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Massive Hemoperitoneum Following Rupture Of A Functional Ovarian Cyst In A Young Woman Receiving Anticoagulation Therapy: A Case Report In King Abdulaziz Hospital - Cluster Health Jeddah 1

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Abstract

Background:
Rupture of functional ovarian cysts is a frequent and usually benign gynecologic event. In patients receiving anticoagulation therapy, however, cyst rupture may lead to severe intraperitoneal hemorrhage with hemodynamic compromise.
Case Presentation:
A 24-year-old woman on long-term anticoagulation for previous venous thromboembolism presented with sudden severe lower abdominal pain and syncope. On arrival, she was hypotensive and tachycardic with signs of acute blood loss. Laboratory investigations revealed significant anemia. Bedside ultrasonography demonstrated large-volume intraperitoneal free fluid, and contrast-enhanced computed tomography confirmed massive hemoperitoneum secondary to rupture of a right-sided functional ovarian cyst. Anticoagulation was withheld, resuscitation with blood products was initiated, and the patient underwent emergency laparoscopic surgery. Intraoperatively, active bleeding from a ruptured ovarian cyst was identified and controlled. The patient recovered without complications and was discharged with a revised anticoagulation plan.
Conclusion:
This case highlights a rare but life-threatening complication of anticoagulation therapy in women of reproductive age. Prompt recognition, early imaging, multidisciplinary management, and timely surgical intervention are essential to prevent morbidity and mortality.

Keywords:
Hemoperitoneum; Ruptured ovarian cyst; Anticoagulation; Acute abdomen; Gynecologic emergency.

1. Introduction:

Functional ovarian cysts are a common finding in women of reproductive age and represent a physiological consequence of the normal ovulatory cycle. The majority of these cysts, including follicular and corpus luteum cysts, are asymptomatic and resolve spontaneously without intervention [1,2]. When rupture occurs, it is typically associated with mild to moderate pelvic pain and limited intraperitoneal bleeding, often managed conservatively with analgesia and observation [3]. However, in rare circumstances, rupture may result in significant hemorrhage, leading to hemoperitoneum and hemodynamic instability, constituting a gynecologic emergency [4].
Hemoperitoneum resulting from ovarian cyst rupture is an uncommon but potentially life-threatening condition. Reported risk factors include larger cyst size, corpus luteum cysts with increased vascularity, vigorous physical activity, trauma, and underlying bleeding diatheses [5,6]. Among these, systemic anticoagulation represents one of the most significant yet under-recognized contributors to severe hemorrhagic complications [7]. With the expanding indications and widespread use of anticoagulant therapies—particularly direct oral anticoagulants (DOACs)—clinicians are increasingly encountering atypical bleeding presentations across multiple organ systems, including gynecologic emergencies [8]. Direct oral anticoagulants such as rivaroxaban, apixaban, and dabigatran have largely replaced vitamin K antagonists for many indications due to their predictable pharmacokinetics, fewer dietary interactions, and lack of routine monitoring requirements [9]. Despite an overall favorable safety profile, DOACs

are associated with a non-negligible risk of major bleeding, particularly in young women of reproductive age where gynecologic bleeding may be under-recognized or misattributed [10]. Ovarian cyst rupture–related hemoperitoneum has been reported sporadically in anticoagulated patients, but remains insufficiently characterized in the literature, leading to potential delays in diagnosis and management [11,12].

The clinical presentation of ruptured ovarian cyst with massive hemoperitoneum is often nonspecific and overlaps with other causes of acute abdomen, including ectopic pregnancy, ovarian torsion, appendicitis, and gastrointestinal perforation [13]. In anticoagulated patients, this diagnostic challenge is further compounded by the rapid progression from mild symptoms to hemorrhagic shock [14]. Prompt recognition, early imaging, and multidisciplinary involvement are therefore essential to prevent morbidity and mortality.

Point-of-care ultrasonography (POCUS) has emerged as a valuable diagnostic adjunct in the emergency setting, allowing rapid identification of free intraperitoneal fluid and expediting definitive imaging and surgical consultation [15]. Contrast-enhanced computed tomography (CT) remains the imaging modality of choice for identifying the source of bleeding and guiding management decisions in hemodynamically stable or transiently responsive patients [16].

Management strategies range from conservative observation to urgent surgical intervention, depending on hemodynamic status, volume of hemoperitoneum, and ongoing bleeding [17]. While conservative management may be appropriate in selected stable patients, anticoagulated individuals frequently require operative control of hemorrhage due to continued bleeding and limited compensatory mechanisms [18]. Laparoscopy, when feasible, offers a fertility-preserving, minimally invasive approach with favorable outcomes even in cases of large-volume hemoperitoneum [19].

This case report describes a young woman receiving therapeutic anticoagulation who developed massive hemoperitoneum following rupture of a functional ovarian cyst. The report aims to highlight diagnostic challenges, management considerations, and the importance of heightened clinical vigilance in anticoagulated women presenting with acute abdominal pain.

Case Presentation

2.1 Patient Information

A 24-year-old Saudi woman presented to the Emergency Department at King Abdulaziz Hospital with acute onset lower abdominal pain and syncope. She was nulligravid (G0P0), with regular menstrual cycles and no prior gynecologic diagnoses. Her last menstrual period occurred 14 days before presentation, corresponding to the mid-luteal phase of her cycle.

She had been diagnosed with unprovoked deep vein thrombosis eight months earlier and was maintained on rivaroxaban 20 mg once daily. She reported full adherence to therapy and denied use of antiplatelet agents, herbal medications, or non-steroidal anti-inflammatory drugs. There was no history of trauma, recent sexual intercourse, strenuous physical activity, or prior abdominal surgery.

2.2 Clinical Presentation

Six hours prior to arrival, the patient experienced sudden, severe, sharp lower abdominal pain, initially localized to the right iliac fossa and rapidly becoming diffuse. The pain was associated with nausea, dizziness, and a brief syncopal episode at home. She denied fever, urinary symptoms, bowel changes, or vaginal bleeding.

On arrival, she appeared pale, diaphoretic, and in significant distress.

2.3 Physical Examination

Vital signs revealed hypotension (88/54 mmHg), tachycardia (124 beats/min), tachypnea (22 breaths/min), and normal temperature. Oxygen saturation was 98% on room air.

Abdominal examination demonstrated distension, generalized tenderness, guarding, and rebound tenderness, more pronounced in the lower abdomen. Pelvic examination revealed right adnexal tenderness without cervical motion tenderness or vaginal bleeding.

2.4 Initial Differential Diagnosis

The initial differential diagnosis included:

- Ruptured ectopic pregnancy
- Ruptured ovarian cyst with hemoperitoneum
- Ovarian torsion
- Spontaneous anticoagulation-related intra-abdominal hemorrhage
- Acute appendicitis

2.5 Investigations

A urine pregnancy test was negative, effectively excluding ectopic pregnancy. Initial laboratory investigations revealed acute anemia with hemoglobin of 8.1 g/dL, normal platelet count, and mildly prolonged coagulation parameters consistent with DOAC therapy.

Bedside focused abdominal ultrasonography demonstrated a large volume of free intraperitoneal fluid in the pelvis and upper abdomen. Subsequent contrast-enhanced CT of the abdomen and pelvis confirmed massive hemoperitoneum with active bleeding from a ruptured right ovarian cyst measuring approximately 4.5 cm, without evidence of other intra-abdominal pathology.

2.6 Initial Management

Anticoagulation was immediately withheld. Aggressive resuscitation was initiated with intravenous crystalloids and packed red blood cells. Given persistent hemodynamic instability and imaging evidence of ongoing bleeding, urgent surgical intervention was undertaken.

Therapeutic Intervention

3.1 Emergency Resuscitation

Following radiologic confirmation of massive hemoperitoneum with active bleeding, the patient was managed as a case of hemorrhagic shock secondary to gynecologic bleeding. Immediate priorities included hemodynamic stabilization, reversal or interruption of anticoagulation effect, and rapid surgical source control.

Rivaroxaban was withheld immediately upon suspicion of intra-abdominal hemorrhage. Two large-bore peripheral intravenous cannulas were secured, and fluid resuscitation was initiated with isotonic crystalloids. Given evidence of ongoing blood loss and hemodynamic compromise, a massive transfusion protocol was activated. The patient received four units of packed red blood cells and two units of fresh frozen plasma prior to surgery. Tranexamic acid was deliberately avoided due to the patient's recent history of venous thromboembolism and the absence of guideline-supported indications in this context [20].

Continuous invasive blood pressure monitoring and urinary catheterization were instituted. Broad-spectrum prophylactic antibiotics were administered preoperatively in accordance with institutional surgical protocols.

3.2 Surgical Management

Given the patient's persistent tachycardia, hypotension, and imaging evidence of active intraperitoneal bleeding, emergency operative intervention was deemed necessary. A multidisciplinary decision was made to proceed with diagnostic and therapeutic laparoscopy, given the availability of surgical expertise and the patient's transient response to resuscitation.

Under general anesthesia, laparoscopic entry was achieved using an open (Hasson) technique to minimize the risk of iatrogenic injury in the presence of massive hemoperitoneum. Upon entry, a large volume of blood and clots was immediately encountered.

Intraoperative Findings

- Approximately 2.3 liters of blood and organized clots were evacuated from the peritoneal cavity.
- The uterus and left adnexa appeared normal.
- The right ovary demonstrated a ruptured cyst with active arterial and venous bleeding from the cyst wall.
- No evidence of ectopic pregnancy, ovarian torsion, endometriosis, or other sources of bleeding was identified.

Hemostatic Technique
Hemostasis was achieved using bipolar electrocautery applied to the bleeding cyst wall, followed by the application of absorbable topical hemostatic agents. Care was taken to preserve ovarian tissue and maintain fertility potential. No suturing or oophorectomy was required. Following hemostasis, the peritoneal cavity was irrigated thoroughly, and hemostasis was reassessed under low-pressure pneumoperitoneum.
The procedure was completed without conversion to laparotomy. Estimated intraoperative blood loss after evacuation was minimal.

3.3 Postoperative Management
The patient was transferred to the high-dependency unit for close monitoring. Serial hemoglobin measurements were obtained every six hours for the first 24 hours. Hemoglobin stabilized at 10.2 g/dL without further transfusion requirements.
Analgesia was provided using a multimodal, opioid-sparing approach. Early mobilization was encouraged. Mechanical venous thromboembolism prophylaxis was used initially, with pharmacologic prophylaxis withheld during the immediate postoperative period.
A multidisciplinary discussion involving gynecology, hematology, and internal medicine teams guided anticoagulation management. Given the recent life-threatening hemorrhage, anticoagulation was withheld for 72 hours, then reintroduced at prophylactic-dose low-molecular-weight heparin before planned transition back to oral anticoagulation.

4. Follow-Up and Outcomes
The patient's postoperative course was uncomplicated. She was discharged home on postoperative day five in stable condition. At six-week follow-up, she reported complete resolution of symptoms. Pelvic ultrasonography demonstrated normal bilateral ovaries with no residual or recurrent cysts. Anticoagulation was successfully resumed without recurrence of bleeding.
She was counseled regarding the risk of recurrent hemorrhagic ovarian cysts while on anticoagulation and advised on early presentation in the event of recurrent abdominal pain. Hormonal ovulation suppression was discussed as a preventive strategy.

5. Discussion
Hemoperitoneum resulting from rupture of a functional ovarian cyst is a rare but serious gynecologic emergency. In the general population, ovarian cyst rupture is usually self-limiting, with bleeding controlled by intrinsic hemostatic mechanisms [21]. However, in patients receiving systemic anticoagulation, these mechanisms are impaired, predisposing to uncontrolled hemorrhage even from physiologic ovarian structures [22].

5.1 Pathophysiology of Hemorrhagic Ovarian Cysts
Functional ovarian cysts arise from normal follicular development and corpus luteum formation. The corpus luteum is particularly prone to hemorrhage due to its rich vascular supply and fragile neovascularization [23]. In anticoagulated patients, minor vascular disruptions during ovulation may progress to significant bleeding, leading to cyst expansion, rupture, and intraperitoneal hemorrhage [24].

5.2 Anticoagulation and Gynecologic Bleeding
The widespread adoption of direct oral anticoagulants has shifted the landscape of anticoagulation-related bleeding. While DOACs are associated with lower rates of intracranial hemorrhage compared with warfarin, rates of gastrointestinal and gynecologic bleeding remain clinically significant [25]. Several reports have documented severe hemoperitoneum in women receiving DOACs, often initially misdiagnosed as surgical or obstetric emergencies [26].
Young women on anticoagulation represent a unique population in whom bleeding risk is often underestimated. Menstrual and ovulatory bleeding may be dismissed as benign, leading to delayed presentation and diagnosis [27]. This case underscores the need for targeted counseling and anticipatory guidance in this population.

5.3 Diagnostic Challenges

The differential diagnosis of acute abdomen in reproductive-age women is broad. Ectopic pregnancy remains the most critical diagnosis to exclude and mandates immediate pregnancy testing [28]. In anticoagulated patients, clinicians must additionally consider spontaneous hemoperitoneum without an identifiable source, further complicating diagnostic evaluation [29].

Point-of-care ultrasonography plays a pivotal role in early detection of free intraperitoneal fluid, particularly in unstable patients [30]. Computed tomography provides definitive localization of bleeding and aids surgical planning but should not delay operative intervention in unstable patients [31].

5.4 Surgical Decision-Making: Laparoscopy Versus Laparotomy

Historically, massive hemoperitoneum in hemodynamically unstable patients was managed via exploratory laparotomy, particularly in settings where rapid access and visualization were prioritized. However, advances in minimally invasive surgery, anesthesia, and perioperative monitoring have expanded the role of laparoscopy even in emergency settings [32]. Several studies have demonstrated that laparoscopy can be safely performed in patients with significant hemoperitoneum, provided that adequate resuscitation is achieved and surgical expertise is available [33].

In the present case, despite the presence of over two liters of intraperitoneal blood, laparoscopy allowed rapid evacuation of hemoperitoneum, precise identification of the bleeding source, and effective hemostasis while preserving ovarian tissue. This approach minimized postoperative pain, reduced hospital length of stay, and preserved fertility potential—an important consideration in young, nulligravid women [34].

Conversion to laparotomy should remain a low-threshold option in cases of uncontrolled bleeding, poor visualization, or hemodynamic deterioration. The choice of surgical approach must therefore be individualized, taking into account patient stability, institutional resources, and surgeon experience [35].

5.5 Anticoagulation Management in the Acute Setting

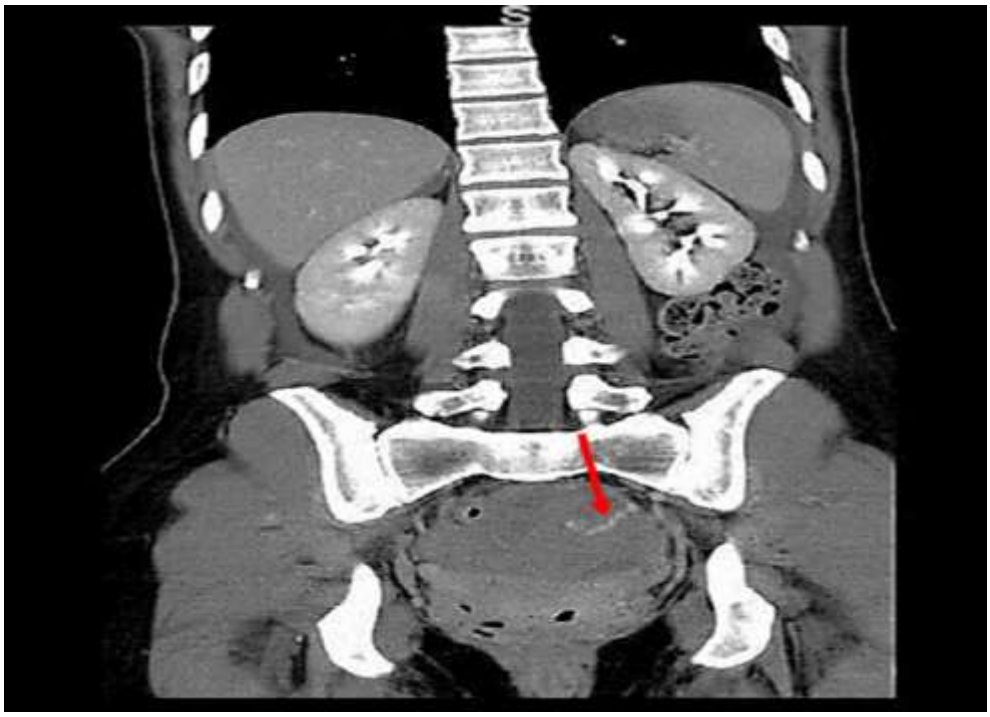
Management of anticoagulation in the setting of life-threatening bleeding represents a complex balance between hemorrhagic risk and thromboembolic recurrence. Immediate cessation of anticoagulant therapy is universally recommended in cases of major bleeding [36]. For DOAC-associated bleeding, supportive measures remain the cornerstone of management, as specific reversal agents may not be readily available in all institutions and are typically reserved for critical bleeding involving vital organs [37].

In this case, anticoagulation was withheld without administration of a reversal agent, as surgical source control was rapidly achieved and hemostasis confirmed intraoperatively. This approach aligns with emerging evidence suggesting that prompt surgical intervention may obviate the need for pharmacologic reversal in selected cases [38].

Postoperative resumption of anticoagulation requires individualized risk stratification. Factors such as the indication for anticoagulation, time since thromboembolic event, bleeding severity, and patient comorbidities must be carefully weighed [39]. A stepwise reintroduction strategy—beginning with prophylactic-dose anticoagulation and escalating to therapeutic dosing—was employed in this case and has been shown to reduce rebleeding risk while maintaining thromboembolic protection [40].

Figure 1 — Focused Abdominal Ultrasound (FAST / POCUS): Focused abdominal ultrasonography demonstrating a large volume of anechoic free fluid in the pouch of Douglas and upper abdominal recesses, consistent with hemoperitoneum.

Figure 2 — Contrast-Enhanced CT Abdomen and Pelvis: Contrast-enhanced CT scan of the abdomen and pelvis demonstrating massive hemoperitoneum with hyperdense intraperitoneal fluid and active contrast extravasation adjacent to the right ovary, consistent with rupture of a functional ovarian cyst.



5.6 Preventive Strategies and Long-Term Considerations

Prevention of recurrent hemorrhagic ovarian cysts in anticoagulated women remains an important yet under-addressed aspect of care. Hormonal ovulation suppression using combined oral contraceptives or progestin-only methods has been proposed as a strategy to reduce the risk of functional cyst formation and ovulatory bleeding [41]. While evidence remains limited, several observational studies support the use of hormonal suppression in high-risk patients [42].

Patient education is equally critical. Women of reproductive age receiving anticoagulation should be counseled regarding the potential for gynecologic bleeding complications and advised to seek early medical attention for acute pelvic or abdominal pain [43]. Multidisciplinary collaboration between hematology, gynecology, and primary care providers is essential to ensure comprehensive risk assessment and preventive planning.

5.7 Review of the Literature

A review of published case reports and small case series reveals that massive hemoperitoneum from ovarian cyst rupture in anticoagulated patients, although rare, is consistently associated with delayed diagnosis and significant transfusion requirements [44–46]. Many reported cases involve corpus luteum

cysts and present during the luteal phase of the menstrual cycle, consistent with the timing observed in this patient [47].
Outcomes are generally favorable when early recognition and surgical management are achieved. However, cases complicated by delayed presentation or misdiagnosis have been associated with increased morbidity, including prolonged intensive care stays and, in rare instances, mortality [48]. These findings underscore the importance of maintaining a high index of suspicion for gynecologic sources of bleeding in anticoagulated women presenting with acute abdomen.

5.8 Strengths and Limitations of the Case

This case highlights several strengths, including rapid diagnosis facilitated by bedside ultrasonography, timely multidisciplinary intervention, and successful minimally invasive surgical management. It also contributes to the limited literature on DOAC-associated gynecologic emergencies.
Limitations include the inherent constraints of a single case report and the inability to generalize management strategies across all clinical settings. Additionally, long-term outcomes beyond six weeks were not assessed. Nevertheless, the case provides valuable insights into diagnostic and therapeutic considerations relevant to emergency physicians, gynecologists, and internists.

6. Learning Points

- Functional ovarian cyst rupture can result in life-threatening hemoperitoneum in anticoagulated women.
- Acute abdominal pain in reproductive-age women on anticoagulation warrants urgent gynecologic evaluation.
- Point-of-care ultrasonography is a critical early diagnostic tool in unstable patients.
- Laparoscopic management is safe and effective even in cases of massive hemoperitoneum when expertise is available.
- Anticoagulation resumption should be individualized and guided by multidisciplinary input.

7. Conclusion

Massive hemoperitoneum due to rupture of a functional ovarian cyst is a rare but severe complication in women receiving anticoagulation therapy. This case emphasizes the importance of early recognition, prompt imaging, cessation of anticoagulation, and timely surgical intervention. Heightened clinical awareness and multidisciplinary management are essential to optimize outcomes and preserve fertility in this vulnerable population.

8. Patient Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. All identifying information has been removed to ensure patient confidentiality.

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