Acute Venous Sinus Thrombosis after Chickenpox Infection

Vijay Sardana*, Lal Chand Mittal**, SR Meena***, Deepti Sharma****, Girish Khandelwal*****

Abstract

Background: Chickenpox is one of the classic childhood diseases. Recently chickenpox has been reported in adults with more severe systemic and neurological complications. Cerebral venous thrombosis (CVT) is a life threatening disorder if not treated in time. We report a patient with post varicella CVT as a rare complication of primary Varicella zoster virus.

Case Report: Vasculitic arterial infarction is known while venous stroke has rarely been reported with Varicella- zoster virus infection. Here, we report an immunocompetent 30 yr old male who developed chickenpox after contact with his daughter two month back. He presented with acute neurological deficit, one week after onset of skin lesion. MR venography revealed non-visualisation of left transverse sinus and left sigmoid sinus suggestive of venous sinus thrombosis.

Conclusion: Varicella infection is rarely associated with venous sinus thrombosis. Possibly hypercoagulable state produced by the infection or direct invasion of virus in venous endothelial wall with subsequent damage to endothelium leading to thrombosis could be the cause.

Introduction

Chickenpox (Varicella) is a benign illness caused by varicella-zoster virus, predominantly in childhood. Vasculitic arterial infarction is known while venous stroke has rarely been reported with Varicella- zoster virus infection. We report a young man with varicella infection who developed haemorrhagic venous infarction in the absence of hypercoagulable state.

Case Report

A 30-year-old male presented with continuous headache, non projectile vomiting, right side weakness and irrelevant speech of 2 days duration. The illness started with rash predominantly on the trunk and limb and to a less degree on the face two week back. The lesions were centripetal and were diagnosed to be chicken pox. The lesions were in crusting stage when the patient developed neurological complaints. He had also complained of fever, malaise, tiredness for 2 weeks and cough and sneezing for 3 days. Patient had contact history of chickenpox with his daughter 2 months back. There was no history of seizures. Past history was not significant. There was no history of smoking, anticoagulation and IV drug abuse.

When patient came to the emergency he was conscious and appeared confused. General
nerves, right sided hemiparesis with power of 4/5 in right upper limb and 3/5 in right lower limb.

Routine hemogram and serum biochemistry were normal except erythrocyte sedimentation rate (ESR) was 50 mm/hour. Serology for human immunodeficiency virus (HIV), hepatitis B surface antigen (HBsAg), vasculitis, connective tissue disorders was negative. Serum antiphospholipid antibodies were negative and C-reactive protein levels were 5.5 mg/dl (normal range 0.0-0.6 mg/dl). Other investigation for procoagulant state like Protein C, Protein S, Factor V, antithrombin III and homocysteine levels were within normal limits. Chest X-ray and 2D Echo were normal. A plain computed tomography scan showed a haemorrhagic infarct in the left temporo-parietal lobe with oedema and mass effect over the ipsilateral lateral ventricle (Figure 2). A possibility of venous sinus thrombosis was considered and a magnetic resonance venography with gadolinium was done. It showed haemorrhagic infarct with significant perilesional oedema and adjacent meningeal enhancement in left temporo parietal region with mass effect (Figure 3). Venography showed loss of normal signal intensity in transverse sinus and sigmoid sinus on left side (Figure 4). Guided Cerebrospinal fluid (CSF) examination done after intravenous Mannitol and dexamethasone with 24 gauge lumbar puncture needle. CSF examination showed 3 cells/mm; protein 46 mg%, and glucose 54 mg%. Varicella-specific immunoglobulin G (IgG) was positive in the cerebrospinal fluid (CSF) and blood with reduced serum/CSF ratios of VZV IgG.

Patient was started on antioedema measures consisting of intravenous 20% mannitol and dexamethasone and injection low molecular weight heparin (Enoxaparin) 0.6 ml s/c BD for 10 days, followed by oral anticoagulation Acenocoumarol 2 mg OD. Injection Acyclovir 10 mg/kg 8 hourly was given for 10 days. Aspirin was given in the starting...
but later on withdrawn on 3rd day in absence of clear evidence for its use in CVT. Headache improved and language functions improved gradually over next few days. Right hemiparesis also gradually improved during 4 weeks of follow up. Patient was discharged on oral anticoagulants with monitoring of coagulation parameters.

**Discussion**

Varicella is highly contagious disease of childhood with increasing incidence in adults. The latent period between the onset of varicella virus infection and neurologic complaints is usually a few days to 6 months. Central nervous system complications can follow both primary infection and reactivation of VZV including encephalitis, aseptic meningitis, transverse myelitis, acute cerebellar ataxia, Reye syndrome, Ramsay Hunt syndrome, ventriculitis, meningoencephalitis and rarely stroke. All of these complications are recognised to be due to vasculitis affecting small or large vessels. Arterial stroke is a recognised complication of VZV infection but occurrence of venous stroke has been very rarely described in the literature.

Our patient had clinical features and investigations supporting diagnosis of post Varicella infection CVT. Several factors predispose to CVT which include infective and non infective causes. In this patient, occurrence of venous stroke was temporally related to chicken pox infection which could be causal factor as other causes of hypercoagulable states were appropriately excluded. It is possible that following chicken pox antibodies may cause protein S deficiency but in our case protein S level was normal. Higher ESR could have been due to concurrent bacterial sore throat.

Virus in the vessel wall may induce a noncytolytic infection of the smooth muscle cells in the media and functional damage to the vascular endothelium. This may result in thrombosis and promote subendothelial proliferation of smooth muscle cells, fibroblasts, and collagen, leading to areas of stenosis and occlusion. Unifocal large-vessel vasculopathy (granulomatous arteritis) usually affects elderly immunocompetent persons, whereas multifocal vasculopathy occurs primarily in persons who are immunocompromised. Unifocal large-vessel infarcts may follow zoster in a trigeminal distribution and are presumed to result from transaxonal transport of virus from trigeminal afferent fibers that innervate vessels of the anterior circulation. Similarly, smaller infarcts in deep white and gray matter may reflect transport of VZV from trigeminal or cervical afferent fibers to smaller branches of vessels of the posterior circulation. Venous thrombosis following chicken pox is very rare the causal association in this particular case was evidenced by positive varicella antibodies in serum and CSF. The exact pathogenesis of varicella venous thrombosis is not known but similar to VZV arteriopathy, activated varicella may migrate transaxonally to infect meninges and venous sinuses of brain. The mechanisms underlying cerebral vascular events after VZV infection could be vasculitis, thrombosis due to direct endothelial damage, and acquired protein S deficiency.

Since the postulated pathophysiology of infection related CVT is same as in non infectious causes, treatment is also same as in non infectious CVT.

**Conclusion**

Our case demonstrates that a rapid diagnosis of CVT was essential for the proper management of the patient. With this case we wish to add to the literature, CVT as another neurological complication after varicella infection. Possibly direct invasion of virus in venous endothelial wall with damage to endothelium leading to thrombosis could be the cause. Since the management of venous stroke is different than arterial stroke, once should keep higher degree of suspicious for venous stroke after Varicella Zoster infection.

**Acknowledgement**

The authors do not report conflict of interest regarding this work.

**References**