

HISTOPATHOLOGICAL SPECTRUM OF INTRACRANIAL NON-NEOPLASTIC CYSTS- STUDY IN A TERTIARY HOSPITAL

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ABSTRACT

BACKGROUND

Cysts of the Central Nervous System (CNS) are usually benign. Often, these cysts are discovered incidentally during routine radiological examination or at autopsy. They become symptomatic either because of pressure, rupture or secondary inflammation.

The aim of the study is to-

1. Assess the nature and frequency of various non-neoplastic cystic lesions in relation to the age and sex distribution.
2. Study the various histological patterns.

MATERIALS AND METHODS

Period of study was from January 2010 to July 2015. A total of 50 cases were studied. The specimens were fixed in 10% formalin, routine tissue processing was done with paraffin-embedded sections and H and E staining was done.

RESULTS

In the present study, a total of 50 cysts of the central nervous system were diagnosed. Epidermoid cysts formed the major group among all the cysts with a frequency of 34% followed by colloid cysts (32%), arachnoid cysts (20%), dermoid cysts (6%) Rathke's cleft cyst (4%), gliopendymal cyst and hydatid cyst (2%) each.

CONCLUSION

Epidermoid cysts were the most common non-neoplastic cysts, which showed male preponderance. Second most common were the colloid cysts, which showed slight female preponderance. Arachnoid cysts showed equal sex predilection.

KEYWORDS

Cysts, Clinical Features, Histopathology, Intracranial, Non-Neoplastic.

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BACKGROUND

Cysts of the Central Nervous System (CNS) are uncommon and usually benign. In many cases, these cysts can present clinically as space occupying lesions of the CNS. The cysts can arise from defects entirely within the nervous system and maybe static (cysts arising in infarcts) or progressive (arachnoid cysts, ependymal cysts, etc.) They can also arise as a result of non-nervous tissue intruding into the neuraxis (epidermoid, dermoid, Rathke's cleft and colloid cysts). This latter group is congenital and the cysts usually expand and might ultimately become symptomatic early, although some

may become symptomatic in adult life.¹ The age, site, cyst wall and cyst contents provide an insight into their histogenesis and embryology. They are usually maldevelopmental and malignant transformation of the lining epithelium is extremely rare.²

Aim and Objectives

1. To assess the nature and frequency of various non-neoplastic cystic lesions in relation to the age and sex distribution.
2. To study the various histological patterns.

MATERIALS AND METHODS

The cysts of CNS diagnosed between January 2010 and July 2015 from the records of pathology of our institute were reviewed. A total of 50 cases were studied. The specimens were fixed in 10% formalin with routine tissue processing, paraffin embedding and H and E staining.

Cystic degeneration in tumours and inflammations were excluded from the study.

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The age, site, cyst wall lining and nature of cyst contents were noted in all cases. These included epidermoid and dermoid cysts of brain, colloid cysts of third ventricle, arachnoid cysts, Rathke’s cleft cysts, a gliependymal cyst and a hydatid cyst.

RESULTS

In the present study, a total of 50 cysts of the central nervous system were diagnosed. Epidermoid cysts formed the major group among all the cysts with a frequency of 34%, followed by colloid cysts (32%), arachnoid cysts (20%), dermoid cysts (6%) Rathke’s cleft cyst (4%), gliependymal cyst and hydatid cyst (2%) each (Table 1). Gender incidence is shown in Table 2; mean age incidence in Table 3; and location incidence in Table 4.

Sl. No.	Histopathology Diagnosis	Number of Cases	Percentage (%)
1.	Epidermoid cyst	17	34
2.	Dermoid cyst	3	6
3.	Arachnoid cyst	10	20
4.	Colloid cyst	16	32
5.	Rathke’s cleft cyst	2	4
6.	Gliependymal cyst	1	2
7.	Hydatid cyst	1	2

Table 1. Frequency of Cases

Sl. No.	Histopathology Diagnosis	M:F
1.	Epidermoid cyst	1.42:1
2.	Dermoid cyst	0.5:1
3.	Arachnoid cyst	1:1
4.	Rathke’s cleft cyst	0:1
5.	Colloid cyst	0.77:1
6.	Gliependymal cyst	1:0
7.	Hydatid cyst	1:0

Table 2. Gender Ratio of Cases

Sl. No.	Histopathology Diagnosis	Mean Age of Incidence (Yrs.)
1.	Epidermoid cyst	37.1
2.	Dermoid cyst	22.75
3.	Arachnoid cyst	31.05
4.	Rathke’s cleft cyst	54.5
5.	Colloid cyst	21.9
6.	Gliependymal cyst	22
7.	Hydatid cyst	58

Table 3. Mean Age Incidence of Cases

Sl. No.	Histopathology Diagnosis	CP Angle	Suprasellar	Sellar	Third Ventricle	Cerebral Hemisphere
1.	Epidermoid cyst	8	4		-	5
2.	Dermoid cyst	-	-		-	3
3.	Arachnoid cyst	6	2			2
4.	Rathke’s cleft cyst			2		
5.	Colloid cyst				16	
6.	Gliependymal cyst					1
7.	Hydatid cyst					1

Table 4. Site Incidence of Cases

	Nasiruddin et al, 2015		Sundaram et al, 2001		Present Study	
Number of Cases	124		145		50	
Commonest Lesion	Epidermoid Cyst		Epidermoid Cyst		Epidermoid Cyst	
	M:F Ratio	Mean Age (yrs.)	M:F Ratio	Mean Age (yrs.)	M:F Ratio	Mean Age (yrs.)
Epidermoid cyst	1.44:1	31.1	1.09:1	28.9	1.42:1	37.1
Dermoid cyst	1:1	24.1	5:1	10.5	0.5:1	22.75
Arachnoid cyst	3:1	25.3	1.4:1	20.8	1:1	31.05
Rathke’s cleft cyst	2:1	41.2	1:1	27.5	2 females	54.5
Colloid cyst	1.5:1	30.0	1.3:1	28.0	0.77:1	21.9
Gliependymal cyst	1 male	18.0	4:1	34.0	1 male	58
Hydatid cyst	-	-	-	-	1 male	22

Table 5. Comparison of Clinical Data of Cases with Other Studies

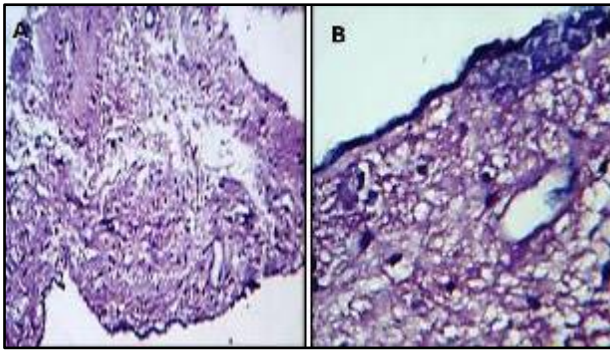


Figure 1A

Figure 1B

Figure 1A. Epidermoid Cyst Lined by Keratinised Stratified Squamous Epithelium and Lumen Containing Acellular Keratin (H and E X100)

Figure 1B. Dermoid Cyst Lined by Keratinised Stratified Squamous Epithelium with Wall Showing Skin Adnexa (H and E X400)

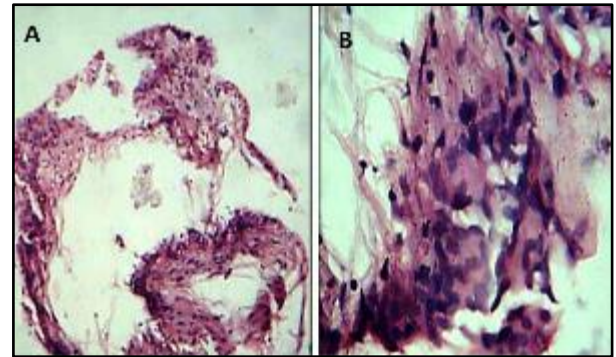


Figure 4A

Figure 4B

Figure 4A. Colloid Cyst Wall Lined by Cuboidal Epithelium and Supported by Delicate Collagenous Stroma (H and E X100)

Figure 4B. Colloid Cyst Contents Mucoid or Thin Gelatinous (H and E X400)

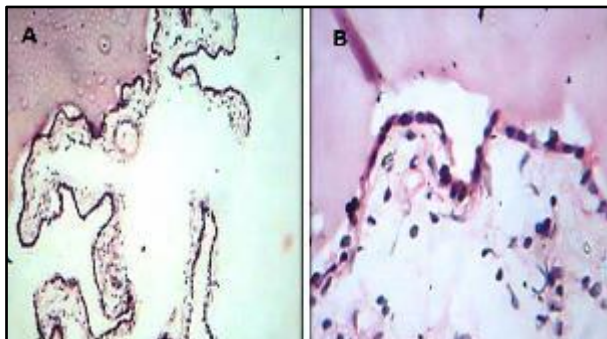


Figure 2A

Figure 2B

Figure 2A. Arachnoid Cyst Wall Lined by Flattened to Cuboidal Cells and Collagen (H and E X100)

Figure 2B. Arachnoid Cyst Wall Lined by Flattened to Cuboidal Cells (H and E X400)

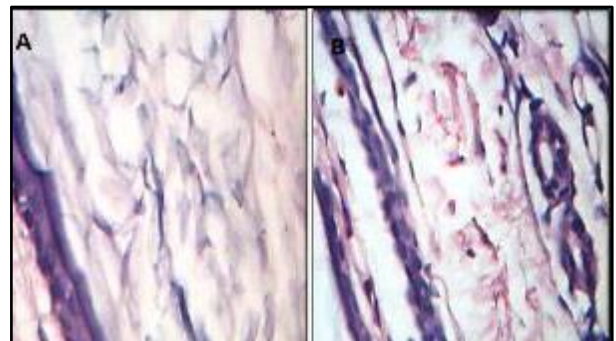


Figure 5A

Figure 5B

Figure 5A. Gliependymal Cyst Lined by Columnar Cells and Glial Cells (H and E X100)

Figure 5B. Gliependymal Cyst Lined by Columnar Cells and Glial Cells (H and E X400)

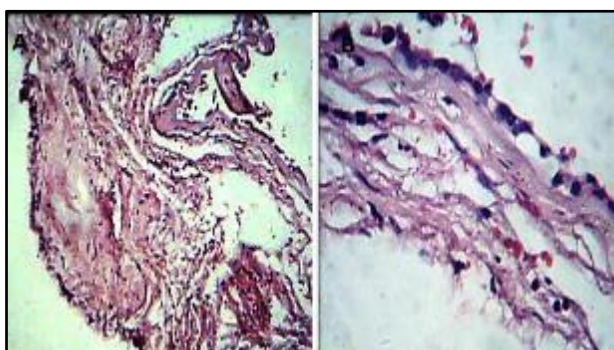


Figure 3A

Figure 3B

Figure 3A. Rathke's Cyst Lined by a Single Layer of Columnar Epithelium (H and E X100)

Figure 3B. Rathke's Cyst Lined by a Single Layer of Cuboidal Epithelium (H and E X400)

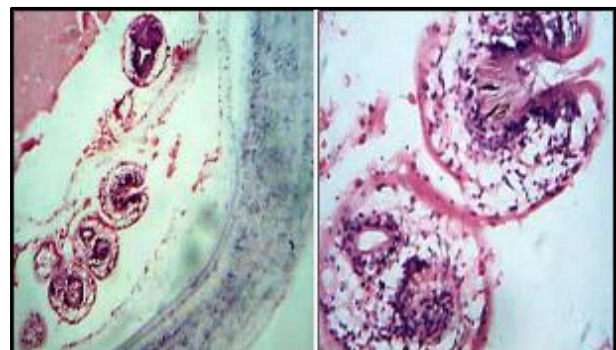


Figure 6A

Figure 6B

Figure 6A. Hydatid Cyst with Characteristic Laminated Cyst wall (H and E X100)

Figure 6B. Hydatid Cyst with Daughter Cysts (H and E X400)

DISCUSSION

Cysts of CNS are usually maldevelopmental in nature. A few are acquired. The recognition of these cysts radiologically and confirmation by pathology is essential for prognostic purposes.²

Epidermoid cysts account for 0.2 to 1.8% of all intracranial lesions and less than 1% of all intraspinal lesions.³ In our study, they constituted the majority of cases and were 34% of the cystic lesions (Table 1). This incidence was encountered in most of the other studies^{1,2} (Table 5). Further, these cysts were seen mostly in males with a mean incidence of 37.1 years (Table 2, 3). Majority of cases were located in the cerebellopontine angle (CP angle) followed by suprasellar and cerebral hemispheres (Table 4) and common presenting features were headache, seizures and weakness of lower limbs. These symptoms were similar in a study by Meena Sidhu et al.⁴ Histologically, these cysts were lined by keratinised stratified squamous epithelium and lumen-contained acellular keratin. Subepithelium showed fibrous connective tissue and was devoid of any skin appendages (Figure 1A).

Dermoid cysts formed only 6% of the cases in our series with female preponderance and a mean age of 22.75 years (Tables 2, 3) and they were all located in the cerebral hemispheres (Table 4).

The cysts were lined by keratinised stratified squamous epithelium with hair follicles, sebaceous and sweat glands in the wall of the cyst. Lumen contained keratin flakes and hair shafts (Figure 1B). Rupture was not seen in any of the cases unlike other studies where rupture with foreign body giant cell reaction was commonly noted.^{1,2,4} Dermoid cysts may also contain teeth.⁵

Arachnoid cysts were the third commonest histologic type in our series comprising 20% of all cysts (Table 1). They were also most commonly seen in middle-aged adults with a mean age of 31.05 years and were of equal incidence in males and females (Table 2).

In studies by other authors, these cysts were seen to be more common in males and seen in younger individuals as compared to our study^{1,2} (Table 5). Location wise, the common site of occurrence was in the CP angle followed by suprasellar and cerebral hemispheres. Histology showed cyst wall lined by flattened to cuboidal cells supported by collagen (Figure 2). Contents were clear fluid like CSF.

Colloid cysts of the third ventricle were the second commonest type in our series comprising 32% (Table 1). All of them were located in the third ventricle, but these cysts can also be infra or suprasellar.⁶ They were mostly seen in young adults and females were affected more than males (Table 2). Colloid cysts were also the second commonest cysts in the series by Sundaram et al.² The cyst wall was lined by cuboidal to columnar epithelium and was supported by delicate collagenous stroma. Cyst contents were mucoid or thin gelatinous (Figure 4).

Rathke's cysts are congenital lesions arising from remnants of the Rathke's pouch. They are intra- and/or suprasellar cysts with intracystic nodules.⁷ In our study, both cases were located in the sellar region (Table 4). Rathke's cleft cysts were seen exclusively in females in our study. The mean age being 54.5 years (Table 3). However, in 2 other studies by Nasiruddin et al and Sundaram et al,^{1,2} the mean age was much lower being mostly in males or with equal incidence (Table 5).

In our cases, the cysts were lined by a single cuboidal or columnar epithelium and the contents were greenish (Figure 3). The cyst content was mainly mucoid. These lesions are usually asymptomatic, but eventually can trigger symptoms due to compression of the optic chiasma, hypothalamus or pituitary gland.

There was only one case of a gliopendymal cyst, which presented with signs of increased intracranial pressure and was located in the posterior fossa. It was not in communication with ventricle or CSF spaces. The cyst was lined by columnar cells and glial cells (Figure 5).

Intracranial hydatid cysts are parasitic infections caused by the larval stage of *Echinococcus granulosus*. The cysts preferentially affect the liver, but may also involve the lungs, bone and brain. Cerebral hydatid cysts are rare, seen in only 2% of cases. Hydatid cysts are usually spherical, solitary and unilocular.⁵

One case of hydatid cyst was identified in a young male patient in the frontoparietal region and the histology showed characteristic laminated membrane and brood capsules with daughter cysts (Figure 6).

CONCLUSION

Epidermoid cyst is the most common non-neoplastic cyst, which showed male preponderance. Second most common is the colloid cyst, which showed slight female preponderance. Arachnoid cysts showed equal sex predilection.

The study included 2 cases of Rathke's cleft cysts and 1 case each of gliopendymal cyst and hydatid cyst seen in males. Majority of our findings were corresponding to cases in literature.

REFERENCES

- [1] Din NU, Arshad H, Ahmad Z, et al. Symptomatic surgically treated non-neoplastic cysts of the central nervous system: a clinicopathological study from Pakistan. *J Coll Physicians Surg Pak* 2015;25(8):588-591.
- [2] Sundaram C, Paul TR, Raju BV, et al. Cysts of the central nervous system: a clinicopathologic study of 145 cases. *Neurol India* 2001;49(3):237-242.
- [3] Russel DS, Rubinstein LJ. Pathology of the nervous system. 5th edn. Baltimore: Williams & Wilkins 1989:693-695.
- [4] Sidhu M, Suri V, Singh D, et al. Histological analysis of cystic tumor like lesions of central nervous system. *Indian J Pathol Microbiol* 2002;45:7-14.
- [5] Osborn AG, Preece MT. Intracranial cysts: radiologic-pathologic correlation and imaging approach. *Radiology* 2006;239(3):650-664.
- [6] Nomikos P, Buchfelder M, Fahlbusch R. Intra and suprasellar colloid cysts. *Pituitary* 1999;2(2):123-126.
- [7] Oprisan A, Popescu BO. Intracranial cysts: an imagery diagnostic challenge. *The Scientific World Journal Article ID 172154*, 2013;2013: p. 9. <http://dx.doi.org/10.1155/2013/172154>.