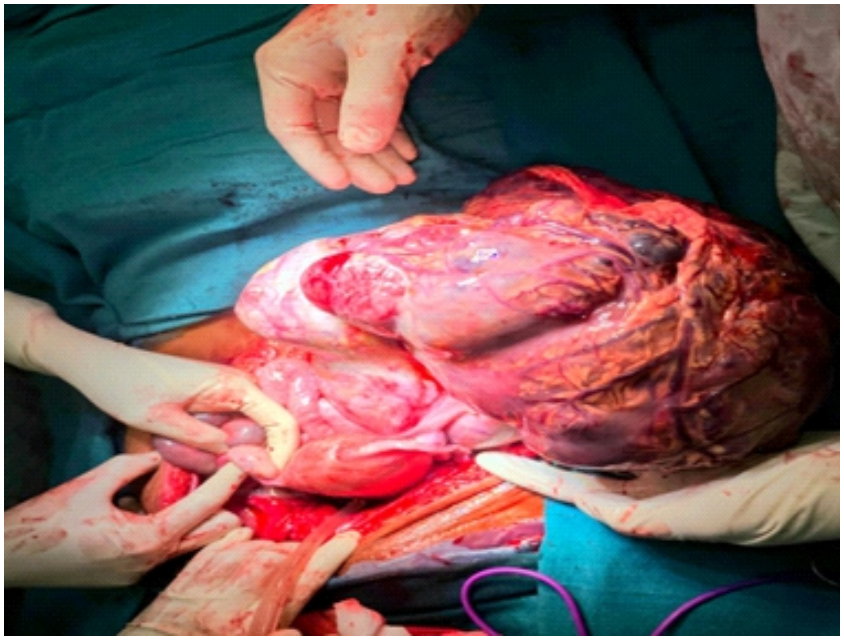

Figure 2: Intra-operative delivery of the solid-cystic mass through the midline laparotomy

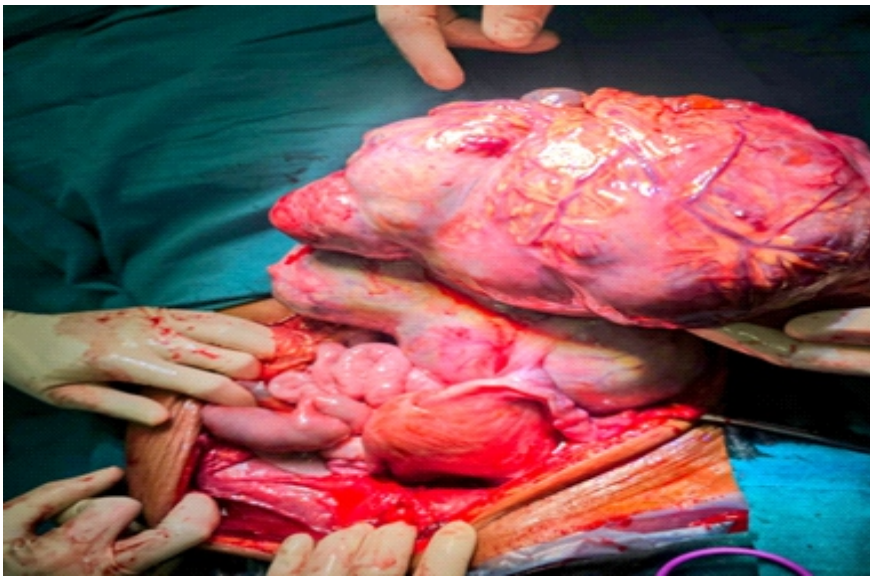

Figure 3: Intra-operative view showing displacement of bowel loops by the mass, with preserved contralateral adnexa.

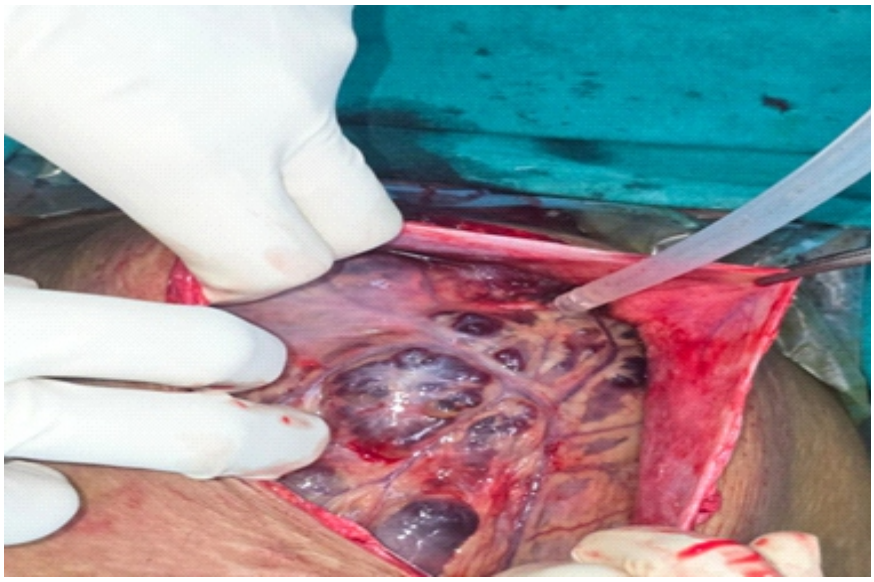

Figure 4: Close-up view of the tumour surface showing prominent vascularity and cystic areas, with aspiration of reactive peritoneal fluid.

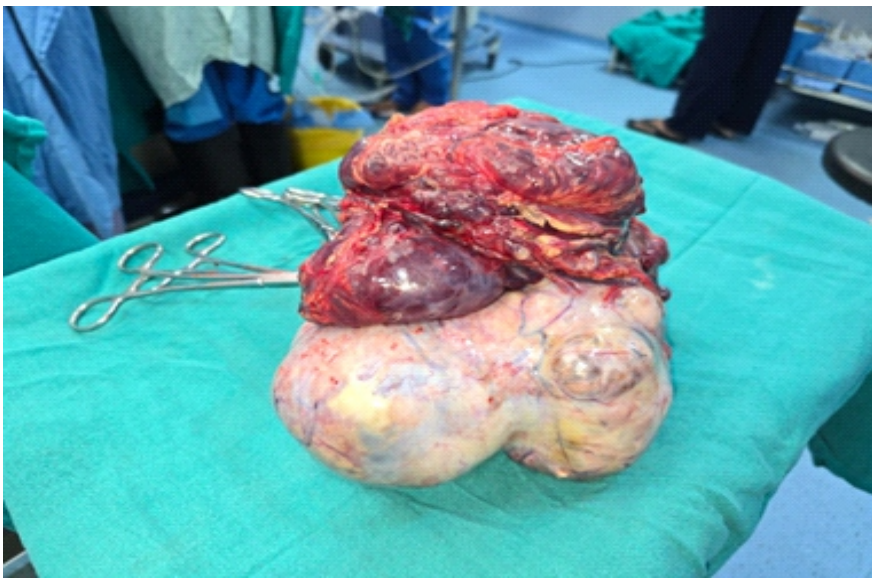

Figure 5: Gross specimen demonstrates a heterogeneous solid-cystic mass with solid vascular components and pale cystic regions.

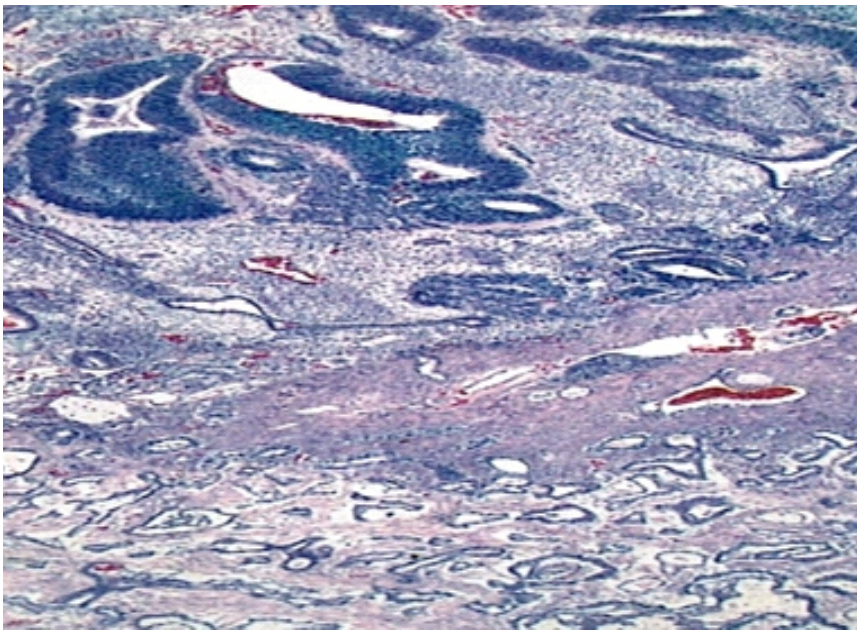

Figure 6: Low-power photomicrograph showing mixed germ cell tumour with immature neuroepithelial elements and mature tissue components (haematoxylin and eosin).

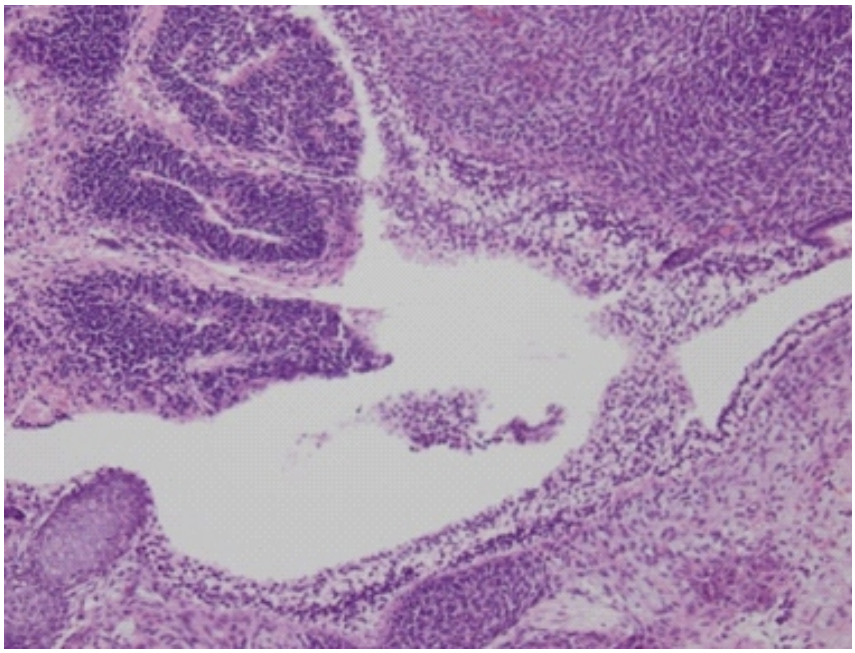

Figure 7: High-power photomicrograph showing immature neuroepithelial rosettes of small round-to-oval cells, consistent with grade 3 immature teratoma (haematoxylin and eosin).

Table 1: Serum tumour marker kinetics before and after surgery.

Biomarker	Pre-operative peak	Post-operative (Day 17)	Reference range (non-pregnant adult)	Trend
AFP	2382 ng/mL	329.4 ng/mL	0–15 ng/mL	Declining
LDH	2618 U/L	465 U/L	271–497 U/L	Normalised
CA-125	437.3 U/mL	50.3 U/mL	<35 U/mL	Declining
CEA	7.13 ng/mL	0.87 ng/mL	0–3 ng/mL	Normalised

DISCUSSION

Ovarian germ cell tumours diagnosed during pregnancy require coordinated input from obstetrics, gynaecological oncology, medical oncology, radiology, pathology and neonatology [3,7]. The present case is notable for the patient's age, the size of the neoplasm at excision (26 × 20 × 11 cm) and the initial clinical resemblance to severe pre-eclampsia, a recognised diagnostic pitfall in pregnancy-associated adnexal masses [4,10].

Ovarian germ cell tumours predominantly affect adolescents and young women and often demonstrate rapid growth, which may lead to significant mass effect during pregnancy [1,2]. The combination of new-onset hypertension, proteinuria and oliguria at 27 weeks of gestation in an adolescent is a recognised presentation of severe pre-eclampsia. In this patient, however, these findings were mechanically mediated. The mass produced compression of the renal vasculature and ureters, resulting in pre-renal and post-renal oliguria, and promoted massive third spacing with reactive ascites and pleural effusions. Similar pathophysiological mechanisms mimicking hypertensive disorders of pregnancy have been described in large intra-abdominal tumours complicating gestation [11]. The resulting volume and vascular alterations produced a secondary hypertensive response that mimicked a hypertensive disorder of pregnancy. Repeatedly negative cytology of ascitic and pleural fluid was consistent with reactive rather than malignant effusions and correlated with the final stage IA (pT1aN0) pathological assessment.

Cross sectional imaging was central to diagnosis. Ultrasonography identified a large pelvi-abdominal mass, while contrast-enhanced computed tomography demonstrated characteristic macroscopic fat attenuation and coarse calcifications within a multiloculated solid-cystic lesion, features which suggested a teratomatous origin and influenced surgical planning in favour of careful, en bloc removal without rupture [6]. MRI is increasingly preferred in pregnancy due to the absence of ionising radiation and its superior soft tissue characterisation, particularly in differentiating benign from malignant adnexal masses [12]. Interpretation of serum tumour markers in pregnancy requires caution. Serum AFP is produced by the fetal yolk sac and liver and is physiologically elevated during pregnancy, typically peaking at about 60–65 ng/mL [5]. The markedly elevated AFP level (2382 ng/mL) observed in this patient far exceeded physiological gestational values and corresponded to the yolk sac tumour component identified on histopathology. Previous studies have emphasised that markedly elevated AFP levels beyond expected gestational ranges should raise suspicion for germ cell malignancy [13]. Post-operative normalisation of LDH and CEA, together with a steep decline in AFP, supported the completeness of surgical cytoreduction.

Fertility-sparing surgery is the standard of care for women with early-stage ovarian germ cell tumours who wish to preserve reproductive potential [7,8]. Despite the size of the mass and the presence of reactive ascites, unilateral salpingo-oophorectomy with comprehensive staging achieved complete macroscopic cytoreduction while preserving the contralateral ovary and uterus. In selected cases, chemotherapy can be safely administered during the second and third trimesters with acceptable maternal and fetal outcomes, although timing must be individualised [14]. The use of a gonadotropin-releasing hormone (GnRH) agonist during chemotherapy was intended to reduce the risk of chemotherapy-induced ovarian damage, although evidence remains heterogeneous [9].

The principal limitations of this report are those inherent to single-case observations. While the findings provide valuable clinical insight, they are hypothesis-generating and should not be generalised without validation in larger studies.

CONCLUSION

A large ovarian germ cell tumour in advanced pregnancy may present with features indistinguishable from severe pre-eclampsia. Unexplained oliguria, refractory third-spacing and atypical hypertensive presentations during pregnancy warrant early cross-sectional imaging and a full tumour marker panel interpreted against gestation-specific reference ranges. A staged multidisciplinary approach, prioritising fetal lung maturation, controlled delivery and fertility-sparing surgical staging, can achieve oncological control while preserving perinatal and reproductive outcomes.

LIMITATIONS & FUTURE PERSPECTIVES

The study's limitations include a single-centre setting, a relatively small sample size, and a short study duration, which may limit the broader applicability of the results. Future studies should incorporate multicentre designs with larger populations to enhance validity, assess long-term outcomes, and investigate advanced diagnostic and management approaches. Such efforts will improve overall patient care and help minimize complications.

CLINICAL SIGNIFICANCE

The clinical significance of this study lies in its potential to bridge the gap between research findings and practical healthcare applications. It emphasizes the importance of trans-lating scientific observations into meaningful improve-ments in patient care, diagnosis, and treatment outcomes. By highlighting real-world relevance, the study contributes to evidence-based medical practice and supports informed clinical decision-making. Ultimately, the findings aim to enhance patient quality of life, optimize therapeutic strategies, and promote better disease management in clinical settings.

ABBREVIATIONS

OGCT: Ovarian Germ Cell Tumour

PE: Pre-eclampsia

AFP: Alpha-fetoprotein
MDT: Multidisciplinary Team

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AUTHOR CONTRIBUTIONS

All authors significantly contributed to the study conception and design, data acquisition, or data analysis and interpretation. They participated in drafting the manuscript or critically revising it for important intellectual content, consented to its submission to the current journal, provided final approval for the version to be published, and accepted responsibility for all aspects of the work. Additionally, all authors meet the authorship criteria outlined by the International Committee of Medical Journal Editors (ICMJE) guidelines.

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CONFLICT OF INTEREST

Authors declared that there is no conflict of interest.

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All data generated and analyzed are included within this research article. The datasets utilized and/or analyzed in this study can be obtained from the corresponding author upon a re-asonable request.

USE OF ARTIFICIAL INTELLIGENCE (AI) & LARGE LANGUAGE MODEL (LLM)

The authors confirm that no AI & LLM tools were used in thewriting or editing of the manuscript, and no images were altered or manipulated using AI & LLM.

AUTHOR'S NOTE

This article serves as an important educational tool for the scientific community, offering insights that may inspire future research diretions. However, they should not be relied upon independently when making treatment decisions or developing public health policies.

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