

CORRELATION OF RADIOLOGICAL AND OPERATIVE FINDING REGARDING THE CELLULARITY OF MASTOID IN CHRONIC SUPPURATIVE OTITIS MEDIA (ATTICOANTRAL DISEASE)

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ABSTRACT

BACKGROUND

Chronic Suppurative Otitis Media (CSOM) is the most prevalent disease of middle ear which is characterised by inflammation of middle ear cleft, middle ear cavity, mastoid antrum and eustachian tube in which atticoantral type of disease is life-threatening primarily due to intracranial complications of the disease. Hence, it is of utmost importance to diagnose the disease as early as possible. Radiological investigation is primarily helpful in diagnosis as well as determining the extension of the disease. X-ray mastoid is the investigation of choice at first scenario to know the disease and conditions of mastoid.

Aims and Objectives- To compare the preoperative radiological findings with intraoperative findings in patients with CSOM.

MATERIALS AND METHODS

It is a descriptive study. Fifty clinically diagnosed admitted cases of CSOM were studied in Department of Otorhinolaryngology, Gandhi Medical College and Hamidia Hospital, Bhopal from March 2015 to August 2016. Clinical investigations including blood glucose, serum electrolytes, renal function test, liver function test, bleeding and clotting time, urine examination, serological examination, pure tone audiometry and radiological investigations like x-ray were performed.

RESULTS

Mean age of the study population was 22.72 ± 11.30 years. Most of the patients (52%) belonged to age group of 15 - 25 years. Male preponderance was noted (54%). Most of the patients were having severe/ complete type of sclerosis (78%) followed by moderate type (22%). Most of the patients did not show any type of erosion (80%). Most of the patients had Cholesteatoma (52%). Radiological and surgical findings were comparable as complete sclerosis was observed by both the techniques (39 vs. 40 patients; $p > 0.05$).

CONCLUSION

X-ray mastoid can be used as primary radiological investigation until there is no clear-cut indication for CT scan.

KEYWORDS

Chronic Suppurative Otitis Media, Cholesteatoma, Mastoid Sclerosis.

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BACKGROUND

Chronic Suppurative Otitis Media (CSOM) is a long-standing inflammation of the middle ear cleft. It also implies concomitant inflammation to a greater or lesser extent of the mastoid air cell system, owing to its anatomical linkage to the middle ear. Vavassori et al highlighted that the diagnosis of CSOM implies a permanent abnormality of the pars tensa or flaccida, most likely a result of earlier acute otitis media, negative middle ear pressure or otitis media with effusion and production of pus, often from the adjacent mucosa.¹

The radiological findings of the temporal bone in patients with CSOM evaluate the extent and sites of involvement of the middle ear and mastoid air cell system and study the inter-

relationships of the tympanomastoid compartment with the adjacent, critical and important neurovascular structures.^{1,2}

Schuler described the first view to visualise pathologic lesions in the area frequently involved in chronic disease namely attic, aditus, antrum or the key area. It is thought that CSOM is usually associated with sclerosis of the mastoid, but various authors in the past while operating on atticoantral disease ear found that the mastoid air cell system may be cellular or hypocellular also. Birrell et al and Goodhill et al detected cholesteatoma in pneumatised mastoid.^{2,3}

Shea et al suggested a direct relationship between the duration of the disease and degree of pneumatisation.^{4,5} Kumar et al reported as case of 33-year-old male patient who was brought to OPD with a six month's history of foul smelling profuse otorrhoea from (L) ear and progressive hearing loss.⁶

An x-ray mastoids lateral oblique view (Laws) showed (L) mastoid to be sclerotic with evidence of bone destruction.⁶ Sethi et al evaluated the influence of presence and duration of chronic otitis media and auditory tube functional status on the pneumatisation of mastoid air cell system.⁷ Wang et al investigated the methods of preoperative diagnosis and differentiation of different pathological tissue in middle ear and mastoid and concluded that it was not reliable to

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diagnose and differentially diagnose different pathological tissue in middle ear and mastoid.⁸ Santosh et al reported that the diagnosis of cholesteatoma can be made with both otoscopic examination and radiological evaluation.⁹

A conventional plain x-ray or a CT scan provides information about congenital anatomic variations that may be encountered during surgery as well as the complications of cholesteatoma.⁹ Gyanu et al advocated using plain x-rays as the only preoperative investigation.¹⁰ Sunitha et al assessed and compared the status of pneumatization in patients with chronic suppurative otitis media by x-ray of both mastoids and reported that in diseased ears x-ray of the mastoids concluded that a well taken x-ray of mastoids provides the mastoid pneumatization status.¹¹

This type of study was not done in Central India, hence the present study was performed to compare the preoperative radiological findings with intraoperative findings in patients with CSOM.

Aims and Objectives

To compare the preoperative radiological findings with intraoperative findings in patients with CSOM.

MATERIALS AND METHODS

The present descriptive study was performed on 50 patients having atticointral disease CSOM (unilateral or bilateral) at Department of Otorhinolaryngology, Gandhi Medical College and Hamidia Hospital, Bhopal from March 2015 to August 2016.

Patients having atticointral disease CSOM (unilateral or bilateral) were included. The study was based on hospital admitted patients. Firstly, it was diagnosed on clinical examination, investigation of pus (culture sensitivity) and then undergoing examination under microscope on local anaesthesia, radiological investigation and all the routine blood investigations were done prior to surgery.

All clinical investigations such as blood glucose, serum electrolytes, renal function test, liver function test, bleeding and clotting time, urine (routine and microscopic examination), serological examination, pure tone audiometry and radiological investigation; x-ray (Owen's view/ Schuller's view) was performed.

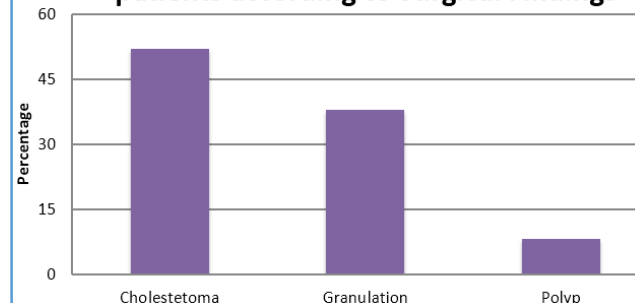
All the data was analysed using IBM SPSS Version 20 software. Frequency distribution and cross tabulation was used to prepare the table. Data was expressed as number and percentage. Chi-square test was used to compute 'p' value. P value of < 0.05 was considered as significant.

RESULTS

Mean age of the study population was 22.72 ± 11.30 years with 7 years being the minimum and 58 being the maximum age of the study cohort. Most of the patients [26 (52%)] belonged to age group of 15 - 25 years followed by 10 (20%) patients who belonged to age < 15 years. In the present study, out of 50 patients 27 (54%) were male and 23 (46%) were female with male-to-female ratio of 1.17: 1.

In the present study, most of the patients were having severe/ complete type of sclerosis [39 (78%)] followed by moderate type [11 (22%)]. In bony erosion, most of the patients did not show any type of erosion [40 (80%)]; however, most of the patients had sinus plate erosion [5(10%)].

Graph 1: Showig distribution of patients according to Surgical Findings



Surgical Finding	No. of Patients	Percentage
Complete sclerosis	32	64
Complete sclerosis with bony erosion	7	14
Partial sclerosis	11	22

Table 1. Distribution of Patients according to Sclerosis of Mastoid

Parameters		Radiological Finding	Surgical Finding	P value
Sclerosis	Complete	39	40	NS
	Partial/ Diploic	11	10	NS
	Well Pneumatisation	0	0	NS
Bony Erosion	Yes	10	7	NS
	No	40	43	NS

Table 2. Comparison between Radiological and Surgical Finding

Data is expressed as no. of patients, NS; not significant, p value < 0.05 is considered as significant. P value is computed using chi-square test.

DISCUSSION

CSOM causes recurrent or persistent discharge (otorrhoea) through a perforation in the tympanic membrane and can lead to thickening of the middle ear mucosa and mucosal polyps. It usually occurs as a complication of persistent acute otitis media with perforation in childhood.¹²

CSOM is a common cause of hearing impairment, disability and poor scholastic performance. Occasionally, it can lead to fatal intracranial infections and acute mastoiditis, especially in developing countries.¹² In atticointral type of disease, primary aim of surgery is eradication of disease. Removal of cholesteatoma from pneumatized mastoid is rather difficult. The surgeon must be careful to remove cells thoroughly, otherwise cholesteatoma pocket may be left behind and can cause problem.

Sunitha et al¹¹ performed a similar study on 45 patients presenting with CSOM and reported female predominance and most common age group being 20 - 25 years, whereas in the present study mean age of the study cohort was 22.72 ± 11.30 years with male preponderance (54%). The most common age group was 15 - 25 years, which is in accordance to Sunitha et al.¹¹ Rai et al in a similar study reported that the youngest patient was 5 years and the eldest was 56 years and 40% patients were between 21 and 30 years.¹³ The mean age (26.88 years) reported by Rai et al is almost similar to the present study. In a similar study by

Gyanu et al also reported male predominance, which is in agreement with the present study.¹⁰

The hallmarks of cholesteatoma are the presence of soft tissue density in the middle ear cavity, ossicular erosions, smooth erosions of the middle ear borders and adjacent structures. These changes when associated with bony expansion of the middle ear cavity are highly suggestive of cholesteatoma.

Sunita et al¹¹ studied the importance of pre-operative HRCT temporal bone in CSOM and reported that on x-ray mastoids pneumatization was seen in 30%, diploic in 8%, sclerosed mastoid in 54% and cavity in 8% of the cases, whereas unlike Sunita et al in the present study 88% were observed to have severe type of sclerosis and partial pneumatization was observed only in 12% patients only.

A study done by Rai et al assessed radiological findings in CSOM, its involvement in middle ear and adjacent structure and reported that mastoid was found to be well-pneumatized in 44%, sclerotic in 50% and diploic in 6% on x-ray mastoid Schuller's view as well as intra-operatively. But in the present study, 78% were observed to have severe type of sclerosis and partial pneumatization was observed in 22% patients only.¹³

Payal et al studied computed tomography in CSOM and reported that the most common surgical finding was cholesteatoma (53.33%) followed by 26.67% patients who had granulation without any evidence of cholesteatoma, whereas 16.67% had cholesteatoma along with granulations.¹⁴ The present study is in accordance with the study done by Payal et al where cholesteatoma was observed in 60% patients, 32% patients had granulation without any sign of cholesteatoma and 8% patients had cholesteatoma with granulation. In the present study, most of the patients were having severe/ complete type of sclerosis (80%) followed by moderate type (20%). In bony erosion, most of the patients did not show any type of erosion (80%); however, most of the patients had sinus plate erosion (10%). Similar results were depicted by the study done by Payal et al.¹⁴ Study done by Rai T¹³ reported that ossicular erosion was seen in 87% cases with cholesteatoma, which is less than that seen by Gaurano et al¹⁵ who found it in 92% cases. Results shown by Goodhill are also in accordance with the present study.³

CSOM can be at times life-threatening and warrants that all Otolaryngologist surgeons be familiar with the standard approach to these patients.

CONCLUSION

A conventional plain x-ray provides information about congenital anatomical variations that may be encountered during surgery as well as the complications of cholesteatoma. This study concludes that x-ray mastoid (Schuller's view) done by expert hand with good technical give sufficient information including complication of CSOM (atticoantral disease). CT scan can be avoided until there is no clear indication of computed tomography. CT scan can be recommended only in cases suspected with potential complications, which should alert the clinician and guide in

surgical approach and treatment plan. A skillful, aware and alert surgeon still remains the key to successful diagnosis and surgical treatment of CSOM (Atticoantral disease).

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