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MRI IN EVALUATING CEREBELLOPONTINE ANGLE LESION-AN OBSERVATIONAL STUDY

Radiodiagnosis

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ABSTRACT

Background: The cerebellopontine angle is encircled by the pons, the anterior portion of the cerebellum, and the petrous portion of temporal bone roofed by dura mater. The present study was conducted with the aim to determine the role of MRI in evaluating cerebellopontine angle lesions.

Materials and methods: The present retrospective study was conducted for a period of 6 months in the Department of Radiodiagnosis, Dr.D.Y. Patil Medical College Hospital & Research Centre, Pimpri, Pune Subjects with co morbidities like pace maker, implants who are contraindicated for MRI were excluded from the study. The hypointense, isointense and hyperintense lesions in both T1 and T2 MRI scans were noted. All the data was arranged in tabulated form and analyzed using SPSS software. Data was expressed as percentage of total.

Results: The present study enrolled 25 subjects out of which majority were males. The mean age of the subjects was 36.98+/-4.22 years. On T1 weighted image, hypointense lesion was seen in 20% cases, isointense in 72% cases and hyperintense in 8% cases. There were majority i.e. 40% cases of Acoustic schwannoma. 32% cases were that of meningioma. Epidermoid cyst was seen in 8% cases.

Conclusion: In our study, it was concluded that MRI is a handy tool for diagnosing lesions of cerebellopontine angle. It helps to differentiate all the lesions based on their intensity on the radiograph.

KEYWORDS

Cerebellopontine, Epidermoid, Hypointense, Retrospective

INTRODUCTION

Cerebellopontine angle is technically a subarachnoidspace that contains cranial nerves and vessels together in thecerebrospinal fluid. The cerebellopontine angle is encircled by the pons,the anterior portion of the cerebellum, and the petrous portion of temporal bone roofed by dura mater. Centrally present isinternal auditory canal and the caudal extension variesfrom the trigeminalnerve to IX–X–XIth cranialnerve system complex [1].The three most frequentlesions of cerebellopontine angleregion are schwannomas, meningiomas, andepidermoid cystic structures. The incidence of vestibular schwannomas varies between70–80% of all angle mass lesions, whereas the incidence of meningiomasand epidermoid cysts accounts for 10–15% and 5% of the lesionsrespectively [2–4].Cerebellopontine angle lesions present with different signs andsymptoms like headache, impairment in hearing, and hemiparesis. These clinical signs and symptoms are very common and are not able to differentiate between the pathology or the extent of the lesions,hence there is a requirement for advanced neurological imaging to determine the extension and subtype of the lesion leading to proper management[5].Recent studies on MRI showing the normal anatomy and of lesions of the angle region have shown mostinspiring results. The advantages offered by MRI over high resolution computed tomography include absence of hardening artifacts, capacity to provide a multiplanar image, and greater soft-tissue contrast.[6] The present study was conducted with the aim to determine the role of MRI in evaluating cerebellopontine angle lesions.

MATERIALS AND METHODS

The present retrospective study was conducted for a period of 6 months in the Department of Radiodiagnosis, Dr.D.Y. Patil Medical College Hospital & Research Centre, Pimpri, Pune . The study included 25 subjects, all the subjects were informed about the study and a written consent was obtained from all in their vernacular language. Study was approved by the institutional ethical board. The study enrolled only those subjects who presented with symptoms like tinnitus, hemiparesis, neuralgia, vertigo and headache. Subjects with co morbidities like pace maker, implants who are contraindicated for MRI were excluded from the study. All the subjects who had underwent T1 and T2 weighted axial images were included in the study. The complete demographic details, medical history and all the laboratory investigations were performed for all the subjects. The diagnosis of all the subjects was recorded in a tabulated form. The hypointense, isointense and hyperintense lesions in both T1 and T2 MRI scans were noted. All the data was arranged in tabulated form and analyzed using SPSS software. Data was expressed as percentage of total.

RESULTS

The present study enrolled 25 subjects out of which majority were males. The mean age of the subjects was 36.98+/-4.22 years.

Table 1 shows the age distribution of the subjects. There were 44% subjects (n=11) between 25-35 years of age. there were 28% i.e.7 subjects each between 35-45 years of age and 45-55 years of age respectively.

Table 2 shows the MRI signals of the lesions. On T1 weighted image, hypointense lesion was seen in 20% cases, isointense in 72% cases and hyperintense in 8% cases. On T2 weighted image, hypointense lesion was seen in 8% cases, isointense in 60% cases and hyperintense in 36% cases.

Table 3 shows the MRI diagnosis of lesions. There were majority i.e. 40% cases of Acoustic schwannoma. 32% cases were that of meningioma. Epidermoid cyst was seen in 8% cases. Prominent AICA, Paraganglioma, Cystic neurofibroma, Neurofibromatosis type 2, Arachnoid cyst were observed in 1 case each i.e. they constituted to 4% lesions.

DISCUSSION

MRI has conventionally been regraded the pivotal imaging modality for cerebellopontine lesions, that provide clinically useful information on the neurological diseases. In our study, there were 44% subjects (n=11) between 25-35 years of age. there were 28% i.e.7 subjects each between 35-45 years of age and 45-55 years of age respectively. As per the study byAsaoka *et al*, majority of the subjects were more than 40 years of age [7]. Patients with cerebellopontine angle lesions may present with classic signs and symptoms. In our study, there were majority i.e. 40% cases of Acoustic schwannoma. 32% cases were that of meningioma. Epidermoid cyst was seen in 8% cases. Prominent AICA, Paraganglioma, Cystic neurofibroma, Neurofibromatosis type 2, Arachnoid cyst were observed in 1 case each i.e. they constituted to 4% lesions. According to a research study by Springborg *et al.* [8]the most common angle lesions were vestibular schwannomas observed in 80% cases, followed by meningiomas seen in 10% cases and epidermoids observed in 6% of the cases. In our study, on T1 weighted image, hypointense lesion was seen in 20% cases, isointense in 72% cases and hyperintense in 8% cases. On T2 weighted image, hypointense lesion was seen in 8% cases, isointense in 60% cases and hyperintense in 36% cases. Breuer *et al.* [9]showed that schwannomas on the T1-weighted images look isointense to hypointense with respect to the brain. Whereas on T2-weighted images, they appear

hyperintense or may even be inhomogeneous. The inhomogeneity is due to cystic degeneration, bleeding, or increasedvascularity of the lesion. Generally, these lesions are round or oval in shape and arecisternal in position, and they start tapering as they reach the IAC. The lesions frequently present with homogenous enhancement and while fewshow heterogenous after the administration of contrast medium.As according to a study by Lalwani and Jackler [10], differentiation between meningioma and schwannoma can be done on the basis of radiological appearances. Since meningiomas rarely expand the IAC, they present with a broad base when present in the petrous boneand have strong homogeneous enhancement. These features are absent in schwannoma. On the other hand schwannoma has the tendency toexpand the IAC with part inside it and heterogenous enhancement is seen after contrast administration.[11] As per the study by Maaly et al[12] the most common cerebellopontine angle lesion was schwannoma followed by meningoma and MRI is a gold standard for differentiating brain lesions. The study needs to be performed on greater number of subjects so that the exacting prevalence of the lesions and the sensitivity of MRI in diagnosing cerebellopontine angle lesions can be obtained.

CONCLUSION

MRI is regarded as the gold standard for diagnosing brain lesions. It helps to differentiate lesions on the basis of their shape, size, boundaries and location. In our study, it was concluded that MRI is a handy tool for diagnosing lesions of cerebellopontine angle. It helps to differentiate all the lesions based on their intensity on the radiograph.

TABLE 1: age distribution of the subjects.

Age group	Frequency	Percentage
25-35	11	44
35-45	7	28
45-55	7	28

TABLE 2: MRI signals of lesions

MRI signal	Frequency	Percentage
T1		
Hypointense	5	20
Isointense	18	72
Hyperintense	2	8
T2		
Hypointense	2	8
Isointense	15	60
Hyperintense	9	36

TABLE 3: MRI diagnosis of the lesions

Diagnosis	Frequency	Percentage
Acoustic schwannoma	10	40
Meningioma	8	32
Epidermoid cyst	2	8
Prominent AICA	1	4
Paraganglioma	1	4
Cystic neurofibroma	1	4
Neurofibromatosis type 2	1	4
Arachnoid cyst	1	4

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