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Sinus Vein Thrombosis in Children with Nephrotic Syndrome: A Case Report

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Abstract

Thromboembolism in patients with nephrotic syndrome is a well-known complication because of a hypercoagulable state. It is rather rare that cerebral venous sinus thrombosis is reported as a complication in nephrotic syndrome, which could have potentially fatal consequences. There is a sub-diagnosis of this disease due to non-specific signs, and symptoms that may be like headache, vomiting, drowsiness, and altered behavior. Considering this, sinus vein thrombosis should always be considered in children with nephrotic syndrome, early clinical suspicion, and early detection, and management with anticoagulants result in satisfying outcomes. Here, we describe the case of a male child, two years and six months year-old, in the background; the child suffers from nephrotic syndrome and has been treated with steroids for four months. He was admitted with weakness, drowsiness, and refusing to eat, after full investigation was done, he was diagnosed with sinus vein thrombosis.

Keywords: Nephrotic syndrome; Sinus vein thrombosis; Anticoagulants; Hypercoagulability

Introduction

Nephrotic syndrome in infancy and childhood can be associated with thromboembolic complications [1]. The thromboembolic complication is more common in adults as compared to children; usually it tended to be more severe in children. nephrotic syndrome is associated with a high incidence of thrombotic events due to an increase in serum fibrinogen and factor V and VII, in addition to the loss of anti-thrombin III in urine, and to an increase in platelet aggregation and many other factors like hypoalbuminemia, increased blood viscosity, hemoconcentration, alteration in platelet function [2]. The prevalence of thrombotic events in children with nephrotic syndrome is about 2-5%, which is less common in adults [3]. The difference in types of nephrotic syndrome explains the difference in prevalence between children and adults for thrombotic events, for example, Membranous Nephtoteic Syndrome is more associated with thrombotic events and is more common in adults, Compared to Minimal Change nephrotic Syndrome, which is less related to thrombotic events and more common in children. Thrombotic events can occur in veins and arteries, but less common in arteries, the blood vessels involved in thrombotic events are the renal vein, the lungs arteries, the deep arteries of the lower limb, the femoral artery, and the inferior vena cava. Many works in the literature describe the importance of early diagnosis and early anti-thrombotic therapy has better results and prognosis in these children.

Case Presentation

A two and a half-year-old boy suffers from nephrotic syndrome and has been treated with steroids for four months. He was hospitalized at the age of two due to edema and was treated with steroids and diuretics (*Furosemide*). The mother declared that for about two hours before admission to our institute, the child seemed pale, weak, and drowsiness, but without diarrhea, vomiting, restlessness, or other complaints. On physical examination, the boy seems to show pallor, photoreactive pupil, weakness, edema, and no signs of meningeal irritation no dehydration. Vital sign: No fever, Blood pressure 85/56, Respiratory rate 22 per minute, heart pulse 132. Investigations showed Leukocyte Count 21,000, hemoglobin 15.2, platelets 316,000. Blood proteins: Total protein 3.9, Albumin 1.4, Triglycerides 118 and Cholesterol 373. Coagulation profile showed normal values of prothrombin, international normalized ratio (INR), and activated partial thromboplastin. Protein C and protein S levels were normal.

Urine analysis showed 4+proteinuria, Serum C3, and C4 complements levels were normal. IGA and IGM normal, low IGG 320, ASLO negative, hepatitis B C was negative. The chemistry was normal. Urine toxicology was normal. Normal electrocardiogram is seen. Renal ultrasonography revealed normal-sized kidney without dilatation of the pelvicalyceal system. Computer tomography scan brain without contrast was normal. Due to continued lethargy, a Computer tomography scan of the head with contrast material was done, and the results show no evidence of intracerebral or intracranial bleeding. There is no focal finding in the brain, no evidence of a mass effect, mid-line reserved, normal ventricles and brain grooves. The nasal cavities and mastoid cells are well ventilated; however, after the injection of contrast material into the vein. Filler defects were demonstrated in the superior sagittal sinus, transverse sinuses and sigmoid on the right side of the brain, and proximal jugular vein on the same side. The findings indicated SVT (Figure 1).

Discussion

Nephrotic syndrome is a glomerular disease that is usually characterized by hypoalbuminemia (<2.5 g/dL), proteinuria (>40 mg/m^2/hour), hyperlipidemia and edema. The complications of nephrotic syndrome can be part of the disease itself or secondary to drugs that are analogous to the treatment of the disease [4]. One of the rare complications of the disease is sinus vein thrombosis. The prevalence is 4.7-6%. Sinus vein thrombosis involves intraventricular vein

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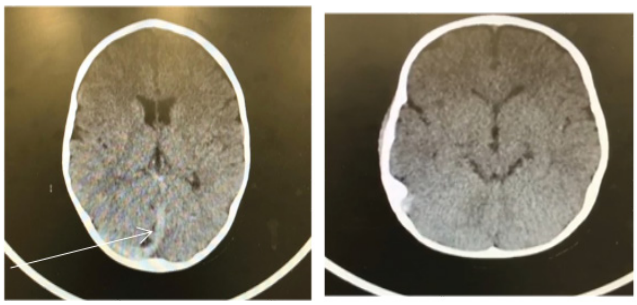

Figure 1: Computer tomography scan brain shows abnormal high signal in the internal cerebral veins, that referred to a blood clot.

thrombotic veins and cerebral veins, which causes non-intracranial venous drainage and intravenous pressure [5]. Sinus vein thrombosis is usually undiagnosed due to non-specific signs and is considered uncommon in children. Risk factors for this disease differ between the different ages. Most thrombotic events are secondary to several risk factors that happen together. Infection is considered the most common risk factor in neonates and older children [6]. Subsequently, hypercoagulable and dehydration are also considered to be a risk factor for this disease, in addition, patients who are resistant to steroids are at higher risk. Nephrotic syndrome is also a causative factor for arterial or vein thrombotic events, especially in patients with severe proteinuria who are 3 to 4 times at risk of having sinus vein thrombosis. The risk of thrombotic events is increased more during the acute illness and during the recurrence of nephrotic syndrome, which then loses more clotting factors and fluids. Thrombotic events in children with nephrotic syndrome are associated with a defect in platelet activity and aggregation, an increase in the production of coagulation factors such as V VII VIII and X, and also to Von Willebrand disease (VWD) Factor and fibrinogen, and decreased anticoagulant factors such as antithrombin III and protein C and S, decreased fibrous system activity and plasmin production, decreased blood volume and use of diuretics. Seizures are the most common manifestation of this disease, and neurological signs such as decreased consciousness, ataxia, headaches, vision changes, diplopia, encephalopathy, nausea, and vomiting, are common in children [7-9]. The less common signs are neck pain, vertigo. The most common site involved in sinus thrombosis is sagittal, Superior transversal, and sigmoid sinuses. The diagnosis is based on a lack of blood flow in the cerebral blood vessels with or without evidence of characteristic cerebral infarction on the CT scan, which is the first screening performed. Treatment of intravenous sinus vein thrombosis is initially supportive. Like any life-threatening event, ABC (airway, breathing, circulation) must be done first, to open airways, to see that there are proper breathing and no cardiovascular problem. Benzodiazepine is the first treatment for seizures due to sinus vein thrombosis [9]. The treatment of choice is the initiation of treatment with heparin and then continued oral anticoagulation therapy [10,11]. Difficulty in anticoagulant withdrawal status has been described in children with nephrotic syndrome due to antithrombin III urine loss. Treatment is LMWH (low molecular weight heparin) after that continue treatment with LMWH or Vitamin K antibodies for 3-6 months or Continue treatment in patients with nephrotic syndrome and proteinuria with less than 2 DL/g albumin. Prophylactic anticoagulation is a controversial subject. Prophylactic treatment should be given to any child undergoing a thrombotic event, albumin lower than 2 G/DL, Fibrinogen >6 G/L, or antithrombin III less than 70% [12,13].

Conclusion

Clinical diagnosis of cerebral venous thrombosis is difficult because the signs and symptoms are often non-specific. The disease should be considered in every child with nephrotic syndrome who presents with signs or neurologic symptoms. Moreover, if this disease is suspected, it is necessary to proceed clearly with a brain image, it is essential to make sure of the diagnosis and to start an anti-thrombotic treatment immediately, Early diagnosis has better outcome and prognosis.

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