Cerebral Venous Sinus Thrombosis Following Primary Varicella Infection in a Child

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Varicella infection commonly called chicken pox is a benign self-limiting infection in children. Neurological complications following varicella infection are rare. Cerebral venous sinus thrombosis following varicella infection is very rare. Herewith we report a child who developed transverse and sigmoid sinus thrombosis following chicken pox.

Keywords: Antiphospholipid antibodies, cerebral venous sinus thrombosis, varicella infection

INTRODUCTION

Varicella-zoster virus (VZV) generally causes chicken pox, a febrile exanthematous illness with vesicular rash. Neurological complications following primary VZV infection account for less than 1% of cases.[1] The various neurological complications that can occur include aseptic meningitis, cerebellitis, encephalitis, acute transverse myelitis, and Guillain–Barré syndrome. VZV infection can cause unifocal or multifocal vasculopathy and arterial strokes. Varicella causing venous stroke is very rare. Few cases have been reported in adults[1-4] and only one case in a child[5] and hence this report.

CASE SUMMARY

A 10-year-old boy was brought to the emergency department with history of generalized tonic clonic convulsions and altered sensorium. It was preceded by headache and vomiting for the last 2 days. He developed vesicular rash typical of chicken pox following 2 days of fever 12 days ago. His younger sibling and father also had chicken pox in the same period. There was no history of prior seizures. At the time of admission, he was drowsy, afebrile, and had vesicular lesions with scab over the trunk and limbs. He had normal doll’s eye movements and intact pupillary reflexes. Fundi were normal. Relative paucity of movements was noticed in the left upper and lower limbs and there were no meningeal signs. His sensorium improved over the next 12 h and there were no further seizures. Examination revealed left hemiparesis.

His blood counts and metabolic parameters including sugar, urea, creatinine, electrolytes, calcium, and liver function tests were normal. Computed tomography brain showed hemorrhagic infarct in the right temporo-parietal region. Coagulation profile was normal. Magnetic resonance imaging (MRI) brain revealed hemorrhagic infarct in the same region [Figures 1–3]. Magnetic resonance Venogram showed thrombosis of right transverse sinus and sigmoid sinus and internal jugular vein [Figure 4]. Cerebrospinal fluid (CSF) was sterile with no cells and normal biochemistry. Blood for VZV was positive. CSF polymerase chain reaction for VZV was negative.

He was treated with intravenous acyclovir, anticonvulsants, and low-molecular-weight heparin overlapped with oral anticoagulants. Prothrombotic workup including protein C, S, antithrombin III, and plasma homocysteine were normal. Antiphospholipid antibody IgM levels were high. Over the next 3 days,
his hemiparesis improved. At the time of discharge, he did not have any focal deficit and he was advised to continue anticonvulsants and oral anticoagulants for the next 3 months.

MRI repeated after 3 months showed recanalization of the sinuses. His repeat antiphospholipid antibody levels were normal and he was advised to stop oral anticoagulants and anticonvulsants.

**DISCUSSION**

Chicken pox is usually a benign self-limiting illness in children. Cerebellitis is the most common neurological complication in children during primary infection. In adults, it can cause serious complications such as aseptic meningitis, encephalitis, cerebellitis, acute transverse myelitis, Guillain–Barré syndrome, Ramsay Hunt syndrome, and vasculopathy. Postvaricella angiopathy causing arterial ischemic stroke is well-known entity...
in children. However, recently the clinical spectrum of VZV vasculopathy has been expanded to include hemorrhagic stroke, extracranial vasculopathy, aneurysm, arterial dissection and dolichoectasia, ischemic cranial neuropathy, cerebral venous thrombosis, spinal cord infarction, and peripheral thrombotic disease. Vasculopathy can occur after either primary infection with VZV (chicken pox) or after viral reactivation (herpes zoster). VZV is the only virus in human beings, which has been shown to replicate in vessels and produce vasculopathy. The mechanisms underlying vasculopathy could be vasculitis, thrombosis due to direct endothelial damage, and acquired protein-S deficiency. VZV travels transaxonally to the adventitia of arteries where infection is established followed by transmural migration of the virus to media and intima, pathological vascular remodeling, and stroke. The transaxonal spread of the virus is supported by the demonstration of afferent fibers from trigeminal ganglia to intracranial blood vessels, venous sinuses, and dural structures.

The exact pathogenesis of varicella venous thrombosis is unknown. The same pathogenic mechanisms underlying arteriopathy may play a role in the development of cerebral sinus venous thrombosis. An acquired antibody-mediated hypercoagulable state resulting from decreased levels of natural anticoagulants such as protein S in the viremic phase of the infection is also postulated to provoke thrombosis. Josephson et al in a cross-sectional study performed on 95 children showed that 43 children had antiphospholipid antibodies and some had a significant reduction in protein-S level postvaricella infection, describing it as transient varicella autoantibody syndrome. Our patient developed cerebral venous thrombosis during primary varicella infection and had raised antiphospholipid antibodies.

CONCLUSION

In conclusion, though cerebral venous sinus thrombosis following primary varicella infection is rare, in view of the hypercoagulable state associated with this infection, an awareness of this condition is necessary for early diagnosis and appropriate management.

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Conflicts of interest

There are no conflicts of interest.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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