

Case Report

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Deep venous thrombosis in an African adolescent: a case report

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Abstract

Deep vein thrombosis (DVT) was considered to be rare in children but the incidence has increased significantly in the last decade. Pediatric DVT is recently gaining increased awareness because severe venous thromboembolism (VTE) may lead to serious morbidity and mortality in children. The aim of this case report is to create awareness among physicians of the increasing incidence of DVT in children especially in patients with risk factors as this may have dire consequences without adequate prophylaxis, prompt diagnosis and treatment. A 15-year old female adolescent presented with right leg pain and swelling of one week duration, which started a day after removal of cast for an elective orthopedic procedure. A diagnosis of DVT of the right posterior tibial vein was made. She was managed as a case of DVT and was discharged after 11 days on admission with resolution of DVT.

Keywords: Adolescent, children, deep vein thrombosis, orthopaedic

Introduction

The incidence of deep venous thrombosis (DVT) is considerably lower in paediatric patients than in adults [1]. Pediatric DVT is recently gaining increased awareness because severe venous thromboembolism (VTE) may lead to serious morbidity and mortality in pediatric patients [1]. The incidence in children has also increased significantly in the last decade [2]. Some of the factors proposed to be responsible for this increase include increased prevalence of predisposing conditions like obesity, orthopedic procedures, improvement in the management of complex paediatric cases with iatrogenic complications, use of complex procedures, increased awareness and improved imaging techniques [2].

In children, the incidence is about 0.7-2.1 cases per 100,000 children [2]. The most prominent peak is in early infancy, accounting for up to 20% of pediatric VTE, a second peak is during adolescence, with about 50% of VTE events occurring in children 11-18 years old.³ Advances in the treatment and supportive care of critically ill children have led to improved pediatric

survival but such treatment options frequently necessitate invasive vascular procedures and devices, which has resulted in both an increased risk of deep vein thrombosis (DVT) and the recognition of vascular events among children.⁴ In particular, central venous catheters are associated with >50% of DVTs in children and >80% of cases in newborns.⁴ These days, more children are hospitalized for longer duration due to trauma and various medical problems and these can predispose to VTE. However, the disease is very much under-diagnosed and under-reported probably due to less awareness among treating physicians.⁵

Furthermore, routine screening for DVT is not done in this age group despite longer duration of immobilization and intensive care treatments.⁵ Most VTE events in children are secondary to conditions such as cancer, surgery, congenital heart disease (CHD), nephrotic syndrome and systemic lupus erythematosus (SLE).⁶ Femoro-popliteal veins are the most common thrombosed segments in children.⁶ The incidence of VTE among elective pediatric orthopaedic surgical admissions in a study was 5.1 per 10,000 admissions (0.05%).⁷ Older age, admission as an inpatient, the presence of a metabolic condition,

obesity, and complications of implanted devices and/or surgical procedures increased the odds of VTE following elective orthopaedic procedures.⁷

We therefore report a case of deep vein thrombosis of the left posterior tibial vein in a 15-years old obese female adolescent following an elective orthopaedic surgery.

Case Report

A 15-years old female adolescent was brought to the emergency room with complaints of right leg swelling and right ankle pain of one week duration. She had osteotomy for Blount disease of right lower limb 5 months prior to presentation, following which a cast was placed on the right lower limb. She was immobilized for 2 weeks and was not on prophylaxis for DVT. The cast was removed a day prior to the onset of the symptoms.

She was obese (BMI – 32.5kg/m²) and body temperature was 37.6 °C with a diffuse right leg swelling extending from the knee to the ankle, differential warmth, hyperaemia, mild tenderness and restriction of ankle movement. She also had surgical scars on the anterior and lateral aspects of the leg. There were no neurologic deficits. Other examination findings were essentially normal.

Doppler ultrasound scan of right lower limb noted. Non-compressible posterior tibial vein was observed at the mid to distal aspect which was associated with dilatation. A long segment echogenic focus was visible within the lumen measuring 3.5 cm in length. No flow is noted within the posterior tibial vein. The final impression was, acute right deep vein thrombosis of the right posterior tibial vein(mid-distal) with associated thrombophlebitis.

Clotting profile showed PT – 15.0 sec (control- 15 sec), APTT – 39.0 sec (control-47sec) and INR – 1.0. Complete blood count, electrolyte, urea and creatinine were essentially normal.

She was given an intravenous loading dose of unfractionated heparin at 5000 units and maintained at 1300 units/hour for 24 hours along with intravenous ciprofloxacin. She was subsequently commenced on subcutaneous enoxaparin (Clexane) at 1mg/kg/dose 12hourly subcutaneously. The patient was placed on bed rest and the right lower limb was immobilized and elevated.

The clotting profile on day 4 was PT= 12.0sec (control 12.0 sec), APTT = 35.0 sec (control 35.0 sec), INR=1.0

The right lower limb swelling progressively reduced in size over a q10-day period. She was commenced on warfarin tablet 5 days after commencement of clexane at 10mg daily. Repeat Doppler ultrasound scan of the right lower limb was normal on day 10. She was

discharged home on oral warfarin after 11 days on admission and was counseled on the need to be ambulant.

On follow up a week after discharge her D-dimer test result was 465.7ng/dl (500ng/ml), APTT was 47.0sec (control- 41sec) and INR was 1.1. the warfarin dose was reduced to 5mg daily. Patient is still being followed up.

Discussion

The incidence of deep vein thrombosis is significantly lower in children than the adults but has increased significantly over the past decade.² Over 80% of thromboembolism in children were on a background of severe preceding illness or other predisposing factors.⁸ These factors include trauma, infection and medications⁹. Cancer, congenital heart disease, and prematurity are the most common medical conditions associated with thromboembolic events.

Although the development of deep venous thrombosis in pediatric patients is unusual, it certainly does occur and can be complicated by the development of pulmonary embolism and the long-term sequelae of the post-phlebotic (post-thrombotic) syndrome (PTS).⁹

A study by Ishola et al reported that 81% of adolescents with thromboembolism had two or more risk factors and morbidity ¹⁰In this report, our patient had more than one underlying risk factor for DVT.

One important factor is orthopedic surgery. Our patient had osteotomy for correction of Blount's disease 5 months prior to development of DVT and was immobilized for 2 weeks following the surgery. Patients who had orthopedic surgery are at risk of DVT because of stasis, hypercoagulation and damage to the veins. Goergopoulos et al reported an incidence of 5.1 per 10,000 admissions following elective orthopaedic surgeries.⁷Additional risk factors in our patient were immobility and obesity. Our patient was obese with a BMI of 32.5kg/m.

Ultrasound with Doppler flow is the most commonly employed imaging study for the diagnosis of upper-extremity, or more often lower-extremity, VTE. ⁹This was used for the diagnosis of DVT in our patient.

Furthermore, our patient was treated with low molecular heparin and warfarin. Low-molecular weight heparin therapy has many benefits over unfractionated heparin agents and may be more appropriate for the prophylaxis or treatment of children and adolescents with DVT because of its acceptable safety and efficacy.¹¹

Conclusion

The incidence of DVT in a pediatric patients is increasing. The careful clinical assessment of pediatric

patients and a high index of suspicion is important for a prompt diagnosis of deep vein thrombosis. Ultrasound scan can be used as an effective tool in confirmation of diagnosis. Adequate prophylaxis and/or early treatment can prevent thromboembolic complications.

List of abbreviations

aPTT, Activated partial thromboplastin time; BMI, Body mass index; DVT, Deep vein thrombosis; VTE, Venous thromboembolism; SLE, Systemic lupus erythematosus; PT, Prothrombin Time

Declarations

Ethics approval and consent to participate

None provided

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

No conflict of interest associated with this work.

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Contribution of Authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

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