CASE REPORT

Acute Infrarenal Abdominal Aortic Dissection with Secondary Aneurysm Formation in Pregnancy

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Introduction

Pregnancy related vascular emergencies are associated with an increased risk of morbidity and mortality to the mother and foetus. Over 50% of ruptured arterial aneurysms in women under the age of 40 are pregnancy related, with maternal mortality ranging from 40 to 100%.¹² Rupture of cerebral artery aneurysms during pregnancy accounts for 12 to 80% of all maternal deaths.³ Splenic artery aneurysms recognised during pregnancy, even if asymptomatic, are a serious threat to the survival of the mother and foetus. Nearly 20% of splenic artery aneurysm ruptures occur during pregnancy, with maternal mortality approaching 70% and foetal mortality exceeding 75%⁴⁻⁵.

Various physiological changes, hormonal and haemodynamic, appear to predispose a pregnant woman to vascular complications, especially during the third trimester.¹⁻⁵ Since some of these rare lesions can be corrected, either before or during pregnancy, earlier detection can save the life of the mother and foetus.

Case Report

A 26-year-old black woman, with a twin pregnancy, presented to the emergency room with severe acute low back pain of 2 h duration. She was in the last two weeks of her third trimester.

On admission her blood pressure was 200/110 mmHg. Mild hypertension had developed in the second trimester and this had responded well to dietary control plus salt and water restriction. There was no history of cardiac disease, essential hypertension, kidney disease or trauma.

Physical examination disclosed a 38-week intrauterine pregnancy, a gestational age that corresponded well to her last menstrual period. The twin foetuses were in no distress, and an ultrasound examination of the pregnant uterus was normal. Medical workup for hypertension, kidney dysfunction or preeclampsia was negative. Her pain and hypertension subsided on bed rest, low salt diet and liquid restriction; she did not require any antihypertensive medications.

The patient was kept on the same conservative management until she delivered vaginally, at full term to live twins. When she went home 1 week later, she was breast feeding, normotensive and asymptomatic.

Two weeks later she presented to the emergency room with another attack of abdominal and back pain. There was a tender pulsating mild-line supra umbilical abdominal mass. She was afebrile and normotensive. Her past medical history and physical findings were negative for collagen or autoimmune disorders such as Marfan’s syndrome and Ehlers-Danlos syndrome. An ultrasound examination of the abdomen showed a 4 cm infrarenal abdominal aortic aneurysm, with a transverse intimal flap in the lumen, posteriorly. An abdominal CT scan and aortogram confirmed the diagnosis (Figs. 1 and 2). A CT scan of the chest was normal.

At operation there was a 4 cm localised dilatation of the infrarenal aorta starting midway between the left renal vein and the inferior mesenteric artery. The aortic dilatation extended to, but not beyond, the common iliac artery bifurcation, bilaterally. There was...
a moderate inflammatory reaction in the retroperitoneum. The anterior wall of the aneurysm was thinner than the lateral or posterior wall, with numerous foci of localised subadventitial haemorrhages. In the lumen there was a thick transverse intimal flap, posteriorly, forming a cervix-like rupture. This process extended for a distance of approximately 6 cm.

Histologic examination of the aneurysm wall revealed perivascular infiltration of the vasa vasorum by lymphocytes. There was fragmentation of the media with foci of micro calcification. The intima was unremarkable.

An aorto-bilateral iliac artery bypass, using a 16 × 8 mm knitted double velour Dacron graft, was performed without technical difficulties. The proximal anastomosis was end-to-end to the infrarenal aorta, approximately 3 cm distal to the renal arteries; the distal anastomoses were end-to-end to the common iliac artery bifurcation.

The patient had a smooth postoperative recovery. All serologic studies for arteritis, autoimmune or infectious disorders, endocrine etiology for the previous episode of hypertension, or a systemic inflammatory process, were normal. The patient remained normotensive, and went home on the seventh postoperative day. Unfortunately she never returned for follow-up.

Discussion

Acute uncomplicated arterial dissection limited to the abdominal aorta is a very rare condition. It was first described by Shekelton in 1822. DeBakey et al. did not mention this entity in the follow-up of 527 patients, while Crawford and Crawford cited only one case among 250 thoracoabdominal dissections. Dubost classified abdominal dissections as 'Group D', representing 2–4% of all aortic dissections. Since such lesions are infrequently reported, their aetiology and management are not clearly outlined.

The etiology of localised abdominal aortic dissection includes: blunt trauma 15%, iatrogenic 15%, and idiopathic in 70%. Graham et al. and Van Maele et al. reported 52 cases of localised abdominal aortic dissections. Marfan’s syndrome, congenital cardiovascular lesions, and pregnancy were distinctively absent. Hypertension occurred in 54% of the patients, while atherosclerosis in the region of the dissection was found in 76%. The most frequently reported symptoms were: acute abdominal and back pain in 70%; acute lower limb ischaemia, in the absence of previous chronic arterial insufficiency in 25%, and 5% were asymptomatic, or presented with complaints of a chronic nature: abdominal pain of few weeks duration, melena and haematuria.

The commonest physical findings were: abdominal tenderness; pulsatile abdominal mass; abdominal bruit; diminished lower extremity pulses; and lower limb neuromuscular dysfunction. Rupture of the dissection occurred in 28% and was associated with a 29% mortality.

Fig. 1. Contrast enhanced CT scan showing double-lumen infrarenal abdominal aorta with the intimal flap separating the true lumen (arrow) from the false lumen.

Fig. 2. Aortogram showing infrarenal aortic dissection with filling of both channels. Small arrow points to the intimal flap; large arrow points to the outer false lumen.
A literature search over the past 20 years revealed only two cases of abdominal aortic aneurysms associated with pregnancy. Neither case, however, was secondary to infrarenal aortic dissection.20,21

In humans and in animal subjects, pregnancy has been related to hyperplasia of the arterial intima, and to changes in the organisation and content of the arterial media. The factors which appear to be the most likely causes for these structural changes are the haemodynamic and hormonal alterations of pregnancy. Such haemodynamic stresses and hormonal changes are at their peak during the third trimester.1,23,24 In a review of aortograms performed on pregnant women in their third trimester, Ohlson demonstrated that significant occlusion of the aortoiliac arteries occurs in the supine position.25 External compression of the aorto-iliac segment by the pregnant uterus, with sudden rise in peripheral resistance, might lead to undue haemodynamic stresses on the heart and arteries proximal to the site of compression. Such haemodynamic stresses and structural changes can predispose to arterial dissection, aneurysm formation or both, especially if the patient is hypertensive.25-28

It is unfortunate that we could not identify the etiology of the aortic disease in our patient; moreover, the lack of follow-up hampered additional work to look into rare genetic disorders. Whether mechanical stresses, such as external compression of the aortoiliac vessels by the pregnant uterus or hypertension played a role, is difficult to ascertain. Nevertheless, considering the rare occurrence of these complications, it is not unlikely that the patient had an underlying collagen, autoimmune or genetic disorder.

To reduce the high mortality and morbidity of these vascular complications, early diagnosis is essential. Evaluation of the abdominal aorta and its major branches should be considered in pregnant women, especially in late pregnancy, who develop symptoms such as unusual pain in the abdomen or lower back, or symptoms of arterial insufficiency in the lower extremities. Even thought data in the literature does not corroborate that hypertension during pregnancy predisposes to vascular complications, we feel that when it is part of the unusual clinical picture, an impending vascular emergency must be ruled out. Real time ultrasound imaging with colour Doppler flow can identify aneurysms and dissections with a high degree of accuracy.29

In summary, there is ample evidence that pregnancy predisposes women to vascular complications. Patients that deserve special consideration are those who have inherited disorders, such as Marfan’s syndrome or Ehlers-Danlos disorders, etc. When the vascular lesion involves the ascending or thoracic aorta, surgical repair seems to be favoured, even if the pregnancy has to be terminated.30,31

If the dissection is limited to the abdominal aorta, there is no consensus as to the optimal therapy. Localised uncomplicated dissections can be managed conservatively, e.g. bed rest, normalising blood pressure, and close follow-up of the pregnancy and aortic pathology. On the other hand, when the process is associated with persisting pain, limb or organ ischaemia, or aneurysm formation, surgical repair is indicated even if the pregnancy has to be terminated.

References


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