Ovarian Hemorrhagic Cyst Secondary to Warfarin Overdose Following Mitral Valve Replacement: A Case Report

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Abstract

Warfarin remains a cornerstone anticoagulant therapy for patients with mechanical heart valves but carries significant bleeding risks. Ovarian hemorrhagic cysts represent a rare but potentially life-threatening complication in women of reproductive age receiving anticoagulation therapy. The combination of warfarin overdose and ovarian bleeding can result in severe hemoperitoneum requiring emergency intervention. I present the case of a 48-year-old woman with a history of mitral valve replacement who was admitted to the emergency department with acute pelvic pain. The patient had been receiving warfarin therapy for mechanical valve anticoagulation and developed signs of warfarin overdose with an International Normalized Ratio of 8.9. Computed tomography revealed a large hemorrhagic ovarian cyst with associated hemoperitoneum. Conservative management was initially attempted with warfarin reversal using prothrombin complex concentrate. However, due to hemodynamic instability, the patient required emergency laparotomy. Right salpingo-oophorectomy was performed. The patient recovered fully and was discharged on postoperative day 9. Emergency physicians and surgeons should maintain high clinical suspicion for ovarian hemorrhagic complications in women of reproductive age receiving anticoagulation therapy, particularly when presenting with acute pelvic pain, oliguria, and elevated coagulation parameters. Early recognition, appropriate reversal of anticoagulation, and timely surgical intervention when indicated can prevent life-threatening complications and preserve reproductive function.

Keywords: Warfarin Overdose, Ovarian Hemorrhagic Cyst, Mitral Valve Replacement, Anticoagulation Complications, Emergency Surgery

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Background

Warfarin, a vitamin K antagonist, remains the standard anticoagulation therapy for patients with mechanical heart valves despite the introduction of direct oral anticoagulants. The therapeutic window for warfarin is narrow, and bleeding complications occur in approximately 1–3% of patients annually. Ovarian hemorrhagic cysts represent a rare but serious complication of anticoagulation therapy in women of reproductive age, with the potential for massive hemoperitoneum and hemodynamic compromise [1,2]. The pathophysiology involves rupture of physiological ovarian follicles or the corpus luteum during ovulation, which, in the setting of anticoagulation, can lead to uncontrolled bleeding into the peritoneal cavity. This complication is particularly concerning in patients with mechanical heart valves who require lifelong anticoagulation and face the dual challenge of bleeding risk versus thromboembolic prevention [3,4]. I present a case of an ovarian hemorrhagic cyst secondary to warfarin overdose in a patient with previous mitral valve replacement, highlighting the diagnostic challenges and management considerations in this complex clinical scenario.

Case Presentation

A 48-year-old woman presented to the emergency department with a 2-day history of severe right-sided pelvic pain, nausea, and decreased urine output. The

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patient had a significant medical history of rheumatic heart disease with mitral valve replacement using a mechanical prosthetic valve 3 years prior. She had been maintained on chronic warfarin therapy with a target INR of 2.5–3.5 for thromboembolic prophylaxis. The patient reported that her symptoms began suddenly during routine daily activities and progressively worsened over the following 48 hours. She denied any recent trauma, changes in medication compliance, or new drug interactions. Her menstrual history revealed regular cycles, with the last menstrual period occurring 12 days prior to presentation. The patient had no history of ovarian cysts, endometriosis, or other gynecological conditions. Upon arrival, the patient appeared distressed and pale. Vital signs revealed blood pressure of 95/60 mmHg, heart rate of 120 beats per minute, respiratory rate of 22 breaths per minute, temperature of 37.6 °C, and oxygen saturation of 96% on room air. Physical examination demonstrated a regular heart rate with mechanical valve clicks, clear lung fields, and significant abdominal findings including right lower quadrant tenderness with guarding and rebound tenderness. Pelvic examination revealed cervical motion tenderness and right adnexal fullness with exquisite tenderness.

Initial laboratory investigations showed hemoglobin of 10.2 g/dL (baseline 12.5 g/dL), hematocrit of 24.8%, platelet count of 180,000/μL, and white blood cell count of 13,500/μL. Coagulation studies revealed a prothrombin time greater than 120 seconds and an INR of 8.9. Renal function demonstrated elevated blood urea nitrogen of 75 mg/dL and creatinine of 1.7 mg/dL. Beta-human chorionic gonadotropin was negative, ruling out ectopic pregnancy. Point-of-care ultrasound (POCUS) showed moderate to severe free fluid in the abdominal cavity. Intravenous contrast-enhanced computed tomography (CT) revealed a complex right ovarian mass measuring 8.5 × 6.2 cm with mixed echogenicity (large hemorrhagic right ovarian cyst) and free fluid in the abdominal cavity (Figure 1,2).

Discussion

Ovarian hemorrhagic cysts secondary to anticoagulation therapy represent a rare but well-documented complication affecting women of reproductive age. The incidence of spontaneous bleeding complications with warfarin therapy ranges from 1–3% annually, with gynecological bleeding accounting for approximately 5–10% of all major bleeding events. Premenopausal women taking anticoagulation therapy are at particular risk of developing hemorrhagic ovarian cysts, with some studies reporting acute hemoperitoneum requiring surgical intervention in up to 15% of reproductive-age women on chronic anticoagulation [1,2]. The

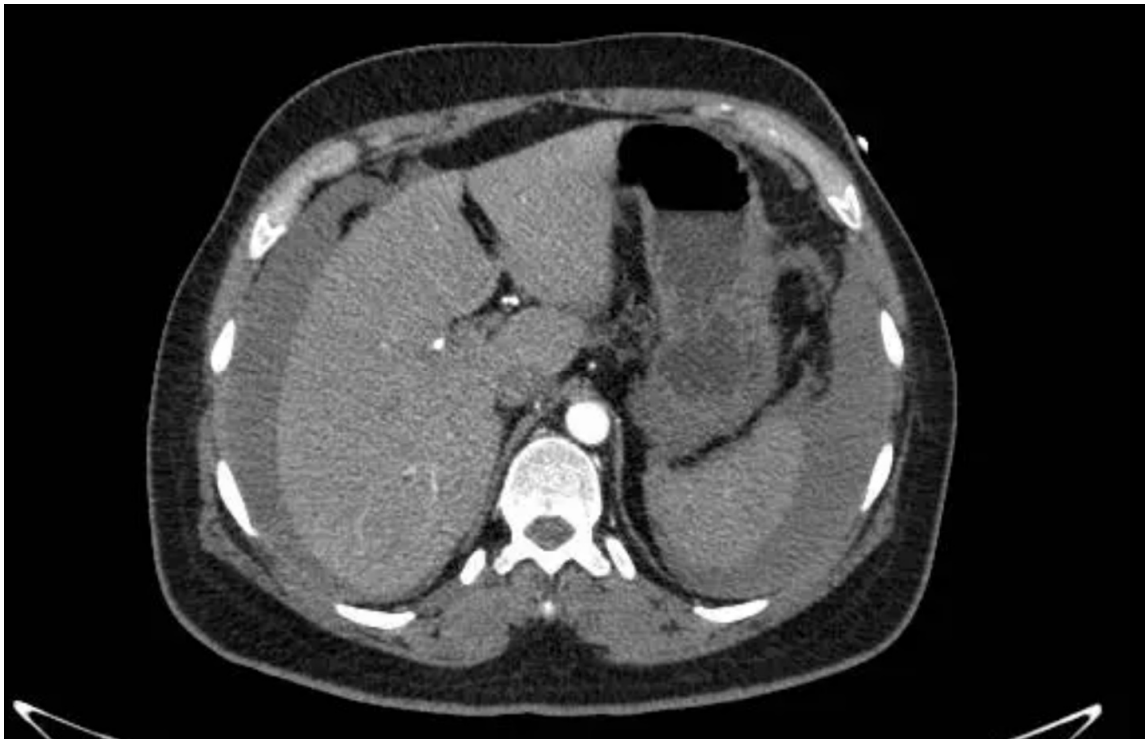

Figure 1: Axial image of abdominopelvic CT scan demonstrated hemoperitoneum within the abdominal cavity

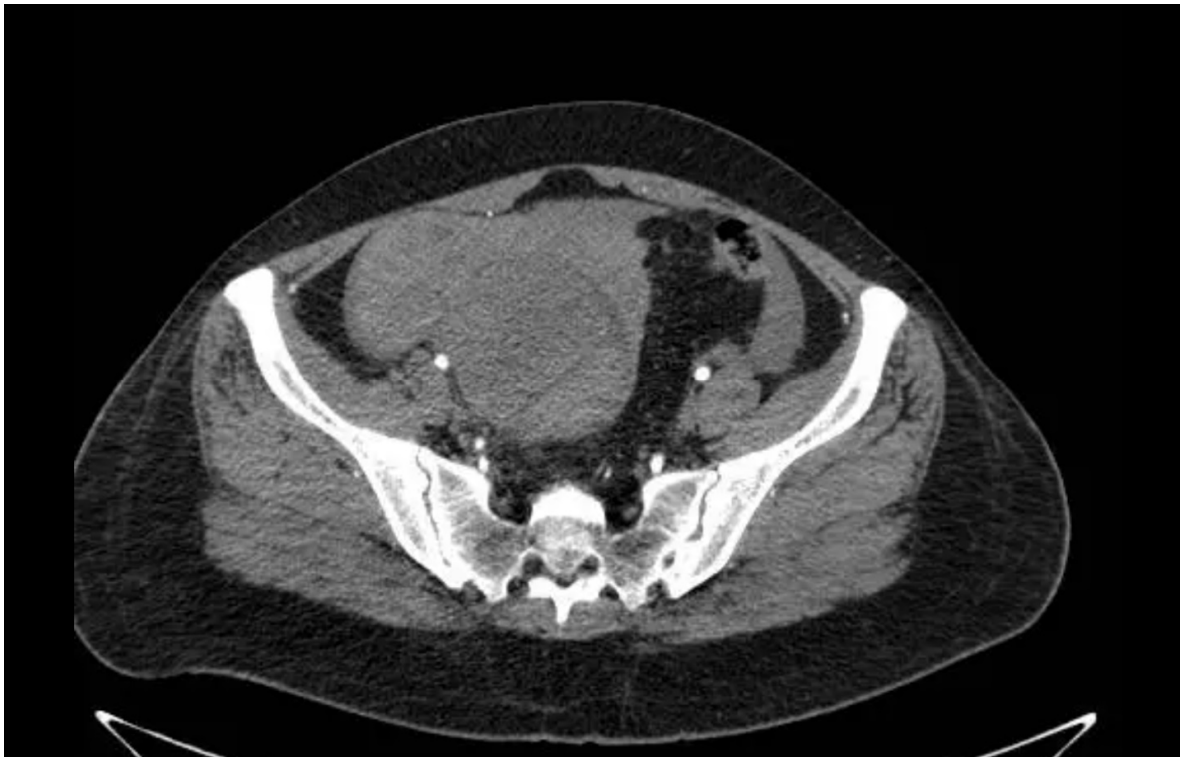

Figure 2: Axial image of CT scan revealed complex right adnexal mass with mixed echogenicity and free fluid in the pelvis from the right adnexa. A ruptured hemorrhagic cyst is considered in the differential diagnosis.

risk factors for ovarian hemorrhage in anticoagulated patients include age under 50 years, ovulatory status, intensity of anticoagulation, and concurrent use of antiplatelet agents. Women with mechanical heart valves requiring lifelong anticoagulation represent a particularly vulnerable population, as the therapeutic INR targets are typically higher than those used for other indications [3].

The pathophysiology of ovarian hemorrhagic cysts in anticoagulated patients involves the normal physiological process of ovulation becoming pathological in the setting of impaired hemostasis. During normal ovulation, follicle rupture and corpus luteum formation involve controlled vascular changes and hemostasis. In patients receiving anticoagulation therapy, the impaired coagulation cascade prevents adequate hemostasis at the ovulation site, leading to continued bleeding into the cyst cavity and potential rupture with hemoperitoneum [4). Warfarin inhibits the vitamin K-dependent coagulation factors II, VII, IX, and X, creating a state of relative anticoagulation that can persist for several days even after drug discontinuation due to the long half-life of these clotting factors. This prolonged effect explains why bleeding complications can occur even with seemingly minor trauma or physiological processes like ovulation [5].

The clinical presentation of ovarian hemorrhagic cysts in anticoagulated patients typically includes acute onset of unilateral pelvic pain, often described as sharp or cramping in nature. Associated symptoms may include nausea, vomiting, dizziness, and syncope, particularly if significant hemoperitoneum develops. Physical examination findings commonly reveal abdominal tenderness, guarding, and rebound tenderness localized to the affected side [6]. In cases of significant bleeding, patients may present with signs of hypovolemic shock, including hypotension, tachycardia, and altered mental status. The presence of oliguria, as seen in our case, may indicate either hypovolemia secondary to blood loss or direct pressure effects from hemoperitoneum on pelvic structures [6,7]. The diagnostic approach for suspected ovarian hemorrhagic cysts in anticoagulated patients should include high-resolution pelvic ultrasound as the initial imaging modality, followed by contrast-enhanced computed tomography to assess for active bleeding and quantify hemoperitoneum. Laboratory evaluation must include complete blood count, comprehensive metabolic panel, coagulation studies including INR, and pregnancy testing [7].

CT findings characteristic of hemorrhagic ovarian cysts include high-attenuation adnexal masses with fluid-debris levels and associated free fluid in the pelvis. The presence of active contrast extravasation indicates ongoing bleeding and may necessitate

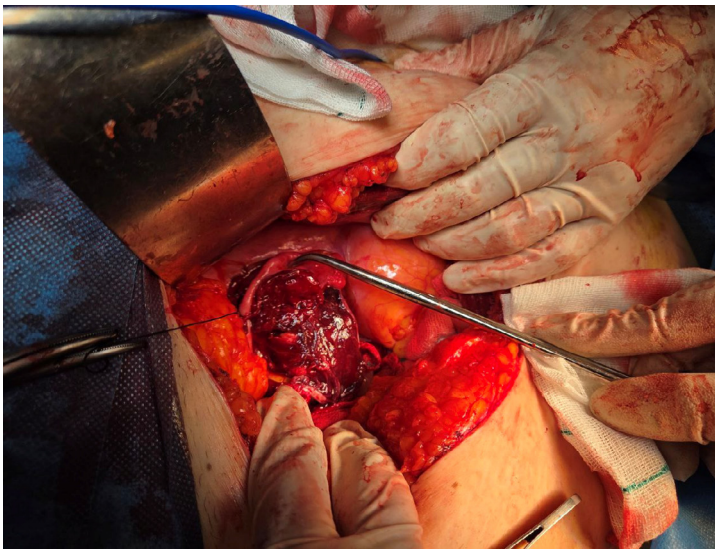

Figure 3: Hemorrhagic Ovarian cysts after salpingo-oophorectomy.

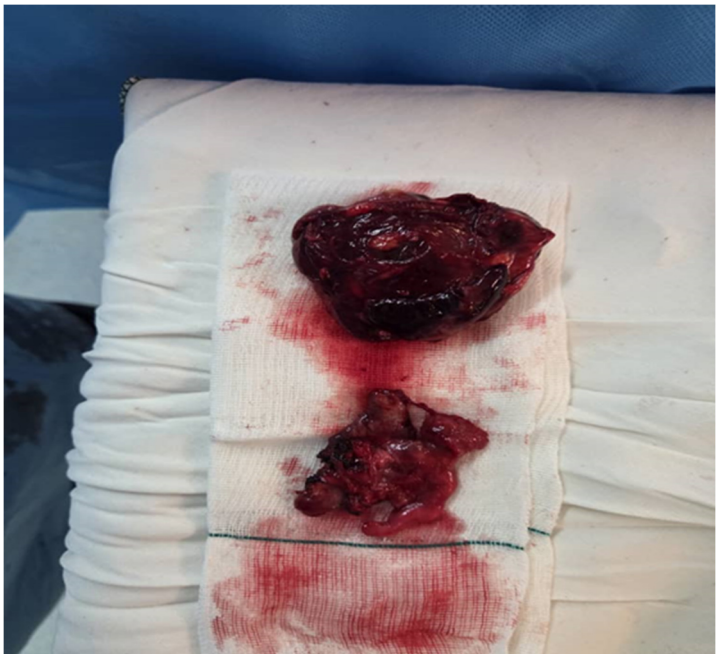

Figure 4: Hemorrhagic Ovarian cysts after salpingo-oophorectomy.

immediate intervention [7]. Serial hemoglobin monitoring is crucial, as patients can develop significant anemia rapidly due to ongoing bleeding. Coagulation parameters should be closely monitored to guide reversal therapy and assess the effectiveness of interventions. The management of ovarian hemorrhagic cysts in anticoagulated patients requires a multidisciplinary approach involving emergency physicians, gynecologists, and hematologists. Initial management focuses on hemodynamic stabilization, warfarin reversal, and determination of the need for surgical intervention [8].

Three primary therapeutic interventions are available for the urgent reversal of vitamin K antagonist anticoagulation: vitamin K administration, prothrombin complex concentrate (PCC), and fresh frozen plasma (FFP). PCC represents a concentrated coagulation factor replacement therapy derived from pooled donor plasma, containing factors II, VII, IX, and X, along with anticoagulant proteins C and S at concentrations approximately 25-fold higher than those found in FFP. The standard dosing protocol involves an initial bolus of 500–1000 IU administered at 100 IU/min, followed by maintenance infusion at

≤25 IU/min, with total doses typically ranging from 25–50 IU/kg. Four-factor PCCs demonstrate superior efficacy compared to FFP in achieving rapid and complete anticoagulation reversal while avoiding the complications associated with large-volume plasma transfusion, though FFP remains a viable alternative when immediately available and pre-thawed, particularly in patients requiring concurrent volume resuscitation.

The clinical application of PCC is associated with elevated thrombotic risk attributed to disproportionately high factor II concentrations, which enhance thrombin generation capacity. Given the abbreviated six-hour half-life of factor VII, concurrent vitamin K administration is essential to sustain reversal effects through endogenous factor synthesis restoration. However, high-dose vitamin K (10 mg) is contraindicated in patients with mechanical valve prostheses due to the risk of inducing hypercoagulable states and subsequent valve thrombosis. Additionally, excessive vitamin K dosing may precipitate warfarin resistance through hepatic vitamin K accumulation, necessitating higher warfarin doses to achieve therapeutic anticoagulation and potentially increasing thromboembolism risk during the re-anticoagulation period. Consequently, clinical guidelines recommend FFP monotherapy or combination therapy with low-dose vitamin K (1–2 mg intravenously) as the preferred approach for patients with mechanical mitral valve prostheses [9].

Surgical intervention is indicated for patients with hemodynamic instability, large or expanding hemoperitoneum, or failure of conservative management. A laparoscopic approach is preferred when technically feasible, allowing for ovarian-sparing cystectomy and preservation of reproductive function. An open surgical approach may be necessary in cases of massive hemoperitoneum or hemodynamic instability [6,9]. The challenge in managing these patients lies in balancing the need for hemostasis against the risk of thromboembolic complications from interrupting anticoagulation. Careful timing of anticoagulation resumption is crucial, typically beginning 24–48 hours postoperatively with close monitoring of both bleeding and thrombotic risks [10].

Conclusion

Ovarian hemorrhagic cysts represent a rare but potentially life-threatening complication in women of reproductive age receiving anticoagulation therapy. Emergency physicians should maintain high clinical suspicion for this diagnosis when anticoagulated women present with acute pelvic pain, particularly in the setting of elevated INR values. Early recognition, appropriate imaging, and timely intervention can prevent serious complications and preserve reproductive function. Management requires careful balance between bleeding control and thromboembolic prevention, emphasizing the need for multidisciplinary care and individualized treatment approaches.

Funding

None.

Conflict of interests

None declared.

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