Ultrasound Diagnoses of an Iliac Artery Aneurysm during the Second Trimester of Preganancy

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Introduction

Isolated iliac artery aneurysm (IIAA) is a rare event and may occur related or unrelated to pregnancy. There are few cases of IIAA during pregnancy reported in the literature and none were diagnosed before rupture (C. F. La Chapelle et al. BJOG 2012; 119: 86–93).

Development or enlargement of an aneurysm during pregnancy is a serious condition that is often misdiagnosed and delayed, causing high fetal and maternal mortality.

We present a case of a symptomatic IIAA during the second trimester of pregnancy, diagnosed by ultrasound (US) before emergency.

Case Description

A 31-year-old gravida 1 para 0 had a history of endometriosis treated by laparascopic surgery one year earlier. The first admission to our department was at gestational age (GA) 19 + 0, due to lower abdominal pain with US revealing no pathology. She was discharged and went on holiday in Turkey, where her symptoms recurred and she was admitted to a local hospital. Left hydronephrosis was diagnosed and treated with a ureteral stent on the suspicion of urolithiasis. Upon arrival in Denmark, the patient went directly to a trauma and emergency center at The National University Hospital, where the stent was removed since there was no suspicion of urolithiasis. However, the symptoms continued and she was readmitted to our clinic. Her symptoms were still lower abdominal pain, worsened by physical activity, three weeks after first admission. She had normal vital signs except for fever, and a urinary tract infection was diagnosed and treated.

US examination revealed a fetus (GA 23 + 3) that was normal-sized and healthy. However, dedicated US showed: bilateral slight hydronephrosis, retroperitoneal fluid collection with membrane sedimentation in the deep pelvic region and first and foremost a 2 cm lesion connected to the left internal iliac artery with pathological color flow – arterial aliasing and venous flow at the same time (▶ **Fig. 1a–d**). An aneurysm was suspected. The patient was transferred to a national referral center.

Magnetic resonance angiography (MRA) confirmed the diagnosis of an aneurysm. Thirteen days after referral (GA 24 + 6), the patient developed hypovolemic shock, blood pressure of 80/60 mmHg, tachycardia of 110 beats/min, and a fetus with extreme bradycardia.

Before surgery, a percutaneous balloon catheter was placed in the aorta. Through a midline incision, a cesarean section was performed and a girl weighing 635 g was delivered. At this point, the patient's blood pressure dropped and the balloon in the aorta was inflated. The aneurysm was embolized with coils.

The patient received 4 units of plasma and 4 units of red blood cells. The child died seven days after delivery due to respiratory distress. Seventeen days postoperatively, the patient was discharged. Apart from a postoperative infection and a subcutaneous hematoma in the left inguinal region, the patient's recovery was uneventful.

Discussion

IIAAs are uncommon, representing 0.9–2 % of all abdominal aneurysms. The majority are asymptomatic and are usually incidental findings not requiring therapy in the absence of symptoms or growth. Many centers use a diameter measurement of > 3 cm as the indication for treatment, given the increased risk of rupture associated with aneurysms of this size, and that rupture is associated with high morbidity and mortality (R. Uberoi et al. Cardiovasc Intervent Radiol 2011; 34: 3–13).

The underlying pathogenesis of IIAAs is unknown. Etiologies that may cause IIAAs include atherosclerosis, trauma, fibromuscular dysplasia, infection, cystic medial necrosis, collagen vascular diseases and pregnancy (R. Uberoi et al. Cardiovasc Intervent Radiol 2011; 34: 3–13).

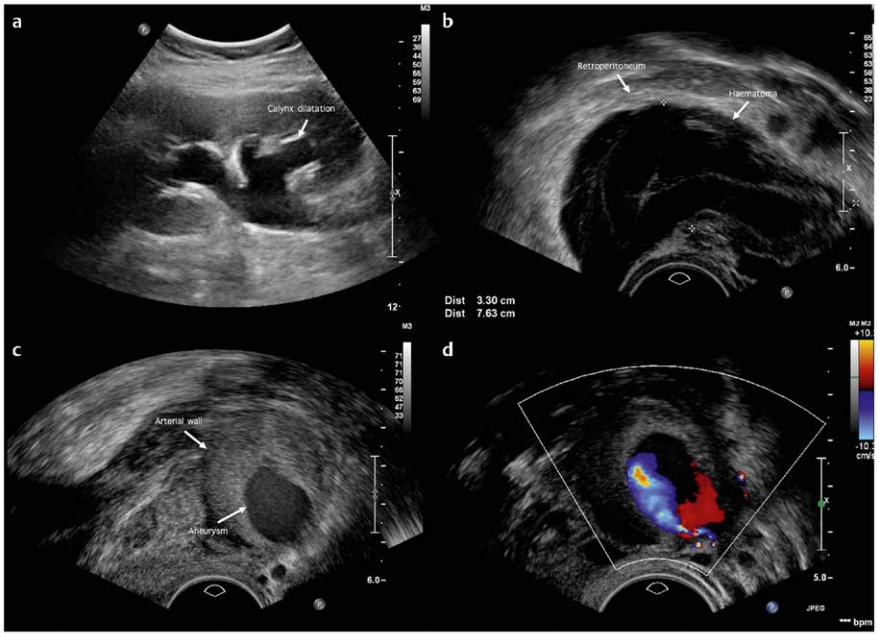
There is an ongoing debate as to whether pregnancy may contribute to the pathogenesis of vascular disease. Cardiovascular changes during pregnancy may enhance the stress on the arterial wall. High levels of female hormones during pregnancy alter the histological structure of the arterial wall, thereby resulting in a predisposition to aneurysmal dilatation. Pregnancy may be an initiator of arterial degeneration, which is additive with multiple pregnancies and changes may be permanent (J.E. Nolte et al. J Vasc Surg 1995; 21: 515–520).

Aneurysm rupture during pregnancy is often associated with nonspecific symptoms and is life-threatening. The maternal mortality rate for vascular dissection and rupture is 0.74–0.76 per 100,000 live births (C. F. La Chapelle et al. BJOG 2012; 119: 86–93). It is important to have differential diagnoses in mind as this contributes to the complexity of diagnosing this condition. Differential diagnoses include: uterine rupture, placental abruption, massive pulmonary embolism, cholecystitis, perforated ulcer, and urolithiasis (C. F. La Chapelle et al. BJOG 2012; 119: 86–93).

Diagnosis can be made by computed tomography angiography, MRA and abdominal/transvaginal US, which is quick, easy and free of ionizing radiation. US is used extensively within obstetrics and gynecology and many clinical situations are diagnosed via a combination of clinical experience and US skill. A detailed evaluation of the kidneys (size, location, tumors, stasis and concrements), a specific description of fluid collections (free fluid, hematoma, serous, mucinous etc.) and use of color flow mapping provided valuable information for exact diagnosis of an extremely rare condition in this case.

In this case the treatment was emergency cesarean section followed by immediate embolization of the aneurysm. The child died after seven days due to extreme prematurity and respiratory failure.

Currently there are no guidelines for treatment of IIAAs during pregnancy. Lauback et al. reported a case, in which primary embolization of a pseudo-aneurysm in a uterine artery (a branch of internal iliac artery) was successfully performed in a 29-week pregnant woman without delivery of the child. After the procedure no alterations of cardiotocography were seen and



▶ **Fig. 1** **a** Left kidney with hydronephrosis; **b** Transvaginal US: a solid mass with membrane sedimentation typical of a hematoma; **c** A cross-section of IIAA; **d** Aneurysm with aliasing flow

Doppler of the umbilical artery remained normal in the fetus (M. Laubach et al. JPM 2000; 28: 321–325). Despite interruption of one of the main arterial supplies of the uterus, the fetus did not show any signs of hypoxia, assuming collateral blood flow can ensure enough circulation for continuation of pregnancy. Aortic dissection, when extending into the internal iliac artery, is another vascular emergency threatening uterine artery insufficiency. The current recommendations for this condition are cesarean section at the time of operative repair only if the GA is above 28 weeks. However, developments in neonatal care may justify delivery at a lower GA (C. J. Zeebregts et al. Ann Thorac Surg 1997; 64: 1345–1348).

Rupture of an aneurysm is an infrequent complication in pregnancy, especially IIAAs. To increase awareness of this rare condition, we report this case which is an important differential diagnosis to consider in pregnant women with abdominal pain. We have also demonstrated that US can be an important tool to establish the diagnosis. Definitive treatment should imply a multidisciplinary approach tailored to a given individual case.

Conflict of interest

The authors have no conflict of interest to disclose.

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