VERTEBRAL ARTERY ISCHEMIC STROKE IN A CHILD

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Introduction

Strokes or cerebrovascular accidents though primarily affecting adults are not rare in children. In western literature, childhood stroke has been reported to occur with an annual incidence of 2.5 cases per 1,00,000 population, which is one half the incidence of primary intracranial neoplasms [1]. There is no corresponding figure available for the Indian population.

Ischaemic strokes in children due to various causes usually involves internal carotid artery or middle cerebral artery territory, leading to hemiplegia. Occlusion of posterior circulation arteries in stroke syndrome is very uncommon in children.

Case Report

10-year-old male child, asymptomatic three days prior to admission, reported to outpatient department with sudden onset of vomiting and headache. Next day he became drowsy. There was no history of fever, seizures, head injury or preceding respiratory or gastrointestinal infection. In the past he had been getting episodic headache for three years. Each episode was characterized by generalized headache lasting 15-30 minutes with no triggering factors/aura and subsiding with sleep and analgesics. His immediate family members did not have any neurological disorders. He was fully immunized and development was normal.

On admission, the child was irritable and drowsy. Vital parameters were normal. General examination was normal and there were no neurocutaneous markers. Neurological examination was essentially normal, except for mild hypotonia with bilateral extensor plantar response. Over the next three days, his sensorium improved. However, bilateral cerebellar signs were elicited in the form of limb ataxia, scanning speech and truncal ataxia. Other systems were essentially normal.

The investigation profile in chronological order is highlighted in Table-1. Initial management included anticerebral edema measures. During the course of investigations, the child had three episodes of severe headache associated with photophobia. These episodes were managed with analgesics. Over the next four weeks he showed gradual improvement in cerebellar signs. He was discharged with minimal cerebellar signs and is on regular follow-up.

TABLE 1

Investigation profile

Type of investigation	Result
Complete blood counts	Normal
Blood sugar	Normal
Serum electrolytes	Normal
Blood urea and creatinine	Normal
CSF	Protein 30 mg/dl, Sugar 60 mg/dl WBC 1/cmm, Culture negative antiviral antibodies negative
CT scan (Fig. 1)	Non hemorrhagic cerebellar infarct involving right and left hemisphere, vermis. Mild obstructive hydrocephalus
MRI scan (Fig. 2)	Confirmed infarct on T2 image
X-ray cervical spine	Normal
Screening for tuberculosis	Negative
Coagulation profile	Normal
Antiphospholipid antibody	Negative
Antinuclear antibody	Negative
Rheumatoid factor	Negative
Lipid profile	Normal
EEG	Right hemispheric dysfunction
Echocardiography	Normal
Sickling test	Negative
Urine for homocystinuria	Negative
Repeat CT scan brain four weeks later (Fig. 3)	Well demarcated infarct, with reduction in extent and resolution of hydrocephalus
Four vessel transfemoral cerebral angiogram (Fig. 4)	Normal carotids left vertebral, basilar arteries and branches. Right vertebral artery showed occlusion 5 cms from its origin in a gradually tapering fashion (string sign) and its branches could not be delineated.

Discussion

The acute onset of stroke in this otherwise healthy child prompted a search for an infective etiology, it being more common. Investigations for tuberculosis, bacterial and viral infections were negative. Hence the investigations were directed towards the other cause of stroke. Angiography confirmed right vertebral artery

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Fig. 1: CT scan brain showing non-haemorrhagic cerebellar infarct involving both hemispheres and vermis

Fig. 2: MRI brain scan showing cerebellar infarct on T2 weighted image

Fig. 3: Repeat CT scan brain showing well demarcated cerebellar infarct with reduction in size

occlusion resembling the string sign of arterial dissection [2]. The other possibility is congenital anomaly (atresia) seen in about 10% of population [3]. This is

Fig. 4: Cerebral angiogram showing right vertebral artery occlusion (string sign)

usually well compensated.

Occlusion of one vertebral artery is not known to lead to ischemic infarction. However, in the presence of an infarction and demonstrable occlusion of an artery known to contribute to blood supply to the area, the cause effect relationship is more likely. The exact precipitating factor for an ischemic event in this child is not clear. Dissection of cervical carotid and vertebral arteries is a well known cause of stroke in the young and incidence of dissection is increased in patient with migraine, fibromuscular dysplasia, hypertension and trauma [2]. Migraine could be a risk factor for vertebral artery dissection in our cases. A similar case involving carotid artery has been reported [4].

There are few reports of posterior circulation strokes in children. In some series on strokes in childhood, the occurrence of posterior circulation strokes has not been reported [5,6] whereas others found evi-

dence of posterior fossa signs in 11% cases [7]. Chat Kupt et al described three cases of cerebellar infarction over a two-year period [8]. The etiology of reported cases of posterior circulation strokes has been variable. Deviro, et al were the first to describe primary vertebro basillar occlusive disease in children probably related to congenitally tortuous vertebral artery at C2 level [9]. Mechanical injury to C1-C2 vertebral artery segment due to trauma, cervical spine manipulation and atlanto axial instability is another cause [10].

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