Reminder of important clinical lesson

Early diagnosis of iliofemoral DVT in pregnancy in the emergency department

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Summary

The case of a 26-year-old woman who was 23 weeks pregnant is described; the patient presented, on a weekend, to the emergency department (ED) with left groin pain. There were few clinical signs of deep venous thrombosis (DVT) but ED ultrasound (US) showed a left external iliac vein thrombus. This is a new technique in the ED. Not only does this case show the importance of using this technique in the ED, but it also shows the importance of correct training in how to examine for thrombus in the external iliac vein in the pregnant patient. The patient was admitted to the hospital and started on low-molecular-weight heparin. A formal radiology department US performed the next week confirmed the diagnosis of DVT.

BACKGROUND

This case deals with a very important area of venous thrombosis in pregnancy. This is still one of the leading causes of death from the start of pregnancy until the end of the puerperium. This patient had no clinical evidence of deep venous thrombosis (DVT) at the time she was examined, but the emergency department (ED) ultrasound (US) showed thrombus in the external iliac vein. This illustrates the importance of this technology that is gradually being introduced into EDs. US of the common femoral vein and distally initially failed to show the thrombus. Scanning more carefully in this area and above did show the pathology; the technique for scanning in the pregnant patient and for external iliac vein thrombosis is discussed.

CASE PRESENTATION

Case

We report a case of a 26-year-old para 1 woman who was 23 weeks pregnant. The patient presented, on a weekend, to the ED with an unexplained left-sided groin pain. She had gone on a recent journey by car of more than 20 hours duration 6 days before her presentation. She was a non-smoker with a normal body mass index (BMI) and did not have any significant sign of lower limb DVT. An initial two-point compression US did not demonstrate a DVT, but a more detailed scan also in the ED, more proximally, showed left external iliac vein thrombus with a small extension projecting into the common femoral vein (figures 1 and 2). The patient was started on a therapeutic dose of low-molecular-weight heparin and was admitted for further investigation. A radiology department US performed the next week confirmed the findings.

DISCUSSION

Women are at risk of thromboembolism from the very beginning of pregnancy until the end of the puerperium and all health professionals must be aware of this. For the

first time since the UK-wide enquiry into maternal deaths began in 1985, thromboembolism is no longer the leading cause of direct deaths. Eighteen women died from thromboembolism in 2006–2008 as compared with 41 deaths in 2003–2005.¹ This is the first full triennium following the publication of the 2004 Royal College of Obstetricians and Gynaecologists (RCOG) guideline ‘Thromboprophylaxis during pregnancy, labour and after normal vaginal delivery’.² It seems likely that the unprecedented fall in deaths is the result of better recognition of at-risk women and more widespread thromboprophylaxis.¹ All deaths occurred before the publication in 2009 of the updated guidelines which include more extensive weight-specific dosage advice,³ although our patient had a normal BMI and no risk factors other than pregnancy.

Figure 1 Compression illustrating extent of the common femoral vein.

Figure 2 Thrombus extending into the common femoral vein.

The incidence of pulmonary embolism has been estimated as 12.6 per 100 000 maternities.⁴ More than 70% of DVTs in pregnancy are iliofemoral compared to 9% in the non-pregnant. Iliofoemoral DVTs are also more likely to embolise than calf DVTs.⁵ Interestingly, 90% of DVTs in pregnancy are left sided compared to 55% in the non-pregnant.^{6 7} This might be the result of compression of the left iliac vein by the left iliac artery and the ovarian artery.⁵ There is a higher incidence of iliofemoral DVTs in the third trimester and the increased uterine size and the hypercoagulable state could play a role in this. Iliofoemoral DVT has high long-term morbidity with only 40% of the patients being asymptomatic at 10–24 year follow-up.⁸

Clinicians need to be aware of the presentation of iliofoemoral DVTs in pregnancy. Groin or pelvic pain is a common condition in pregnancy, the causes of which include symphysis pubis dysfunction, which occurs after the 12th week, and urinary tract infection, and early in pregnancy ectopic pregnancy may present this way. This symptom appearing for the first time in pregnancy or puerperium needs careful assessment, which should include assessment for DVT. Compression ultrasonography is used more frequently in the ED to diagnose proximal DVTs. Frazee *et al* demonstrated that emergency physicians could use a two-point compression technique to diagnose a DVT in the femoral and popliteal veins. In a convenience sample, the negative predictive value was 96% when compared with formal duplex US.⁹ Jang and Docherty¹⁰ in 2004 showed that residents with limited US experience could use a two-point compression technique that had a sensitivity of 100% and a specificity of 92% when compared with formal radiology duplex US. Jacoby *et al*¹¹ showed that ED physicians with 90 min of training could use a two-point compression technique of the femoral and popliteal veins that had a sensitivity of 89% when compared with formal duplex US. Whereas this two-point compression test has been recommended for the non-pregnant patient, it has been recommended that, in the symptomatic pregnant women, compression of the entire proximal venous system to the trifurcation

be performed because the former has not been validated in pregnancy.¹²

Unfortunately, most diagnosis and treatment studies of DVT have excluded pregnancy, so it is difficult to provide evidence-based recommendations for this population.¹³ It should also be noted that unilateral left leg swelling can be caused by compression of the left iliac vein by the gravid uterus, and leg swelling can be caused by isolated common iliac vein thrombosis that may not be detectable by compression ultrasonography (as in this patient). Despite the above caveats, initial management in the pregnant patient, as in the non-pregnant patient, should be to assess the pretest probability by the Wells test. D-dimer levels are often positive in the later stages of pregnancy, lowering the utility of this test in ruling out DVT. It has not yet been validated in pregnancy and its place in diagnosis is as yet uncertain.^{12 13} The frequency of iliac vein thrombus is low but higher than that in the non-pregnant patient.¹⁴ These patients present usually in the third trimester with swelling of the entire leg with or without back pain. Since these vessels cannot be compressed, US diagnosis relies on seeing visible thrombus on B mode (as in this case) or the absence of flow. In this patient the clinical signs were not obvious, probably because the disease was found at an early stage. The leg did swell over the next few days.

If there is a strong clinical impression of iliac vein thrombosis but ultrasonography is negative, further assessment is required. A venographic assessment of the iliac veins or magnetic resonance direct thrombus imaging (MRDTI) is most likely to be indicated. Venography of the iliac veins is performed without an abdominal shield and is associated with a higher but still safe level of radiation exposure to the foetus. MRDTI does not require gadolinium contrast and appears to have a similar accuracy to venography for iliac vein thrombi in the non-pregnant population. Experience with MRDTI and access to it are limited.¹⁴

A possible diagnostic algorithm for venous thrombosis in pregnancy is given in table 1. If the initial US test is negative it should be repeated after a few days (in non-pregnant patients 7 days is recommended, but owing to the increased speed of progression in the pregnant patient, 2–3 days is recommended in pregnant patients¹²). This strategy would have picked up the DVT in this case; when US was repeated in the radiology department after 3 days, the thrombus had spread to occlude the common femoral vein and, hence, was easily detected. There would have been a delay in treatment, however, if treatment had been postponed to await this investigation.

ED US is a 'rule-in' investigation. If DVT is not picked up in a patient with moderate or low pretest probability of DVT, it should be followed up with a radiology department US and the algorithm followed.

Thromboembolism in pregnancy can be life-threatening for both the mother and the baby. Diagnosis can be difficult in the ED. The iliac veins may not be easy to visualise in the pregnant patient and spectral analysis of the flow patterns may be necessary in these situations. A loss of phasicity may indicate external iliac vein thrombosis¹⁵ although it was not necessary in this case as the thrombus was visualised. ED physicians need to be aware that compression US techniques of the common femoral vein

Table 1 Algorithm for the evaluation of suspected deep venous thrombosis in pregnancy

MRDTI, magnetic resonance direct thrombus imaging; CUS, compression ultrasound.¹⁴

and distal veins may fail to diagnose an iliofemoral DVT and scanning should be continued above the inguinal ligament when patients present with groin pain during pregnancy. If no thrombus is seen, loss of phasicity should be looked for.

Diagnosis of this potentially catastrophic problem can be difficult in the ED. Care was judged to be substandard in 10 of the 18 cases of maternal deaths in a recent enquiry.¹ Diagnosis in the ED avoids unnecessary delay in starting treatment as this case illustrates. Many UK units

including ours do not at present have weekend facility for a radiology department US, so ED US would hasten the start of treatment.

Given the greater propensity for pregnancy to be associated with pelvic vein rather than deep leg thrombosis, the latest enquiry into maternal death also encourages pathologists to look at and describe the pelvic and deep leg veins for emboli while performing autopsies.¹ For many years, maternal mortality reports have suggested that most deaths from thromboembolism are preventable.

There is now evidence to support this. Every effort must be made to alert all doctors including general physicians and emergency physicians to this significant complication of pregnancy and its diagnosis. In this patient there were no risk factors other than pregnancy and the diagnosis could easily have been missed. The availability and expertise in ED US can optimise the management of such patients and lead to the early identification and treatment of thromboembolism.

Learning points

- ▶ High level of suspicion of deep venous thrombosis in the pregnant patient and patients in the puerperium.
- ▶ Use of emergency department ultrasound for the confirmation of the diagnosis.
- ▶ Remember that thrombus is likely to be at the level of the external iliac vein in the pregnant patient, so do not rely on the two-point compression test here.

Competing interests None.

Patient consent Obtained.

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