The Journal of Obstetrics and Gynecology of India (November–December 2022) 72 (S2):S395–S398
https://doi.org/10.1007/s13224-022-01683-2

CASE REPORT

Venous Thromboembolism in Pregnancy and IVC Filter: A Case Report

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Received: 17 April 2022 / Accepted: 3 July 2022 / Published online: 18 July 2022

Abstract

Introduction Venous thromboembolism (VTE), composed of pulmonary embolism and deep venous thrombosis, can be a significant cause of morbidity and mortality during pregnancy. Underlying factors like thrombophillias can potentiate this risk many folds. Depending on these risks and peripartum stage, the benefits of thromboprophylaxis can outweigh potential side effects.

Case Details Hereby, we present case of a 35-year-old women with known case of Protein C and S deficiency with twin pregnancy who presented with chronic venous thrombosis followed by acute episode in proximal vessels of lower limb. So intervention in the form of inferior vena cava filter insertion has to be done to prevent dreaded complication in the form of pulmonary thrombo-embolism.

Conclusion When thromboprophylaxis fails, intervention procedure like IVC filter can be an effective modality of treatment in venous thrombosis.

Keywords Deep venous thrombosis · Inferior vena cava filter · Pregnancy · Pulmonary thrombo-embolism · Thrombophilia

Abbreviations

IVC	Inferior vena cava
ART	Artificial reproductive techniques
DVT	Deep venous thrombosis
VTE	Venous thrombo-embolism
LMWH	Low molecular weight heparin
PTS	Post thrombotic syndrome

The corresponding author got a deputation in the current working medical school. Before that she was working in the medical school where the work was undertaken. The work was undertaken under her supervision.

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Introduction

Pregnancy is one of the major risk factors for the development of venous thrombosis. The incidence of venous thrombosis in pregnant women is approximately 1 in 1000–20,000 pregnancies. The incidence is on a rise in developing countries like India also because of increased incidence of obesity, lifestyle changes and increased ART practices. The risk in pregnancy is increased because it is a state fulfilling Virchow's Triad i.e. hypercoagulability, venous stasis because of mechanical obstruction to venous outflow by growing uterus and vascular damage. The risk is increased many folds when there are underlying risk factors like acquired or inherited thrombophillias. Pulmonary embolism occurs in approximately 16 percent of patients with untreated deep vein thrombosis (DVT) and can cause significant morbidity and mortality during pregnancy [1]. Thus a timely diagnosis of DVT during pregnancy and appropriate measures taken to prevent its deadliest complication of pulmonary thromboembolism can prevent significant maternal morbidity and mortality. Hereby, we present case report of a patient with Protein S deficiency who presented with recurrent DVT and

history of pulmonary thromboembolism. An IVC filter was put antenatal to prevent PTE.

Case Details

A 35-year-old lady presented in our outpatient department at 7 weeks period of gestation with twin pregnancy (diamniotic dichorionic). Patient was a known case of Protein S and Protein C deficiency. She was diagnosed with the same when she had sudden intrauterine foetal demise with pre-eclampsia followed by episode of postpartum deep venous thrombosis of left proximal lower limb with PTE. After this episode, patient was explained about risk of recurrence and complications in next pregnancy and she was advised for pre-conceptional counselling. But she was lost to follow up and came only after conception. During evaluation, colour Doppler of bilateral lower limbs showed partial occlusion of left sapheno-femoral vein suggestive of chronic DVT. There were no signs and symptoms of acute DVT. So patient was started on low molecular weight heparin in therapeutic dose i.e. 60 mg subcutaneous BD. Before starting heparin, baseline investigations complete hemogram & activated partial thromboplastin time(aPTT) were done and patient was monitored on same. Patient was booked in high risk pregnancy clinic of institution. Her second trimester target scan was normal. At 26 weeks period of gestation when patient visited, twin 1 had Intrauterine death with parameters of 19 weeks and twin 2 was growing well. Patient was admitted in hospital in view of high risk and foetal monitoring. Colour Doppler of bilateral lower limbs showed no features of acute DVT. Around 30 weeks period of gestation, there was newly developed swelling in right leg. A follow up Doppler scan showed deep venous thrombosis in right sapheno-femoral junction at the proximal end. In view of previous history of pulmonary thrombo-embolism, patient was at increased risk of developing PTE. So decision for inserting IVC filter was taken. There was concern regarding antenatal radiation exposure and foetal prematurity. On foetal biometry, baby had a weight of 1.5 kg. After giving antenatal steroid to mother for foetal lung maturity and explaining the risks and benefits of procedure, femoral angioplasty was done and an infra-renal Denali IVC filter was placed in situ via transfemoral route. Counselling regarding maternal risk of procedure failure, haemorrhage, transient leg swelling, risk of filter tilting, migration & fracture and foetal risk of preterm labour and radiation exposure was done. Patient was put on tab warfarin to maintain INR in therapeutic dose of 2.5–3. Patient was taken till 36 weeks' period of gestation when she developed pre-eclampsia. So elective caesarean was done at 36 weeks and 2 days' period of gestation after stopping warfarin. Patient delivered a healthy female baby of 2.5 kg. postpartum of patient was uneventful. She was discharged on warfarin maintaining an INR in therapeutic range i.e. between 2–3. The filter was a retrievable one and was removed after 6 months postpartum through transfemoral route.

Discussion

The risk of venous thrombosis and other pregnancy related complications like pre-eclampsia, intrauterine foetal growth restriction, foetal loss are increased in acquired and inherited thrombophillias of pregnancy. The overall risk of DVT in pregnancy (0.05–1.8%) is higher in women with a previous history of VTE, with a recurrence rate of about 1 in 71 women. Deficiencies of endogenous anticoagulants such as antithrombin, protein C and protein S are associated with moderate risk of developing venous thromboembolism during pregnancy. The American College of Chest Physicians (ACCP) and ACOG recommend prophylaxis with LMWH for all pregnant patients with a previous history of venous thrombosis and documented thrombophilia, as well as for those with a history of multiple (> 2) episodes of DVT. Lyon VTE Risk Score (Table 1) in the literature has been described as a very strong tool to assess the need of anticoagulation in antenatal women who are at high risk of developing VTE [2]. We found the tool very practical and easy to do the risk assessment.

Diagnosis of DVT during pregnancy can be tricky as swelling of the legs can occur due to mechanical compression by enlarging uterus which causes stasis in lymphatic vessels and veins. Even biochemical markers can be masquerading as there is physiological hyperfibrinogenaemia and increased D-dimers during pregnancy. Radio-imaging ultrasonography and MRI are the recommended modalities to have a confirmed diagnosis of DVT. Compression ultrasonography has a sensitivity of 97% and a specificity of 94% for the diagnosis of symptomatic femoro-popliteal DVT in the general population [3]. However, MRI is the modality of choice where there is suspicion of pelvic thrombosis. Ultrasound should continue to be the primary method of diagnosis of DVT, but if the ultrasound is negative and clinical suspicion is still present, one should not hesitate to order an MRI. A study by Torkzad et al. found, in women between 23 and 37 weeks of gestation, that ultrasound revealed 42% of pelvic and abdominal DVT whereas MRI 98.5%. Once diagnosed, DVT must be treated not only to prevent PE, but also to prevent PTS.

Medical management remains the mainstay of treatment for DVT. LMWH in therapeutic dose is the drug of choice. But failure of medical treatment in the form of progression of thrombus to iliac vessels or inferior vena cava raises the alarm for alternative procedures. These alternatives are in the form of IVC filter placement or percutaneous catheter

Table 1 Lyon VTE risk scoring system

Risk factor	Venous thromboembolism	Score
Personal history of VTE	History of VTE related to pregnancy (occurred during the antepartum period), or cerebral vein thrombosis or massive PE/VTE in childhood	6
	Spontaneous or estrogen induced PE or proximal DVT	3
	Transient risk factor induced PE or proximal DVT	2
	Spontaneous or estrogen induced distal calf DVT	2
	Transient risk factor induced distal calf DVT	1
If there is a personal history of VTE	Recurrent VTE history	3
	Residual venous thrombi with clinical signs of post thrombotic syndrome	3
	Recent VTE history	2
Thrombophilia	Homozygous mutations, combined thrombophilia risk factors, protein C 1 Deficiency, protein S deficiency, heterozygous F5 G1691A mutation Heterozygous F2 G20210A mutation No thrombophilia detected but family history of severe recurrent VTE	1
Other risk factors	Bed rest, immobilization	2
	Twin pregnancy	1
	Age > 35	1
	BMI > 30	1

Depending on the score:

< 3: No antenatal prophylaxis

3–5: LMWH starting on the third trimester

> 5: LMWH starting during the first trimester

directed thrombolytic therapy (PCDT). These procedures are a treatment challenge during pregnancy because of risk of radiation exposure as well as procedure related complications. The International Commission on Radiological Protection has recommended that "no deterministic effects of practical significance" would be expected in the developing human at doses lower than 100 mGy. A recent single centre retrospective analysis of patient radiation dose during IVC filter placement, found among 230 consecutive cases reviewed a mean radiation dose of 67.55 mGy [4]. Data regarding IVC filter placement in pregnancy is very limited and international guidelines also don't address this issue in detail. However, The Royal Society of Obstetricians and Gynaecologists VTE guidelines recommend to "considering the use of a temporary IVC filter in the peripartum period for patients with iliac vein thrombosis or in patients with proven DVT and who have recurrent PE despite adequate anticoagulation". A systematic review by Harris et al. [4] concluded that most IVC filters during pregnancy were placed for the absolute indications of failure of medical therapy for VTE despite anticoagulation and complications of anticoagulation including HIT, heparin allergy or significant bleeding. In our patient, she was having progressive proximal thrombosis inspite of therapeutic doses of LMWH. So decision for IVC filter insertion was taken. Reported complications of IVC filter placement included migration, fracture, inability to retrieve and occlusion of the filter with thrombus that could not be lysed. Long term follow up data in safety of IVC filter placement during pregnancy is scarce but from the literature available we could conclude that its use in pregnancy is safe.

Since there are no large studies on thrombolysis during pregnancy, there is agreement between most available guidelines that the use of thrombolytic therapy in pregnancy is best reserved for limb or life threatening maternal thromboembolism.

Treatment and prevention of VTE during pregnancy is challenging as management decisions have to be made taking into consideration both maternal and foetal wellbeing. One should not hesitate in taking the decision for advanced interventional therapies like IVC filters and thrombolytic therapy where indicated. The lack of high quality research and conclusive trial data demonstrating the safety and efficacy of treatment options for VTE during pregnancy highlights the need for prospective trials with larger numbers of patients.

Acknowledgment No financial grants or aid were taken for the work.

Declarations

Conflict of interest The authors declare that they have no conflict of interest and have no interest to disclose.

Informed Consent Informed consent has been taken from the patient and anonymity has been maintained.

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