

Study on Spectrum of Non-Neoplastic Lesions in Posterior Cranial Fossa

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ABSTRACT

BACKGROUND

A wide variety of non-neoplastic lesions can occur in the posterior cranial fossa. Most of them are asymptomatic and incidentally detected. They may become symptomatic either because of pressure, rupture, or secondary inflammation. We wanted to study the spectrum of non-neoplastic lesions in posterior cranial fossa among intracranial lesions.

METHODS

This was a combined retrospective and prospective study, done from January 2009 to May 2014. 32 cases of non-neoplastic lesions in posterior cranial fossa were studied for patient demographics and histopathology.

RESULTS

The patients' age ranged from one to eighty years and the male to female ratio was 1.2 : 1. Among non-neoplastic lesions, majority were epidermoid cysts i.e. 34.3 % followed by cerebellar abscess 28.1 %, arachnoid cyst 15.6 % and others. Maximum number of cases was in the third and fourth decades. Tuberculous lesions accounted for 12.5 % cases.

CONCLUSIONS

Non-neoplastic lesions have a wide spectrum of histopathology and histogenesis. Among the non-neoplastic lesions, the most common lesion was epidermoid cyst followed by cerebellar abscess. The peak age incidence was in 3rd and 4th decades with male preponderance.

KEYWORDS

Posterior Cranial Fossa, Non-Neoplastic Lesions, Tuberculosis CNS

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BACKGROUND

Posterior cranial fossa contains cerebellum and brain stem which is out lined by the clivus, petrous and occipital bones. CNS diseases traditionally are divided into broad etiologic categories : Vascular, infectious, traumatic, degenerative, neoplastic, developmental, demyelinating and metabolic - toxic.¹ The most common destructive but nonneoplastic lesions that mimic neoplasia clinically and radiologically are infections / abscesses, infarcts, and plaques of demyelinating diseases such as multiple sclerosis.² The term "Intra - cranial space occupying lesion" is defined as any neoplasm, benign or malignant, primary or secondary, as well as any inflammatory or parasitic mass lying within the cranial cavity.³ The list also includes haematomas,⁴ different types of cysts,^{5, 6} and vascular malformations.^{7, 8} Many of these cystic lesions are developmental in nature, while others are acquired.⁹ Most of them have a good prognosis and some may recur as a result of incomplete removal. There is a limited comprehensive study of all non-neoplastic cystic lesions of CNS from India, with majority of them having studied mainly the developmental cysts. The epidermoid cysts are derived from ectodermal rests. They may arise due to the failure of separation of the ectoderm from the underlying structures, that is the neural tube, which may occur as a result of embryologic accident between the third and fifth weeks of gestational life.¹⁰ The origin of colloid cysts is controversial. Studies indicate an endodermal origin rather than a neuroepithelial origin as they are immunohistochemically different from normal or neoplastic choroid epithelium.^{11, 12}

Arachnoid cysts arise as congenital developmental abnormalities or as a result of infection or trauma in postnatal period. Developmentally, the subarachnoid space forms when the mesenchymal syncytium breaks down in response to CSF accumulation, if this breakdown is incomplete, then loculation of fluid within arachnoid layer may occur, producing a cyst. Arachnoid cysts are more frequent in the sylvian, parasagittal, and convexity regions.¹³ Most often, the vascular lesions are due to atherosclerosis, thrombosis or embolism and less common causes are vasculitides, trauma, vasospasm and hematologic disorders. Atherosclerosis is the most common cause; certain sites are more prone like Ostia of vertebral artery, basilar artery and internal carotid artery.¹⁴

Similar to epidermoid cysts, the dermoid cysts are also ectodermal in origin with a predilection for midline.^{9,15} Dermoid cysts are predominantly intraspinal in contrast to epidermoid cysts.⁹

Objectives

1. To study the spectrum of non-neoplastic posterior cranial fossa lesions.
2. Age and gender predilection.
3. Sites of occurrence and any site preference for the histological variants.
4. To compare findings of this study with other similar studies on the subject.

METHODS

The study was approved by the Institutional Ethics Committee. This was a combined retrospective and prospective study done over a period of five years and five months from January 2009 to May 2014 in the Department of Pathology, at NRI Medical College, Chinakakani.

Inclusion Criteria

1. Age 01 year to 80 years.
2. Both genders.
3. Cases with relevant clinical and radiological findings.
4. Only Non neoplastic posterior cranial fossa lesions were included.

Exclusion Criteria

1. Cases with insufficient data were excluded.
2. Neoplastic (benign and malignant) posterior cranial fossa tumours were excluded.

The clinical and radiological data of the cases included in the present study were obtained from the case sheets preserved in NRI General Hospital and the histopathological examination of the specimens received was carried out in the department of pathology of NRI Medical College.

The data obtained from the case sheets included the following: age, gender, past history, clinical symptoms, routine blood investigations and relevant radiological findings of patients were noted.

Blocks and slides from all the cases diagnosed as non-neoplastic posterior cranial fossa lesions prior to 2012 May were retrieved and slides were prepared from them wherever necessary and cases were reviewed. Cases between May 2012 to May 2014 were followed prospectively.

Haematoxylin and Eosin staining was done in all cases and examined for histological typing and grading. Findings of this study were compared with other peer studies for final analysis and conclusions.

Statistical Analysis

Descriptive statistical analysis was used in the present study. With the help of tables, diagrams, distribution of age, gender, clinical symptoms, types and sites of lesions were analysed.

RESULTS

A total of 140 cases of posterior cranial fossa lesions was recorded. Among these 140 cases, 32 cases were non-neoplastic lesions and remaining were benign and malignant tumours. These 32 cases were taken for the study.

The age of the patients ranged from 1 year to 80 years. The male to female ratio was 1.2 : 1.

Nature of Lesion	Number of Cases	Percent (%)
Epidermoid cyst	11	34.3 %
Cerebellar abscess	9	28.1 %
Arachnoid cyst	5	15.6 %
Tuberculosis infection	4	12.5 %
Colloid cyst	1	3.1 %
Vascular malformation	2	6.2 %
Total	32	100 %

Table 1. Non Neoplastic Lesions

In the present study among 32 cases of non - neoplastic lesions, epidermoid cysts were most common followed by cerebellar abscess.

Type of Lesion	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	Total
Epidermoid cysts	-	1	2	3	4	-	1	-	11
Cerebellar abscess	1	-	1	2	1	2	1	1	9
Tuberculosis	2	1	-	1	-	-	-	-	4
Arachnoid cyst	2	1	-	-	1	-	1	-	5
Colloid cyst	-	-	1	-	-	-	-	-	1
Vascular malformation	-	-	1	-	-	1	-	-	2
Total	5 (16 %)	3 (9 %)	5 (16 %)	6 (19 %)	6 (19 %)	3 (9 %)	3 (9 %)	1 (3 %)	32

Table 2. Age (in Years) Distribution in Non-Neoplastic Lesions

In the present study according to age wise distribution, maximum number of cases were in the age groups of 31 - 50 years. Least cases were noted in 71 - 80 years.

Type of Lesion	Male	Female	Total
Epidermoid cyst	5	6	11
Cerebellar abscess	4	5	9
Tuberculosis	4	-	4
Arachnoid cyst	4	1	5
Colloid cyst	-	1	1
Vascular malformation	1	1	2
Total	18 (56.2 %)	14 (43.3 %)	32 (99.9 %)

Table 3. Distribution of Non-Neoplastic Lesions in Males and Females

In the present study, among non-neoplastic lesions, slight male preponderance was observed. Tuberculous lesions accounted for 12.5 % cases.

Predominant Clinical Presentation	Frequency	Percent (%)
Headache	16	50 %
Fever	4	12.5 %
Vomiting	6	18.7 %
Cerebellar signs	2	6.2 %
Nerve palsy	1	3.1 %
Visual disturbance	3	9.3 %
Total	32	100 %

Table 4. Clinical Symptoms at the Time of Presentation

Most of the patients had mixture of above complaints. However, the most common clinical presentation was headache followed by vomiting.

DISCUSSION

In the present study, a total of 140 cases of posterior cranial fossa lesions were noted of which 32 (22.8 %) cases were

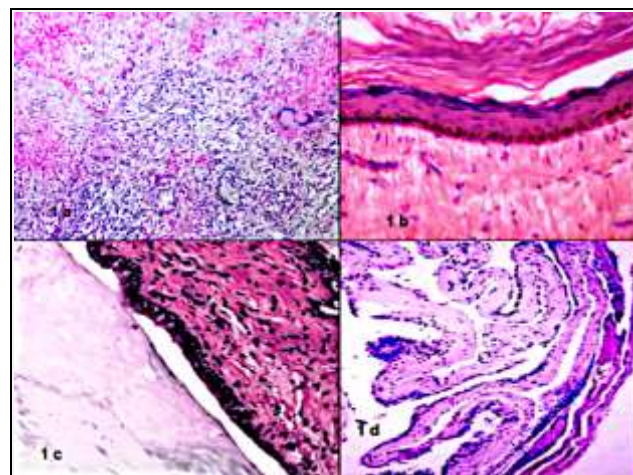


Figure 1. 1a. Tuberculous Infection with Caseous Necrosis and Langhans Type of Giant Cells, H & E 100X. 1b. Epidermoid Cyst Filled with Keratin Material and Lined by Stratified Squamous Epithelium, H & E 400X. 1c. Colloid Cyst Lined by Columnar Epithelium, H & E 400X. 1d. Arachnoid Cyst Lined by Flattened Epithelium, H & E 100X

non - neoplastic lesions and remaining were benign and malignant tumours.

In the present study, according to age distribution, maximum number of cases i.e. 19 % (6 / 32) were in the age group 31 - 40 and 41 - 50 years. The peak age was between 2nd and 4th decades and this observation is similar to the study by Darryl et al.¹⁶ Rehman et al¹ also in a similar study reported 38 / 62 cases i.e. 61.29 % cases as being in the adult age group.

Slight male preponderance was observed in our study with a male to female ratio of 1.2 : 1. Rehman et al¹ in their study observed male preponderance and the male to female ratio was 2.2 : 1, with 43 males (69.35 %) and the remaining 19 (30.65 %) females.

Among all the non-neoplastic lesions, Epidermoid cyst was the most common lesion i.e. 11 / 32 (34.3 %) cases. Female preponderance was observed, with male: female ratio of 1 : 1.2. The most common site was cerebellopontine angle and these findings are similar to those of Meena et al.¹⁷

Cerebellar abscess was second common lesion among the non-neoplastic lesions. The peak incidence was observed between 3rd - 5th decades and similar finding was observed by Shaw et al.¹⁸ Female preponderance was observed in the present study but Shaw et al¹⁸ have recorded male preponderance. Cerebellum was most common site for abscess formation, and this was also observed by Shaw et al.¹⁸

In the present study there were five Arachnoid cysts and this constituted 28.1 % of non - neoplastic lesions. Male preponderance was observed and cerebellum was the most common site followed by cerebellopontine angle. Meena et al¹⁷ observed CP angle as the predominant site for Arachnoid cyst followed by other locations. Figure 4 depicts Arachnoid cyst lined by arachnoid cells.

One Colloid cyst and two vascular malformations were also recorded among the non - neoplastic lesions. The colloid cyst was in the 4th ventricle and the patient was female in 2nd decade. Meena et al¹⁷ found four cases of colloid cysts and all of them were in the third ventricle.

Four (12.5 %) cases of Tuberculosis infection were recorded in the present study and the peak incidence was observed between 0 - 10 years of age group. All these cases of tuberculous infection were observed in cerebellum. Male preponderance was observed in Tuberculosis infection.

CONCLUSIONS

The non-neoplastic lesions of posterior cranial fossa have a wide spectrum of histopathology and histogenesis. They are more common in the third and fourth decades of life with slight male preponderance. Among the non-neoplastic lesions, the most common are epidermoid cysts followed by cerebellar abscess. Tuberculous lesions are also common in the posterior cranial fossa.

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