Placement of a vena cava filter in term pregnancy: case report and review of the literature

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Summary

During pregnancy there are hemostatic changes that may result in a hypercoagulable state producing thrombotic consequences. This condition may be aggravated in women who are carriers of congenital thrombophilic factors. These factors may increase obstetric complications such as miscarriages, fetal growth restriction, placental abruption and preeclampsia. Trombophilic factors may also cause venous thromboembolism, which is the leading cause of maternal morbidity and mortality. We report a case of a 22-year-old woman with factor V Leiden mutation, whose pregnancy was complicated with deep venous thrombosis requiring placement of a vena cava filter.

Key words: Factor V Leiden mutation; Deep venous thrombosis; Vena cava filter; Pregnancy.

Introduction

Hypercoagulability is defined as a group of hereditary or acquired disorders that predispose the patient to the formation of thrombus in the vasculer system [1]. Currently venous and arterial thrombotic events play a major role in many complications of pregnancy. Perhaps, the most obvious thrombotic problem is venous thromboembolism (VTE), as pulmonary thromboembolism is a major cause of maternal death in the developed world [2].

The optimal management of VTE peripartum is difficult as pulmonary embolism risk is likely to be further increased in this period. This is due to the hemodynamic changes following delivery and due to the procoagulant effect triggered by intimal damage in the uterine vasculature as a result of placental separation [3]. We report a case of an inferior vena cava (IVC) filter placement to a 22-year-old pregnant woman with proximal deep venous thrombosis.

Case Report

A 22-year-old woman, gravida 1, was admitted to our department at the 29th week of pregnancy with a sudden onset of localized pain and swelling in her right leg. Obstetric examination did not show any abnormality and obstetric ultrasonography (US) revealed a 29-week-fetus with normal amniotic fluid index. In the full blood count, hemoglobin level was 11.1 g/dl and platelet level was 169.000/ mm³. Liver and renal function tests and coagulation screen were all in normal limits. Doppler US of the deep veins of lower extremities revealed a thrombus at the level of external iliac and the femoral vein on the right side. Acetylsalicylic acid (100 mg daily) in combination with low molecular weight heparin (LMWH) (tinzaparine sodium, 175 units/kg daily subcutaneously) was initiated. Doppler US of the umbilical artery was normal.

The patient was fitted with compression socks and we decided to place an IVC filter one week before elective cesarean section, as pulmonary embolism risk is higher during the peripartum period. After the acute phase, the patient was discharged. Acetylsalicylic acid was discontinued after the 32nd week, however tinzaparine sodium was continued throughout pregnancy. Routine pregnancy follow-ups were carried out and at 37th week an OptEase vena cava filter (Cordis Endovascular, Johnson & Johnson, Roden, The Netherlands) was inserted in the infrarenal position, using a standard technique via the right internal jugular vein under low-dose pulsed fluoroscopic imaging (Figures 1, 2). The procedure took 45 minutes and the fetus was protected with a lead shield. At the 38th week of gestation, the patient delivered a 3,500 g healthy baby by cesarean section. The postoperative period was uneventful and the IVC filter was left in situ.

Discussion

Therapy for deep venous thrombosis (DVT) includes the use of anticoagulation. Both unfractioned heparin and LMWH may be used for the therapeutic approach. Randomized controlled trials have shown equivalent efficacy of LMWH to unfractioned heparin in the initial treatment of venous thromboembolism and prevention of pulmonary thromboembolism [4]. LMWH has the advantage of a lower incidence of osteoporosis, heparin-induced thrombocytopenia, and there is also no need for monitoring.

In nonpregnant women, the recommended therapeutic doses of LMWH varies according to the manufacturer (enoxaparin 1.5 mg/kg once daily; dalteparin 10,000-18,000 units once daily depending on body weight; tinzaparin 175 units/kg once daily). In view of recognized alterations in the pharmacokinetics of dalteparin and enoxaparin during pregnancy, a twice-daily dosage regimen is recommended in the treatment of DVT in pregnancy (enoxaparin 1 mg/kg twice daily; dalteparin 100 units/kg twice daily) [5, 6]. Preliminary biochemical

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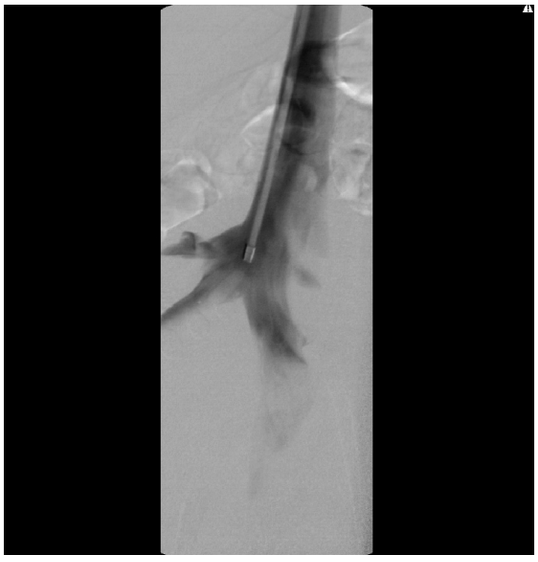
Fig. 1



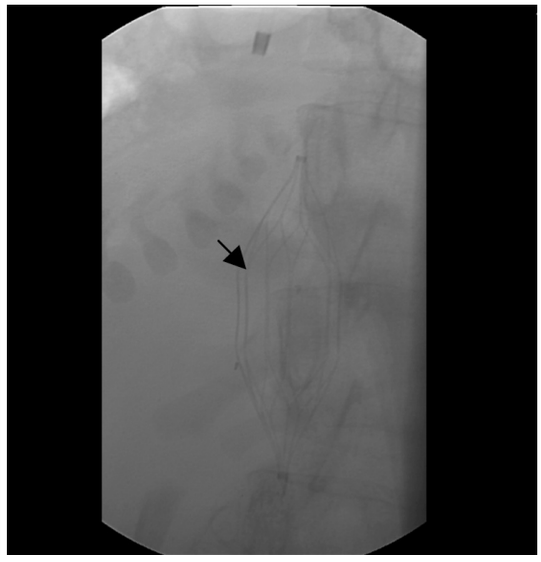


Fig. 2

Figure 1. — Infrarenal segment of the vena cava during floroscopic imaging.
Figure 2. — OptEase filter after placement (black arrow).

data from a relatively small number of women suggests that once-daily administration of tinzaparin (175 units/kg) may be appropriate in the treatment of DVT in pregnancy [7]. If DVT is confirmed by radiological investigation, these patients usually require at least six months of anticoagulation, and treatment should be continued throughout pregnancy and until at least six weeks postpartum. If LMWH therapy requires monitoring, (for example, extremes of body weight or renal impairment) the aim is to achieve a peak anti-Xa three hours postinjection, of 0.5-1.2 units/ml.

As anticoagulation must be discontinued during vaginal or cesarean delivery to avoid hemorrhage and to reduce the risk of epidural hematoma, an IVC filter was used in this case. There is evidence that the use of an IVC filter prior to labor or delivery reduces the risk of pulmonary embolism, however the use of filters for primary prophylaxis, in the absence of DVT, is not recommended. As the most important period for pulmonary thromboembolism is the peripartum and postpartum period, it is advised to place the filter before labor. AbuRahma and Mullins [8] published their experience with a Greenfield filter in 18 pregnant women who had extensive ileofemoral deep vein thrombosis immediately prior to labor. There was no fetal/maternal morbidity or mortality. During long-term follow-up (mean, 78 months), no pulmonary embolism or filter-related complications were encountered. Kawamata *et al*. [9] also published their experience of temporary IVC filters inserted in the perinatal period in 11 women with deep vein thrombosis. There was not any complication at filter insertion and during placement. Also no symptomatic pulmonary thromboembolism occurred during or after delivery. Gupta *et al*. [10] presented a case series with 12 pregnant women out of which four IVC filters were placed during pregnancy and eight filters were already in situ before pregnancy, and continued for the entire duration of pregnancy. There were no antenatal complications due to DVT filter placement and no thromboembolisms occurred.

There are no randomized studies to determine optimal filter placement and the viability of filters. Although clinical follow-ups have not identified any filter-related complications so far, only a fraction of filter case series in the nonpregnant population have documented tilting (5.3%) and strut fracture (2.7%) [11]. Filter tilting and strut fracture may theoretically contribute to impaired filtration efficiency and thus decreased filter performance in pulmonary embolism prevention. Also deferred pain has been reported accompanied with filter placement [12]. This is suggested due to the transmural penetration by the filter arms and also has been recently highlighted in a report by Sadaf *et al*. [13] with a Celect™ IVC filter in a non-pregnant patient.

Since there is limited data, IVC filter placement in pregnant women should be investigated extensively for safety and efficacy. The recommendation of its use should be based on high-risk cases to avoid complications of this invasive procedure.

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