STUDY ON CLINICAL PROFILE AND RADIOLOGICAL FEATURES IN BRAINSTEM STROKE
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Abstract: AIM - To study the clinical profile and radiological features in brainstem stroke. METHODS - This study analysed the clinical features of 20 patients with acute brainstem stroke and correlated the clinical syndromes with radiological findings. RESULTS - 1) The number of 20 patients, of which males (75%) and females (25%). 2) Ischemic stroke (80%), haemorrhagic stroke (20%). 3) The common manifestations were vertigo, sensory disturbances, unsteadiness, cranial nerve involvement, speech disturbance in descending order. 4) The most common stroke syndrome was lateral medullary syndrome. 5) MRI results showed that the large lesions located in paramedian caudal or middle pons correlate with pure motor hemiparesis. 6) Lesions producing ataxic hemiparesis were located variously. 7) Rostral medullary lesion were associated with severe dysphagia, hoarseness, and facial paresis, whereas the caudal lateral medullary lesions, correlate with marked vertigo, nystagmus, and gait ataxia. 8) Lesions extending ventromedially correlates with contralateral facial sensory impairment. 9) Nausea, vomiting and Horner's syndrome were common finding regardless of the lesion location. CONCLUSION - Our data suggest that the various syndromes that follow brainstem stroke reflect the balance of the involvement of the spinal and trigeminal lemniscus, spino-cerebellar, corticopontocerebellar, descending sympathetic tract and corticospinal tract.

Keywords: Brainstem Stroke, MRI

INTRODUCTION: Worldwide, stroke is one of the leading cause of death, with stroke mortality being particularly high in Eastern Europe and Asia (World Health Organization, 2004). By 2020, 19 million out of 25 million annual stroke deaths will be in developing countries (Lemogoum et al., 2005). Stroke is also the leading cause of disability in adults. Of the hundreds of thousands of stroke survivors each year, approximately 30% require assistance with activities of daily living, 20% require assistance with ambulation, and 16% require institutional care. Strokes in the posterior circulation comprise approximately 10% to 15% of all strokes and are more common in men than in women. 80% posterior circulation strokes are ischemic with remaining hemorrhagic in nature similar to that of in anterior circulation. Vertebrobasilar ischemic lesions found to have vertical and rostrocaudal distribution or transverse or it can be patchy. Clinicoradiological correlation may not be precise as lesions are located variously. Patient may present with isolated syndromes or syndrome in combination.

AIMS AND OBJECTIVES:
To study brainstem stroke and its clinicoradiological correlation.

METHODS:
We studied 20 patients with brainstem stroke in Institute of Neurology, Madras Medical College between January 2013 and December 2014. Patients without cortical and subcortical involvement were included. Detailed history was obtained. All patients underwent thorough neurological examination. Biochemical investigations were done as and when needed. CT Brain and MRI Brain were done. Clinical and imaging findings were compared. Risk factors were analyzed.

RESULTS
Total number of 20 patients (age 29 - 67 years) were studied of which 15 males (75%) and 5 females (25%).

- Ischemic stroke (80%), haemorrhagic stroke (20%).
- The common manifestations were unsteadiness, vertigo, motor and sensory disturbances, cranial nerve involvement, speech disturbance in descending order.
- Dysguesia noted in three patients with pontine stroke
Risk factors:
Hypertension was the single most common and important risk factor, and the pathogenetic mechanisms of ischemia were likely to be small arterial (lacunar) occlusion or basilar atheromatosus branch occlusion in most of the patients.

**DISCUSSION**
Imaging studies play an important role in the diagnosis and management of brainstem stroke. However, there are only a few studies correlating the radiological picture with the clinical findings. In our study, ischaemic strokes were more common (80%) than haemorrhagic strokes (20%). This was in accordance with other studies like Uma Sundar et al (77% ischaemic strokes). In our study, patients with rostral lateral medullary lesion had severe dysphagia, hoarseness, and facial paresis and caudal lateral medullary lesions had vertigo, nystagmus, and gait ataxia. Medullary lesions extending ventromedially correlates with contralateral facial sensory impairment. Nausea, vomiting were common symptoms regardless of the lesion location. In the patients with pure motor hemiparesis or Sensory motor stroke, the lesions causing severe hemiparesis were usually large and widely involved the ventral surface of the paramedian caudal ommedullary pons whereas small, medial lesions correlated with mild limb weakness. In the patients (with pontine haemorrhage) had clinical features which could not be accounted by the radiological findings. Unlike ischaemic lesions, the clinical syndromes did not correspond to sites of haemorrhages, thus suggesting that pressure effect rather than tissue destruction may have been responsible for the symptoms and signs. The lack of correlation between the size of lesion and the degree of hemiparesis was noted by previous authors, who speculated that a large part of the infarct seen on MRI may implicate edema rather than destructive lesions. This assumption may be supported by an observation that a large pontine infarct was significantly reduced in size on follow-up MRI. Fisher et al and C Y Huang et al stated that basis pontis infarctions at the junction of the upper one third and inferior two thirds may produce Ataxic Hemiparesis. Three patients with Ataxic hemiparesis had lesion located variously, suggesting that in the basis pontis, pontocerebellar fibers are widespread and may easily be involved. One patient showed Ataxic hemiparesis and additional limb ataxia on the side ipsilateral to the lesions. That patient had marked gait difficulty due to bilateral lower limb ataxia and hemiparesis and was designated as having quadragalaxic hemiparesis. Recent reports described bilateral ataxia following unilateral pontine lesions, which may be attributable to an involvement of the crossing corticopontocerebellar tracts. The findings in this study were similar to the previous brainstem stroke studies.

**CONCLUSION**
Most common clinical symptoms in our study were unsteadiness followed by sensory motor disturbances. Most common clinical syndrome was lateral medullary syndrome. Medulla and pons were the common brainstem structures involved. In our study, 75% patients clinical presentations correlated with radiological features. Patients presenting with identical brainstem stroke may have dissimilar lesions in MRI. Lesions affecting particular part may have different manifestation. Patients presenting with different manifestations can have identical lesion and same lesion can have different manifestations. Analysis of MRI findings in rostrocaudal and dorsoventral aspects allows us, although not unequivocally, to make anatomicoclinical correlations in the evaluation of patients with brainstem stroke syndromes. Our data suggest that the various syndromes that follow brainstem stroke reflect the balance of the involvement of the spinal and trigeminal lemniscus, spinocerebellar, corticopontocerebellar, vestibulo cerebellar connections, descending sympathetic tract and corticospinal tract. An understanding of the functions and relationships between these different brainstem structures allows for better correlation between regions of pathologic involvement.
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