Renal Angiomyolipoma Rupture in a 35-Week Pregnant Woman: A Case Report

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KEYWORDS

Renal angiomyolipoma, Pregnancy, Kidney tumor, Rupture, Embolization

ABSTRACT

Introduction:
Renal angiomyolipoma (rAML) is a rare, benign kidney tumor occurring in approximately 0.3% of the general population. They are typically asymptomatic; however, rAML carries an increased risk of complications such as rupture during pregnancy, especially in tumours larger than 4 cm. Standardized management guidelines for rAML in pregnancy currently do not exist.

Main symptoms and clinical findings: This is a case of a 35-week pregnant woman who presented with vomiting and metabolic acidosis, she underwent an emergency cesarean-section for fetal distress after which she remained hemodynamically unstable and was subsequently diagnosed with a ruptured rAML through imaging.

Diagnosis, therapeutic interventions and outcomes:
She was diagnosed with a ruptured rAML which was managed through embolization. She recovered after the procedure and was discharged in a stable condition.

Conclusion:
This case highlights the diagnostic and management challenges of rAML in pregnancy and highlights the need for awareness and standardized treatment guidelines.

Introduction

Renal angiomyolipoma (rAMLs) are uncommon benign tumors composed of adipose tissue, smooth muscle, and dysmorphic blood vessels. They occur in around 0.3% of the general population **(1)**. Most rAMLs are asymptomatic; however, they carry a significant risk of bleeding and rupture, particularly during pregnancy or when the tumor size exceeds 4 cm. Increased estrogen receptor expression during pregnancy may contribute to tumor enlargement and rupture **(2)**. The absence of standardized management protocols for rAML during pregnancy complicates clinical decision-making. This is a case of a 35-week pregnant woman with a ruptured rAML to emphasize the need for increased awareness and a structured approach to managing rAML in pregnancy.

Patient information:

A 34-year-old female gravida 5, para 3, abortus 1, at 35 weeks of gestation, with an unremarkable past medical and past surgical history. Family history and psychosocial history were also

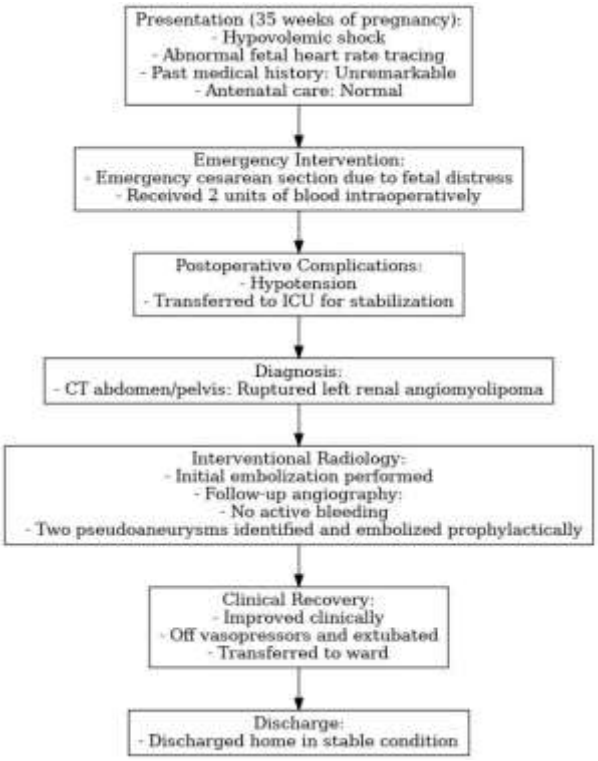
unremarkable. Her current pregnancy antenatal care was normal and her past obstetrical history includes three previous uneventful vaginal deliveries. She presented to the emergency department with sudden and persistent vomiting for the last four hours; this was associated with generalized abdominal pain that worsened over time and was not relieved by over-the-counter medication. She denied any aggravating factors, such as food intake or trauma and reported no changes to bowel movements.

Clinical findings:

On examination, she was conscious, alert, and oriented, but she was tachycardic (110-115 bpm) and hypotensive (BP 90/60 and 85/55 mmHg), while her oxygen saturation was 98%. Physical examination revealed pallor and generalized abdominal tenderness without guarding or rigidity. Initial laboratory results showed a hemoglobin level of 9 g/dL (down from 11 g/dL four weeks prior), normal renal and liver function tests, and elevated lactic acid levels of 4 mmol/L on arterial blood gas analysis. Due to concerns for fetal distress, continuous cardiotocography (CTG) was initiated, revealing abnormal fetal tracing that improved with maternal fluid resuscitation. However, as the CTG deteriorated despite maternal stabilization, an emergency cesarean section was performed under general anesthesia to ensure the safety of both mother and fetus.

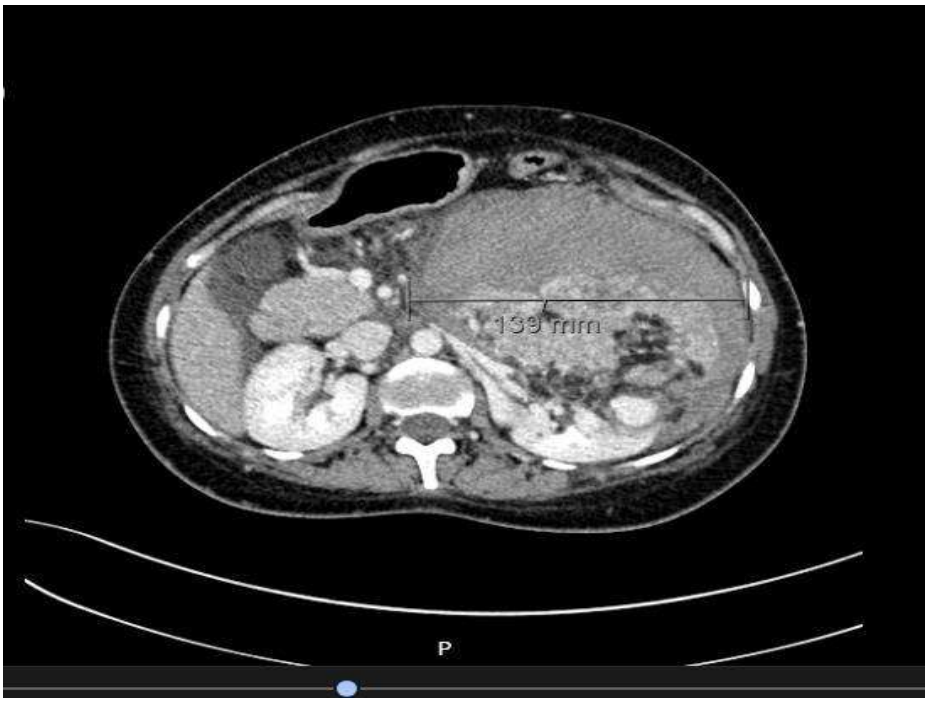
During surgery, approximately 300 cc of blood was encountered upon entering the peritoneum, and a live infant was delivered without complications. After closing the uterus, a systematic exploration of the source of bleeding revealed no apparent etiology and uterine rupture was ruled out. She received two units of packed red blood cells intraoperatively. The patient remained hemodynamically stable postoperatively but then developed persistent hypotension, raising concerns for ongoing bleeding.

Timeline:

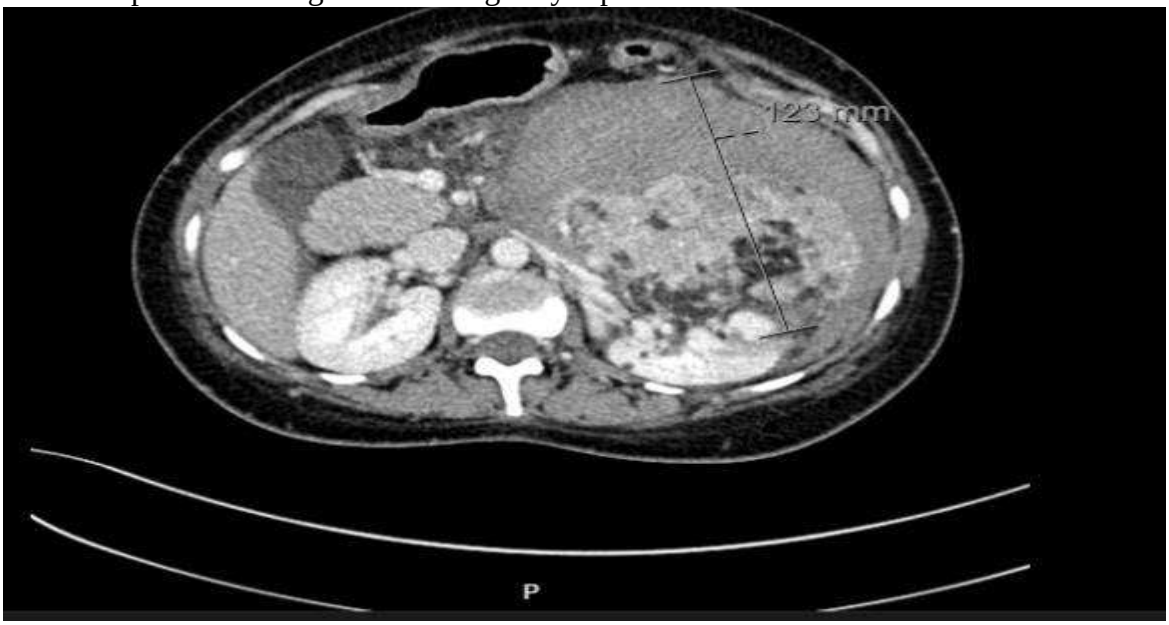


Diagnostic Assessment

A contrast-enhanced computed tomography (CT) scan revealed a large heterogeneous mass in the left kidney (11.4 x 8.4 x 13.3 cm), consistent with a ruptured rAML, along with a perirenal hematoma (14 x 12.4 x 16.5 cm) and a 2 x 2 cm pseudoaneurysm in a segmental branch of the left renal artery. These findings prompted urgent digital vascular intervention (DVI) for angiographic embolization. Angiography confirmed a large pseudoaneurysm in the lower segmental branch and smaller pseudoaneurysms in the upper branches.



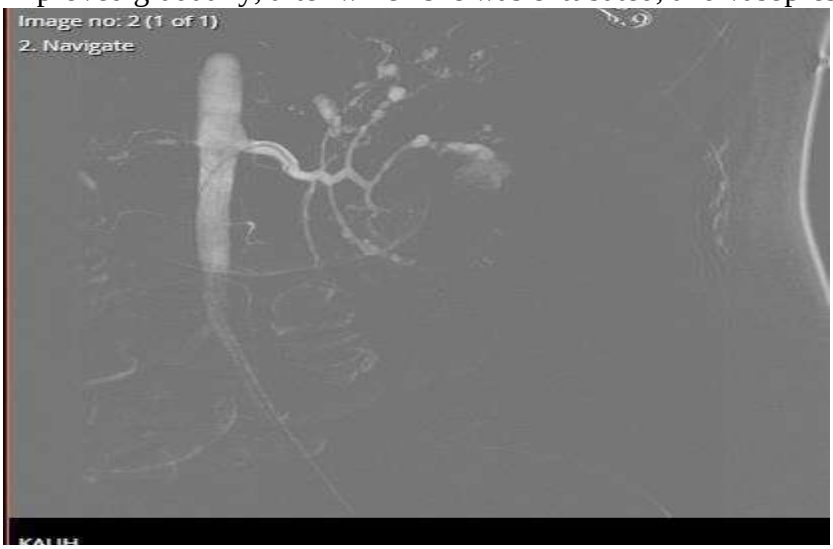
CT Abdo pelvis showing left renal angiomyolipoma



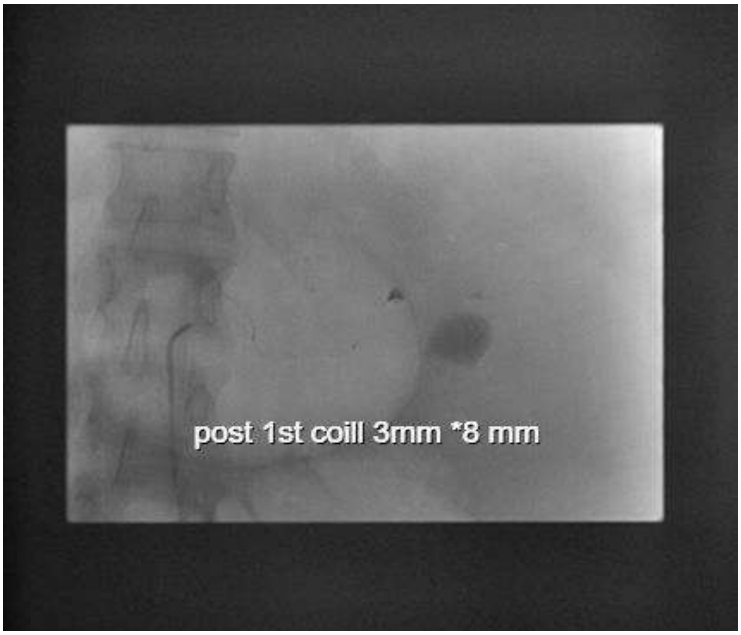
CT Abdo pelvis showing left renal angiomyolipoma

Therapeutic Intervention

The patient underwent coil and gel foam embolization, resulting in the near-complete exclusion of the pseudoaneurysms while preserving renal parenchyma. During the intervention, she required intubation, and the massive transfusion protocol was initiated due to persistent hypotension and tachycardia. Following stabilization in the intensive care unit (ICU), further declines in hemoglobin levels lead to repeat angiography. No active bleeding was observed during the follow-up angiography; however, two additional pseudoaneurysms were noted and were embolized prophylactically. Hemodynamic stability was maintained with vasopressors and transfusions, ensuring hemoglobin levels remained above 8 g/dL. The patient's condition improved gradually, after which she was extubated, and vasopressors were stopped.



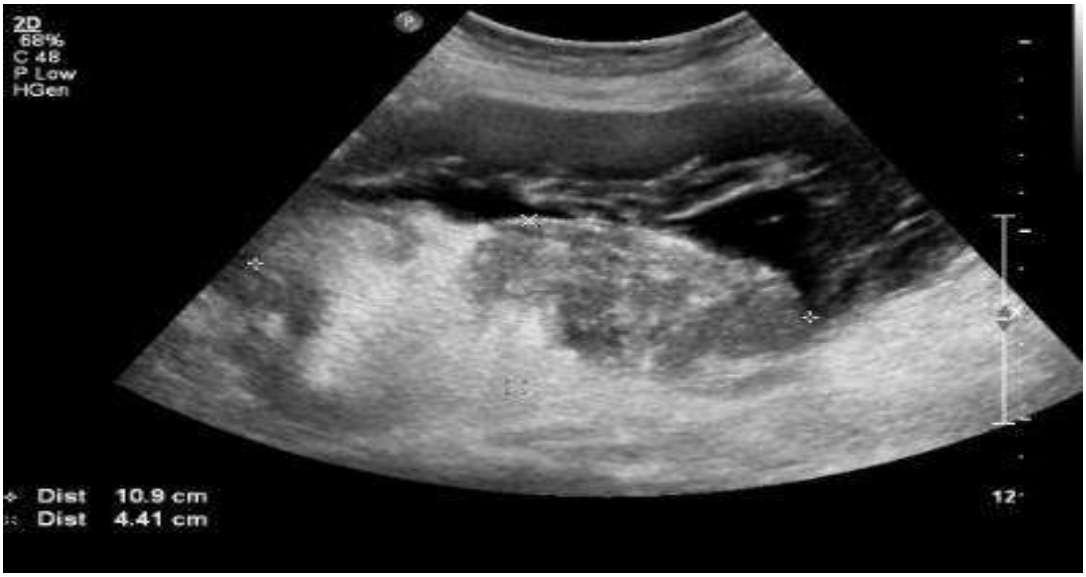
Direct Venous intervention (DVI) shows feeding vessels which are tortuous and dilated.



Post embolization angiogram, 3mm x 8 mm coil deployed. Note the reduction in contrast flow.

Follow-Up and Outcomes

The patient's condition improved in the days post-intervention. She had regular hemoglobin, renal function, and vital signs monitoring. Abdominal examinations remained benign, oral intake resumed, and surgical wounds healed appropriately. Serial imaging demonstrated a reduction in the size of the perirenal hematoma, and Doppler ultrasonography confirmed the absence of active bleeding. Before discharge, no syndromic associations with rAML were identified.



Renal ultrasound post-intervention.

Discussion

Managing rAML during pregnancy is challenging due to the increased risks associated with tumor growth and rupture, posing significant risks to both the mother and fetus. In our case, the patient experienced a rAML rupture at 35 weeks of gestation, requiring immediate intervention. Literature indicates that most AMLs diagnosed during pregnancy are large, with a median size of 10 cm, and they carry a high risk of rupture, which was reported in approximately 69% of cases **(3)**. Physiological and hormonal changes in pregnancy, such as increased vascular volume, hormonal fluctuations, and heightened intra-abdominal pressure, are believed to amplify the risk of rupture **(4)**. The presence of estrogen and progesterone receptors within AMLs suggests a hormonal influence on tumor behavior, potentially contributing to rapid tumor growth and rupture during pregnancy **(2,5)**. Establishing a causal relationship between pregnancy-related changes and rAML rupture can be complex, particularly in cases diagnosed incidentally.

With advances in minimally invasive procedures, embolization has become preferred over surgical excision for rAML, particularly when renal function preservation is a priority **(6)**. However, pregnancy complicates the timing and choice of interventions, as a balance between maternal and fetal well-being is required. A proposed treatment algorithm by Soerensen et al. **(3)** suggests delivery after 34 weeks of gestation before embolization, thereby minimizing radiation exposure to the fetus. In this context, careful multidisciplinary discussions involving obstetrics, urology, and interventional radiology are necessary to develop an optimal treatment plan. In addition to the surgical and anesthesia risks, potential fetal risks, including radiation exposure, must be carefully assessed **(7)**.

The literature suggests that interventions in the second trimester are associated with lower risks of teratogenesis and spontaneous abortion **(8)**. However, for advanced gestations (after 34 weeks), as seen in our case, prioritizing delivery before embolization can provide safer management for both the mother and fetus. The patient's presentation highlights the importance of maintaining a high level of suspicion for retroperitoneal bleeding sources, such as AML rupture, particularly when faced with unexplained hypovolemic shock in pregnant patients.
A systematic review by Soerensen et al. **(3)** found that the most common symptoms of AML rupture in pregnancy were flank pain (67%), anemia or hypovolemic shock (40%), and hematuria (24%). In our case, the patient presented with a vague presentation characterized by vomiting, hypotension, and subsequent acute shock without a clear etiology for bleeding. Prompt diagnosis and emergency cesarean delivery facilitated rapid stabilization and treatment of the rAML rupture. Early recognition and intervention in such cases are vital to prevent maternal and fetal morbidity and mortality.
The decision to pursue embolization in our patient was influenced by the need for rapid hemostasis while preserving renal function. The success of this intervention highlights the role of minimally invasive treatments as a viable option in managing rAML rupture, offering favorable outcomes without significant compromise to the kidney.

Conclusion

This case highlights the challenges of managing a ruptured rAML in pregnancy and demonstrates the successful use of embolization to control hemorrhage and preserve renal function following cesarean delivery. Early recognition and multidisciplinary management are critical for favorable outcomes. While conservative treatment is an option for stable tumors, high vigilance and emergent intervention are vital in cases of rupture. Developing standardized guidelines will improve care, but individualized, case-based approaches remain essential.

Informed consent:
Informed consent was obtained from the patient to write and submit this case report for publication. She was aware that she would remain anonymous and was agreeable.

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