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To Study Magnetic Resonance Angiography Brain in True Isolated Vertigo Patients at a Tertiary Referral Teaching Centre

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ABSTRACT

Aim of Study: *To assess a subgroup analysis of patients of abnormal posterior circulation with respect to their MRA.*

Methods: *This was an observational cross-sectional study, consisting of consecutive more than 18 years patients presenting as isolated vertigo of any duration admitted in department of Neurology in Sri Aurobindo Institute of Medical Sciences Indore (MP), India.*

Results: *Total 23 patients were included in the study who met the inclusion criteria. 47.8% cases were found to have abnormal MRA of brain, while remaining had normal results. Out of the 11 abnormal MRA Brain majority had Infarction 10 [90.9%] and only one [9.1%] was a case of aneurysm. On MRA it was detected that most common artery involved was vertebral in 7 [63.6%] cases and one case [9.1%] each of basilar artery and PCA aneurysm was detected. However 2 [18.2%] cases revealed normal MRA. Four cases [36.4%] revealed no flow in MRA, 2 [18.2%] had stenosis, 1 [9.1] case each of AVM, dissection and hypoplastic artery were detected. However 2 [18.2%] cases had normal MRA.*

Conclusion- *Patients with isolated vertigo due to Cerebellar infarction pose a significant diagnostic challenge to the emergency physician. So MR angiography is an important diagnostic tool for prompt confirmation of posterior circulation abnormalities.*

Keywords: *Vertigo , [Mr Angio Or Mra] Magnetic Resonance Angiography.*

INTRODUCTION

Vertigo is one of the most common complaints in neurology and otology. Its prevalence increases with age but is often underestimated in elderly adults .Although most cases of vertigo are self-limiting, some cases of vertigo may be life threatening such as brain stem or cerebellar infarction. A thorough understanding of the anatomy and physiology in peripheral and central vestibular system, neuro-otological physical examination, and appropriate laboratory tests can sometimes help to produce an exact diagnosis. [1] MRI brain is the first-choice examination in central vertigo. After headaches, vertigo is the most commonly occurring leading symptom in neurology.[2] Survey has revealed the relative frequency of various causes of vertigo. Vertigo attributed to BPPV was diagnosed in 18.8% of

patients, central vertigo in 13.2%, basilar/ vestibular migraine in 9.1%,vestibular neuronitis in 7.9%,Menier's disease in 7.4%, and vertigo with unknown cause in 4.2%.Some researchers reported vertigo of unknown cause (VUC) in 4.2-47.1% of all vertiginous patients. [2,3]

Vertigo is defined as a pathologic illusion of movement. These patients may report episodic imbalance or dizziness that is made worse with head movement.[4] The symptoms of cerebellar infarction overlap substantially with benign conditions it is commonly overlooked, with a misdiagnosis rate estimated at 35%. [5] Patients with missed cerebellar infarction in general are at higher risk for complications, with a mortality rate possibly as high as 40%. Physical diagnosis is the most important diagnostic modality for cerebellar infarction. Resorting to computed tomography (CT) is insufficient because it is only 26% sensitive for acute stroke. In contrast, important physical signs are present in the majority of patients with cerebellar infarction.[5,6] Cerebellar infarction represents approximately 2.3 % of acute strokes overall. These can result from occlusion of the superior cerebellar artery (SCA), anterior inferior cerebellar artery (AICA), or the posterior inferior cerebellar artery (PICA).[5] Hypertension and cardioaortic diseases are found in the majority of patients with cerebellar infarction, and an embolic source is found in 24-40%. [7] 71% of patients with cerebellar infarction and isolated vertigo will present with the inability to walk without support. For hemorrhagic strokes, computed tomography (CT) and MRI are both excellent studies. However, for ischemic strokes, MRI is clearly superior with an 83% sensitivity compared to 26% for CT. Physicians should therefore not rely on CT scanning to rule out cerebellar infarction.

MRI is the first-choice examination in central vertigo, allowing the evaluation of the whole central vestibular pathway. Cerebrovascular ischemia, multipe sclerosis, CNS tumor, CNS infection, etc., are clearly distinguished by MRI. Diffusion-weighted MRI can detect acute ischemia at very early stages. MRI can very sensitively detect lesions in the brain stem and other posterior fossa structures, which are an important part of the vestibular pathway.

This study was conducted to identify the patients of true isolated vertigo having abnormalities in posterior circulation and to do a subgroup analysis of patients of abnormal posterior circulation.

AIMS AND OBJECTIVES

1. To identify the patients of true isolated vertigo having abnormalities in posterior circulation.
2. To do a subgroup analysis of patients of abnormal posterior circulation with respect to their MRA.

MATERIAL AND METHODS

This was an observational cross-sectional study, consisting of consecutive 23 patients admitted in department of Neurology in Sri Aurobindo Institute of Medical Sciences Indore (MP), India from 1st June, 2014 to 31st December, 2015. All more than 18 years patients presenting as isolated vertigo of any duration and ready to give informed consent were included in study and Patient with known case of vertigo of any cause, on ototoxic drugs and having abnormal otologic evaluation, carrying intracranial or other pathology that might cause vertigo, having haemoglobin <7 g%, having postural hypotension, If prior angiography available and showing abnormality in posterior circulation, Recent posterior circulation stroke(4 weeks)were excluded from study.

Patients thus selected and confirmed as isolated true central vertigo were included. These patients underwent MR Angiography of the brain with emphasis on posterior circulation.Any significant abnormality in the form of atherosclerotic disease or stenosis in the posterior circulation and its branches was looked for as per protocol of imaging in department of Radiology.The use of cranial MRI in peripheral vertigo is controversial. Some forms of peripheral vertigo such as BPPV can be diagnosed only on the basis of the medical

history and a typical positional nystagmus examination, requiring no MRI.

OBSERVATIONS

This study was conducted in the department of Neurology, SAIMS Medical College and Hospital, Indore to identify the patients of true isolated vertigo having abnormalities in posterior circulation and to do a subgroup analysis of patients of abnormal posterior circulation with respect to their MRA.

In total 23 patients were included in the study who met the inclusion criteria.

Table 1. MR Angiography Brain results

MR Angio Brain	No of cases	Percent
Abnormal	11	47.8
Normal	12	52.2
Total	23	100.0

Eleven [47.8%] cases were found to have abnormal MR Angiogram of brain, while remaining 12 [52.2%] had normal results.

Table 2. Type of Abnormality in MR Angio Brain

[1] Abnormal MR Angio Brain	No of cases	Percent
Infarction	10	90.9
Aneurysm	1	9.1
[2] Artery Involved on MR angio	No of cases	Percent
Vertebral	7	63.6
NIL	2	18.2
Basilar	1	9.1
PCA aneurysm	1	9.1
[3] Type of vessal pathology in MR Angio		
No flow	4	36.4
normal	2	18.2
Stenosis	2	18.2
AVM	1	9.1
dissection	1	9.1
hypoplastic	1	9.1
Total	11	100.0

DISCUSSION

In this study total 23 patients were included who met the inclusion criteria. Fujita et al [53] in their study examined 33 individuals with symptoms of syndromal vertigo and vertebrobasilar territory disease by equilibriometry, MR imaging (MRI) and MRA.

In this study on MR Angio it was detected that most common artery involved was vertebral in 7 [63.6%] cases and one case [9.1%] each of basilar and temporal artery was detected. However 2 [18.2%] cases revealed normal angiography.

However Inui et al in their study detected eighty-six cases with central vestibular disorders, 11 cases with vertebrobasilar insufficiency, and 26 cases with autonomic nerve disorders. In their study of Fujita et al found under MRA, vertebral artery (VA) stenosis was more common than VA occlusion (23 vs. nine cases, respectively). A basilar artery (BA) deviation was found in eight cases (24.2%). Twenty-five VA or BA abnormalities (75.8%) were found, and eight combined VA and BA abnormalities (24.2%) were found.

WELSH et al in their study observed that approximately 52% of the cohort demonstrated abnormal configurations or evidence of diminished flow within the vertebrobasilar artery system. Of this segment, a vertebral artery was most frequently abnormal, in 76%; the basilar artery was judged pathological in 32%, and combined disease of several arteries was evident in 20%. And Gomez CR et al in their study revealed that all six patients had one of two abnormal patterns on magnetic resonance angiography (MRA): focal basilar stenosis or widespread vertebrobasilar slow flow. In three patients, the MRA findings were confirmed by cerebral angiography. Two patients developed brainstem infarctions, one of them fatal.

Lee H et al in their study found Two types of cerebellar infarction simulating VN: isolated spontaneous prolonged vertigo with imbalance as a sole manifestation of cerebellar infarction (n = 24) and isolated spontaneous prolonged vertigo

with imbalance as an initial manifestation of cerebellar infarction (n = 1) followed by delayed neurologic deficits 2 days after the onset. The cerebellar infarction territory most commonly involved was the medial branch of the posterior inferior cerebellar artery territory (24/25: 96%), followed by the anterior inferior cerebellar artery territory (1/25: 4%). None of patients with infarcts in the territory of the superior cerebellar artery or multiple cerebellar arteries showed isolated spontaneous prolonged vertigo.

In this study four cases [36.4%] revealed no flow in MR angio, 2 [18.2%] had stenosis, 1 [9.1] case each of AVM, dissection and hypoplastic artery were detected. However 2 [18.2%] cases had normal MR angio. Similarly Inui et al in their study detected that the average displacement angle of the basilar artery (*n*_180) was 153.4°939.4° (mean 9S.D.). MRA findings were classified into five categories. Ten patients were classified as category III, which represented unilateral partial vertebral artery stenosis. The detection rate for category III and IV abnormalities by neurological examination was higher than that for the other categories. MRI and MRA are important methods to examine patients with central nervous disorders. Distal vertebral artery stenosis may carry a higher risk of a stroke than brainstem infarction.

CONCLUSION

Central vertigo is an important clinical entity which is often missed if history is not taken carefully. Many a times, central vertigo is the only clinical manifestation of posterior circulation insufficiencies. MR angiography is an important diagnostic tool for prompt confirmation of posterior circulation abnormalities.

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