



Case Report

Section: Obstetrics & Gynaecology

Bilateral Ovarian Necrosis after Emergency Peripartum Hysterectomy: Lessons from a Rare Complication

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HIGHLIGHTS

- Bilateral ovarian necrosis post-hysterectomy.
- Vascular ligation-induced ovarian ischemia.
- Histopathologically confirmed ovarian necrosis.
- Elevated FSH indicated ovarian failure.
- Early recognition is crucial.

Key Words:

Emergency peripartum hysterectomy
 Ovarian necrosis
 Postpartum haemorrhage
 Premature ovarian insufficiency
 Obstetric surgery

ABSTRACT

Introduction: Emergency peripartum hysterectomy (EPH) is a life-saving intervention for severe postpartum haemorrhage unresponsive to conservative management. Although uncommon, ovarian necrosis following EPH can result in irreversible gonadal damage and premature ovarian insufficiency (POI). **Aim & Objective:** To report an exceptionally rare case of bilateral ovarian necrosis following EPH due to inadvertent ligation of the infundibulopelvic ligaments, highlighting the importance of preserving ovarian vascular supply during emergency obstetric surgery. **Case Presentation:** A 19-year-old primiparous woman underwent emergency caesarean section complicated by severe postpartum haemorrhage, necessitating subtotal hysterectomy at a peripheral hospital. She was referred to a tertiary care centre on postoperative day two with oliguria and subsequently developed acute kidney injury requiring haemodialysis. Persistent postoperative fever and imaging findings suggestive of bilateral adnexal masses prompted exploratory laparotomy. Intraoperative examination revealed bilateral ovarian and fallopian tube necrosis secondary to inadvertent ligation of the infundibulopelvic ligaments during the initial surgery. Bilateral salpingectomy and excision of necrotic ovarian tissue were performed. **Results:** Postoperative hormonal evaluation demonstrated markedly elevated follicle-stimulating hormone levels, consistent with premature ovarian insufficiency. The case highlights the severe reproductive and endocrine consequences of compromised ovarian perfusion following emergency obstetric surgery. Early recognition of persistent fever and adnexal abnormalities facilitated definitive surgical management. **Conclusion:** Bilateral ovarian necrosis following EPH is an exception-ally rare but serious complication. Meticulous identification and preservation of the infundibulopelvic ligaments and ovarian vascular pedicles are essential during emergency obstetric procedures. Prompt evaluation of postoperative fever and adnexal abnormalities may enable timely intervention. Awareness of this complication is crucial to preventing irreversible ovarian damage and its long-term endocrine consequences.



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INTRODUCTION

Postpartum hemorrhage (PPH) remains one of the leading causes of maternal mortality worldwide, accounting for approximately 27% of maternal deaths and representing a major challenge to global maternal healthcare [1]. It is generally defined as blood loss of ≥ 500 mL within 24 hours following vaginal delivery or $\geq 1,000$ mL following caesarean section [2]. PPH can rapidly progress to hemodynamic instability, coagulopathy, multiorgan dysfunction, and maternal death if prompt and effective management is not initiated. The major causes of PPH are commonly summarized by the “four Ts”: tone (uterine atony), trauma (genital tract injury or uterine rupture), tissue (retained placental tissue), and thrombin (coagulation abnormalities). Uterine atony is the most frequent cause, and initial management typically includes uterotonics, uterine massage, tranexamic acid when indicated, fluid resuscitation, and blood product replacement. When these measures fail, additional interventions, including intrauterine balloon tamponade, uterine compression sutures such as the B-Lynch technique, and uterine or internal iliac artery ligation, may be required. In cases of persistent, life-threatening hemorrhage despite medical and conservative surgical management, emergency peripartum hysterectomy (EPH) becomes a definitive, life-saving intervention.

EPH is defined as hysterectomy performed during pregnancy, childbirth, or the immediate postpartum period to control severe obstetric complications. It is most commonly indicated for uncontrollable hemorrhage associated with refractory uterine atony, placenta accreta spectrum, uterine rupture, and severe placental abnormalities. Although EPH can be essential for maternal survival, it is associated with substantial perioperative morbidity, including massive blood loss, transfusion requirements, urinary tract injury, infection, & prolonged hospitalization. Preservation of ovarian function is an important consideration during EPH, particularly in women of reproductive age. The ovaries receive their principal arterial blood supply from the ovarian arteries, which arise directly from the abdominal aorta, with additional contributions from the ovarian branches of the uterine arteries. The ovarian vessels travel within the infundibulopelvic (IP) ligaments, which extend from the lateral pelvic wall to the ovaries. During hysterectomy, inadvertent ligation or injury to these ligaments may compromise ovarian perfusion by interrupting the ovarian vessels. If the collateral circulation is insufficient to maintain tissue viability, ischemia may progress to ovarian infarction and necrosis. The risk of this complication may be increased in emergency procedures in which rapid hemorrhage control takes priority and anatomical landmarks are difficult to identify. Bilateral ovarian necrosis following EPH is an exceptionally rare but clinically significant complication. It may result in the abrupt loss of ovarian endocrine function and subsequent premature ovarian insufficiency (POI). POI is characterized by impaired ovarian activity before the age of 40 years & may manifest as menstrual disturbance, reduced estrogen levels, elevated gonadotropin concentrations, infertility, and symptoms

associated with estrogen deficiency, including hot flashes, night sweats, sleep disturbances, and vaginal dryness. Prolonged estrogen deficiency may also adversely affect bone mineral density and cardiovascular health. Early recognition of ovarian ischemia and necrosis is therefore important, as the consequences may extend beyond the immediate postoperative period and substantially affect long-term health and quality of life. We report a rare case of bilateral ovarian necrosis following emergency peripartum hysterectomy, attributed to inadvertent bilateral ligation of the infundibulopelvic ligaments during surgery for life-threatening obstetric hemorrhage. The resulting interruption of ovarian blood supply led to ovarian necrosis and premature ovarian insufficiency. This case highlights the importance of careful identification and preservation of the ovarian vascular pedicles during emergency obstetric surgery, even when rapid hemorrhage control is required. It also emphasizes the need to consider ovarian ischemia in the differential diagnosis of postoperative pelvic symptoms and ovarian dysfunction following EPH, and the importance of appropriate postoperative evaluation and follow-up to identify the potential endocrine consequences of this rare complication.

CASE PRESENTATION

A 19-year-old primiparous woman underwent an emergency caesarean section at term gestation for non-reassuring fetal status at a peripheral hospital. The procedure was complicated by postpartum hemorrhage (PPH) with ensuing hemorrhagic shock. Despite initial resuscitative measures, the bleeding remained uncontrolled, necessitating a subtotal hysterectomy. The patient received three units of packed red blood cells intraoperatively. The immediate postoperative period was complicated by oliguria, which subsequently progressed to near anuria. She was referred to our tertiary care centre on postoperative day (POD) 2 with a documented urine output of approximately 100 mL over the preceding 24 hours.

The patient had conceived spontaneously and had an uneventful antenatal course. There was no history of hypertension, headache, visual disturbances, fever, or any known pre-existing medical illness. Antenatal records and investigations were unavailable at the time of admission. On examination, she was conscious, oriented, and hemodynamically stable, although marked pallor was noted.

Cardiovascular and respiratory examinations were unremarkable. Abdominal examination revealed a soft, non-tender abdomen with no organomegaly or palpable masses. The Pfannenstiel incision showed mild induration without discharge or wound gaping. Laboratory investigations revealed anemia and thrombocytopenia. Renal function tests demonstrated elevated serum creatinine and blood urea nitrogen levels with normal serum electrolytes. Liver function tests and coagulation profile were within normal limits (**Table 1**). Within 24 hours of admission, the patient became anuric, fulfilling the Kidney Disease: Improving Global Outcomes (KDIGO) criteria for acute kidney

injury (AKI). Given the temporal association with surgery, ureteric injury was considered in the differential diagnosis. However, ultrasonography of the kidneys, ureters, and bladder demonstrated no evidence of hydronephrosis, and subsequent cysto-scopy with retrograde pyelography confirmed normal ureteric anatomy and bilateral ureteric patency. Patient's gradual recovery of urine output, metabolic parameters, and renal function following intermittent haemodialysis and supportive management suggested that the renal dysfunction was more likely attributable to a reversible haemodynamic insult rather than obstructive pathology. However, from POD 8 onward, the patient developed persistent high-grade fever associated with a rising total leukocyte count and abdominal tenderness. An extensive infectious workup was performed. Blood, urine, and vaginal swab cultures were sterile, and serological tests for endemic infections including dengue, typhoid, malaria, and scrub typhus were negative. Ultrasonography of the abdomen and pelvis revealed multiple ill-defined hyperechoic pelvic collections with internal echoes, the largest measuring 7.2×9.7 cm, suggestive of an organized pelvic hematoma. Contrast-enhanced computed tomography of the abdomen and pelvis demonstrated multi-loculated, heterogeneously enhancing bilateral adnexal masses along with mild free fluid in abdomen (**Figure 1**). Tumor markers were evaluated in view of the adnexal masses and were within normal limits (**Table 1**).

Despite escalation of broad-spectrum antibiotic therapy, the patient continued to experience persistent febrile spikes. In view

of the non-resolving fever and imaging findings, an exploratory 40-50 mL of foul-smelling peritoneal fluid was noted. Both ovaries were markedly enlarged, necrotic, and filled with purulent material (**Figure 2**).

Both fallopian tubes were also necrotic. Notably, the bilateral infundibulopelvic ligaments had been ligated with polyglactin suture during the previous surgery. The sutures were released; however, no evidence of ovarian vascularity was observed. The necrotic ovarian tissue was excised along with bilateral salpingectomy, and adequate hemostasis was achieved.

The postoperative course was uneventful, with resolution of fever and gradual clinical improvement. Serum follicle-stimulating hormone (FSH) levels were markedly elevated (>200 mIU/mL) in the immediate postoperative period. The patient was discharged in stable condition on postoperative day 10. Repeat serum FSH measurement at six weeks remained markedly elevated, confirming the diagnosis of premature ovarian insufficiency (POI). Histopathological examination of the excised specimen revealed necrotic and hemorrhagic ovarian tissue, confirming ovarian infarction and necrosis (**Figure 3**).

The patient was counselled in detail regarding the implications of premature ovarian insufficiency and the associated long-term endocrine consequences. Long-term hormone replacement therapy (HRT) and regular follow-up for monitoring of bone health, cardiovascular risk, and overall wellbeing were advised. HRT was initiated six months after delivery, and at one-year follow-up the patient remained clinically stable and compliant with hormonal therapy.

Table 1: Showing the laboratory investigations

Investigations	Post EPH Day 2	Post EPH Day 8	Post EPH Day 10
Hemoglobin (g/dL)	7.1	8.5	8.6
Platelet count (mcL)	80,000	99,000	176,000
Total leukocyte count (cells/mm ³)	9000	19,000	23,000
Blood urea nitrogen/ Serum creatinine (mg/dL)	113/5.8	98/4.2	55/2.3
PT/INR	14.6/1.27	13.2/1.1	13.6/1.37
Viral Markers (HIV, HBsAg)	Non- reactive		
Serum Electrolyte (mmol/L) Na ⁺ /K ⁺	136/5.8	134/4.1	140/4.5
Liver function Test AST/ALT/ALP (U/L)	27/38/95	33/44/89	52/46/84
Serum Albumin (g/dL)	3.8		
CA-125 (U/mL)			12
CEA (ng/mL)			0.78
CA-19.9 (U/mL)			18
AFP (ng/mL)			11.8
Ascitic fluid culture/ SAAG index			Sterile / low
Serum FSH on Post laparotomy day1: >200 mIU/ mL			

EPH: Emergency Peripartum Hysterectomy, PT: Prothrombin Time; INR: International Normalized Ratio; AST: Aspartate Aminotransferase; ALT: Alanine Aminotransferase; ALP: Alkaline Phosphatase; CA: Cancer Antigen; CEA: Carcinoembryonic Antigen; AFP: Alfa fetoprotein; FSH: Follicular Stimulating Hormone; SAAG: Serum Ascitic Albumin Gradient

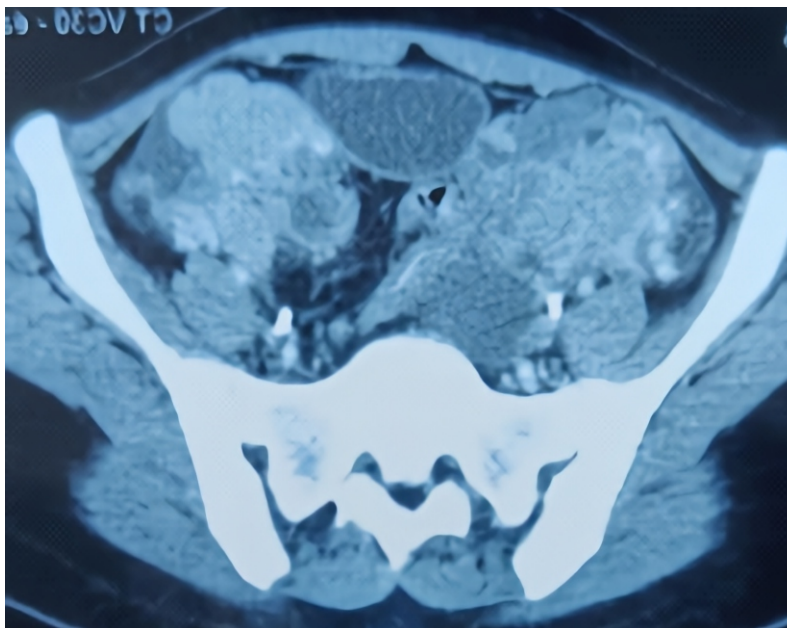


Figure 1: Contrast enhanced CT scan showing heterogenous bilateral adnexal masses

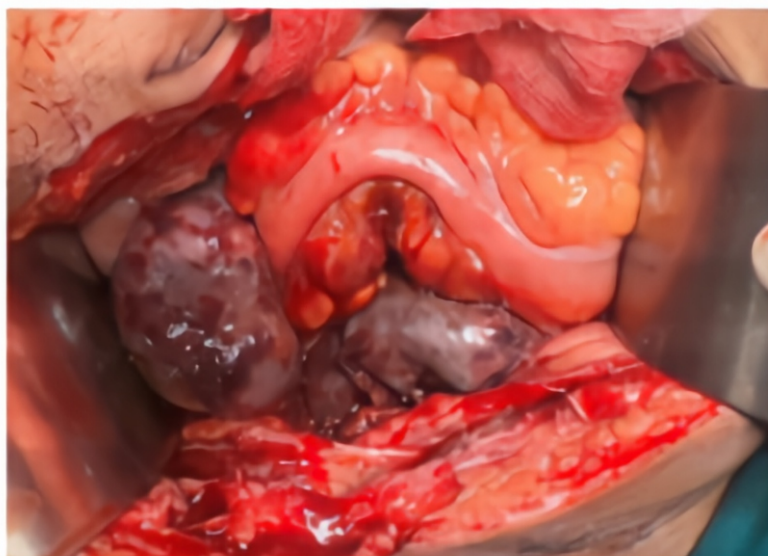


Figure 2: Intraoperative photograph showing bilateral necrosed ovaries

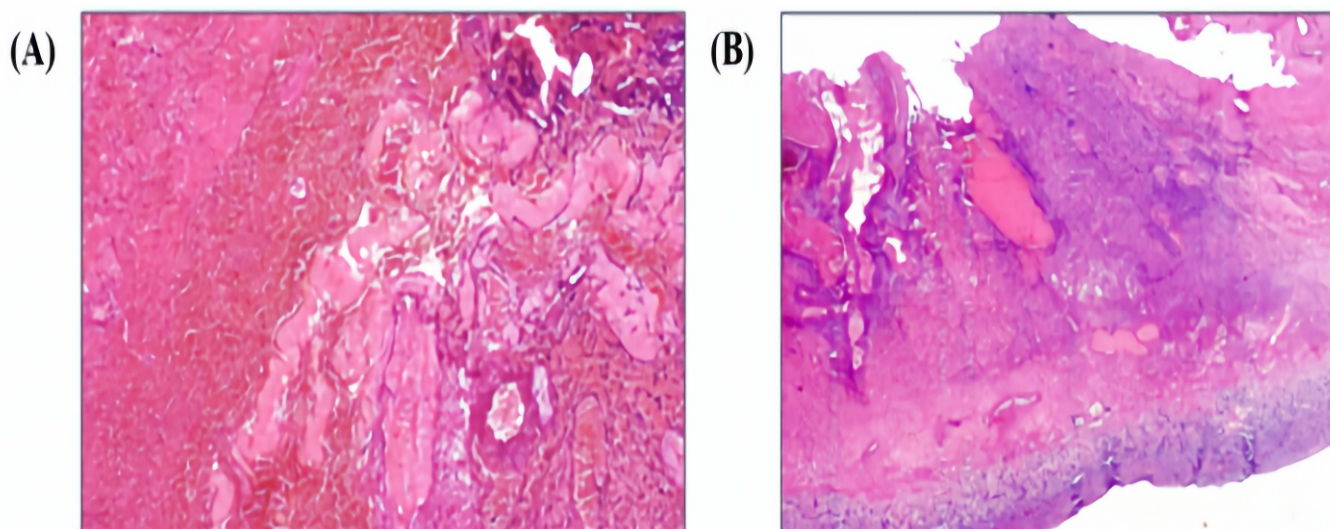


**Figure 3: (A) Histopathological Examination of Right Ovary depicting Hemorrhage & Necrosis
(B) Histopathological Examination of Left Ovary depicting Hemorrhage & Necrosis**

DISCUSSION

Emergency peripartum hysterectomy (EPH) remains one of the most critical life-saving procedures in obstetric practice when severe postpartum hemorrhage cannot be controlled by medical therapy or uterus-preserving surgical interventions. The incidence of EPH varies considerably across different regions of the world. A recent systematic review and meta-analysis reported an incidence ranging from 1.1 to 3 per 1000 births, with higher rates observed in low- and middle-income countries [3]. Compared with planned caesarean hysterectomy performed for conditions such as placenta accreta spectrum, emergency procedures are associated with significantly higher maternal morbidity due to hemodynamic instability, massive hemorrhage, and technical challenges encountered during surgery.

EPH performed for refractory atonic postpartum hemorrhage is often carried out as a supracervical hysterectomy because it can be completed rapidly and is associated with a lower risk of urinary tract injury. However, the physiological changes of pregnancy, including enlarged and tortuous pelvic vessels, tissue edema, and altered anatomical relationships, increase operative difficulty and the risk of inadvertent injury to surrounding structures. Careful identification of pelvic anatomy and meticulous surgical technique are therefore essential. Failure to clearly distinguish the relationship between the uteroovarian ligament, fallopian tube, and infundibulopelvic ligament may result in unintended ligation of ovarian vessels, leading to ovarian ischemia. Ovarian necrosis resulting from compromised ovarian blood supply can ultimately lead to premature ovarian insufficiency (POI). To our knowledge, bilateral ovarian necrosis following emergency peripartum hysterectomy has not been clearly reported in the literature. Most adnexal complications described after hysterectomy involve ovarian torsion or impaired ovarian function secondary to altered vascular supply rather than complete ovarian necrosis. POI is defined as hypergonadotropic hypogonadism due to loss of ovarian follicular activity before the age of 40 years. Earlier studies estimated its prevalence at approximately 1% [4], while more recent meta-analyses suggest a global prevalence of about 3.5%, with iatrogenic causes accounting for approximately 11.2% of cases [5]. Loss of ovarian function may occur due to autoimmune disorders, genetic abnormalities, toxin exposure, or iatrogenic causes such as chemotherapy, pelvic radiotherapy, and surgical procedures affecting ovarian vascular supply [6,7]. Women with spontaneous POI may experience intermittent recovery of ovarian function in up to 10% of cases [8]; however, recovery after surgically induced ovarian failure is unlikely because of irreversible ischemic damage. In addition to endocrine dysfunction, affected women may experience significant psychological distress due to sudden loss of fertility and long-term health risks including cardiovascular disease and osteoporosis [9,10]. Hormone replacement therapy remains the most effective strategy for preventing the consequences of hypoestrogenism & is recommended until the average age of natural menopause [11,12].

Improving awareness among obstetricians and surge-ons, particularly in peripheral and resource-limited settings, may facilitate early recognition of postoperative complications, timely referral, and appropriate long-term counselling for women affected by premature ovarian insufficiency. In emergency peripartum hysterectomy, careful identification and preservation of the infundibulopelvic ligament and ovarian vascular pedicle are essential, as inadvertent ligation may lead to ovarian ischemia, necrosis, and subsequent premature ovarian insufficiency.

CONCLUSION

Emergency peripartum hysterectomy remains a life-saving procedure in the management of severe obstetric hemorrhage but carries significant risk of perioperative complications, particularly when performed under emergency conditions with distorted pelvic anatomy and ongoing hemodynamic instability. This case highlights the importance of meticulous surgical technique and precise identification of adnexal vascular structures to prevent inadvertent compromise of ovarian blood supply. Early recognition of postoperative complications and appropriate long-term management are essential to address the endocrine and reproductive consequences of premature ovarian insufficiency.

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 translating scientific observations into meaningful improvements 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

EPH: Emergency Peripartum Hysterectomy

POI: Premature Ovarian Insufficiency

FSH: Follicle-Stimulating Hormone

AKI: Acute Kidney Injury

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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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The authors confirm that no AI & LLM tools were used in the writing 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 directions. However, they should not be relied upon independently when making treatment decisions or developing public health policies.

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