Deep-vein thrombosis in pregnancy

A case report

D. F. DU TOIT, M. McCORMICH, L. LAKER

Summary

The incidence of thrombo-embolic complications in pregnancy varies between 2 and 5 per 1 000 deliveries. Deep-vein thrombosis (DVT) is classically associated with pulmonary embolism and chronic venous insufficiency, which are leading causes of maternal morbidity and mortality. An accurate diagnosis of iliofemoral or calf vein thrombosis should be confirmed by either Doppler ultrasonography, impedance plethysmography or ascending phlebography. Full-dose continuous intravenous heparin for 5-10 days is the established method of therapy for acute DVT and pulmonary embolism occurring during pregnancy or in the puerperium. Thereafter, long-term treatment with self-administered subcutaneous injections of heparin in low doses is feasible and effective. During pregnancy, coumarin administration results in embryopathy as it readily crosses the placenta; it should be avoided until after delivery. In view of its safety and effectiveness, low-dosage intravenous heparin or heparin by subcutaneous injection seems to be the anticoagulant of choice for the expectant mother.

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The first description of phlegmasia alba dolens or swollen leg in the puerperium was reported by Mauriceau in 1668. A century later the term 'milk leg' was coined by Puzos in the belief that the swollen extremity was caused by deposits of milk, hence the associated suppression of lactation.[1] Although 18th century accoucheurs attributed the changes to an excess of milk being directed to the legs, the significance of phlegmasia alba dolens lies in the occurrence of the post-phlebitic syndrome.[1] The chronic venous insufficiency leading to oedema, induration of the skin and subcutaneous tissue, and eventual recurrent and persistent venous stasis ulcers after pregnancy.[1,2]

A case of deep-vein thrombosis (DVT) in a pregnant woman, together with a brief review of the current status of management of patients with venous thrombo-embolism in pregnancy, is presented.

Case report

A 29-year-old woman, gravida 2, para 1, 8 week's pregnant was admitted to Tygerberg Hospital with the clinical diagnosis of acute DVT of the right leg. She had bilateral varicose veins and had been treated for DVT of the contralateral leg 6 years previously after caesarean section. Two weeks before admission the patient was treated for superficial thrombophlebitis of the right calf.

On examination she was obese (87 kg), with blood pressure 120/70 mmHg, pulse rate 78/min and haemoglobin concentration 11,8 g/dl. The cardiovascular and respiratory systems and the abdomen were normal; vaginal examination was negative. The right calf and thigh were swollen and tender on palpation. Prominent superficial varicose veins were distended and the Homans' sign was present. The findings were strongly suggestive of acute rightsided iliofemoral vein thrombosis.

Laboratory investigations revealed normal urinalysis and serum urea and creatinine levels. The leucocyte count was 11,3 x 10^9/l, haematocrit 34,8% and platelet count 330 x 10^9/l.

Contrast phlebography was not performed because of the possible radiation hazard to the fetus. Doppler ultrasound studies were highly suggestive of a right-sided iliofemoral vein thrombosis.

Continuous intravenous heparin was administered for 10 days and the heparin level monitored by daily estimation of the activated partial prothrombin time (APTT). The daily heparin dose varied from 20 000 to 30 000 U. During this time the patient was confined to bed with the leg elevated. Thereafter long-term treatment with low-dose heparin (5 000 U 12-hourly) using a self-administered regimen of subcutaneous injection was started. The patient learned the technique within 48 hours, using a tuberculin syringe with a 25-gauge needle. The subsequent course was uncomplicated, and particular attention was paid to side-effects of heparin treatment, i.e. thrombocytopenia and osteoporosis.

Discussion

Confidential Enquiries into Maternal Deaths in England and Wales[2] indicated that the incidence of fatal pulmonary embolism from 1973 to 1975 was 0,1/1 000 vaginal deliveries and 0,7/1 000 after caesarean section. The number of deaths in recent years following all forms of vaginal delivery has fallen steadily but those following caesarean section have declined less dramatically.[2]

An increased risk of thrombo-embolism during pregnancy is associated with delivery by caesarean section, increased age, parity, obesity, obstetric complications with prolonged bed rest, suppression of lactation with oestrogens, sterilization operations in the puerperium, and previous episodes of DVT or pulmonary embolism during pregnancy.[2]

The diagnosis of DVT is confirmed by the clinical findings of calf muscle pain, tenderness and swelling, and by non-invasive venous studies and ascending phlebography.[2-4] A clinical diagnosis is not sufficient and confirmation by special investigation is desirable before anticoagulation therapy is started.[5] The diagnosis of DVT may be difficult; even the best clinical evaluation has only a 50% chance of being correct, emphasizing the need to establish the correct diagnosis.[5] Ascending venography has attained the status of a gold standard

Division of Vascular Surgery, Department of Surgery, University of Stellenbosch and Tygerberg Hospital, Parowvallei, CP
D. F. DU TOIT, D.PHIL., F.R.C.S., *Senior Lecturer*
M. McCORMICH, M.B. CH.B., *Surgical Registrar*
L. LAKER, B.SC., *Research Assistant*

and when performed by a skilled radiologist provides accurate localization and precise diagnosis of DVT.[2-4] Venography carries a small risk of chemical phlebitis and may even propagate venous thrombosis.[5] Contrast phlebography should be avoided during pregnancy because of the attendant hazard to the fetus of radiation, despite shielding with a lead apron.[2] For these reasons other less invasive modalities including Doppler ultrasonic scanning and limb impedance phlethysmography should be considered,[3,4] but some workers have suggested that the latter investigation is unreliable during the second half of pregnancy because of the influence of the gravid uterus on the pattern of the venous flow.[2] It is believed that both these investigations are unreliable in diagnosing thrombosis below the knee.[3]

The indications for anticoagulation treatment during pregnancy must be clear because of the hazards.[2,6-11] Patients with calf vein thrombosis should initially be treated with bed rest if severe pain is experienced and should be encouraged to perform active leg exercises before intravenous or oral anticoagulant therapy is begun.[5,10,11] Heparin is the anticoagulant of choice in the acute phase, its use being directed at the prevention of extension and embolization.[2] Continuous intravenous heparin infusion is administered at a rate of 1 000 - 1 200 U/h and the dosage is adjusted by monitoring either the clotting time or APTT.[2,12-14] Prolongation of these tests to 1,5 times the normal value usually ensures adequate anticoagulation.[2,13,14] Intravenous heparin is usually administered for 5 - 10 days. If DVT occurs during pregnancy, low-dosage subcutaneous heparin is administered until the early postpartum period.[2,13,14] Complications of heparin therapy include bleeding, thrombocytopenia, osteoporosis, alopecia and urticaria.[2,7,9]

Because it does not cross the placenta,[15] heparin offers a theoretical advantage over warfarin during pregnancy.[2,15] Because warfarin crosses the placental barrier, it should be avoided altogether for fear of its teratogenic embryopathy, which is characterized by nasal hypoplasia, saddle nose, frontal bossing and short stature with stippled epiphyses (Conradi-Hünermann syndrome).[2,7] Exposure of the pregnant mother to warfarin during the second and third trimesters may be associated with increased incidence of central nervous system abnormalities in the fetus resulting in mental retardation, blindness and intracranial bleeding.[2]

Results of long-term self-administration of subcutaneous heparin during pregnancy have recently been published and it is reported to be safe.[2,12,14] The effective dosage range is between 5 000 and 15 000 U administered twice daily.[2,12,14] It has been suggested by some authors that the administration of 10 000 U twice daily throughout pregnancy is effective, even without knowing the APTT level.[2] It has also been recommended that patients with a previous history of thromboembolism should be started on prophylactic subcutaneous heparin within the first trimester.[2,12,14] Some patients have been maintained on heparin for about 6 weeks postpartum while breast-feeding their baby and those women bottle-feeding their infant have been transferred to warfarin treatment.[14] Where subcutaneous heparin is used and facilities for monitoring are not available, a dose of heparin 5 000 U 12 hourly is usually adequate up to the third trimester when treatment with 7 500 U 12 hourly is recommended.[2,14] Bonnar[2] has shown that calcium heparin produces lower levels of plasma heparin and has a shorter duration of action than sodium heparin and advises an 8-hourly regimen of 5 000 - 7 500 U of calcium heparin. He also recommends that when sodium heparin is used it should be administered 12-hourly because of its longer action.[2] In view of the risk of local bleeding, spinal or epidural anaesthesia should be avoided during pregnancy.[2] Subcutaneous heparin should be continued for 5 - 6 weeks after delivery.[2]

Dextran 70 has no place in the treatment of acute DVT in pregnancy and thrombolytic therapy using streptokinase or urokinase is to be avoided for fear of bleeding from the placental site, genital tract lacerations or episiotomy incision after delivery.[2]

In contrast with the above other authors have reported that heparin is not a superior treatment during pregnancy because 12,5% of such pregnancies will end in stillbirth and 20% of infants will be premature. These authors have shown that the administration of heparin or coumarin derivatives carries a substantial risk to mother and fetus, and suggest that the most prudent and advisable course of action is counselling before conception and thus the prevention of pregnancy.[7]

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