



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2015; 1(10): 235-240
www.allresearchjournal.com
Received: 17-07-2015
Accepted: 18-08-2015

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Original Research Article-Chronic suppurative otitis media- A Clinicopathological study at a tertiary Care Hospital

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Abstract

AIM: To study the aetiological risk factors and clinical features of chronic suppurative otitis media. To study morbidity and mortality associated with chronic suppurative otitis media.

Material and Methods: The study was conducted on 94 patients of CSOM attending O.P.D of Department of Otorhinolaryngology, Gajra Raja Medical College and associated J.A. Group of Hospitals, Gwalior (M.P.) from August 2009 to October 2010. It was prospective tertiary hospital based study.

Results: In the present study males predominated M:F::1.4:1. Most of cases were in age group 11-20 years. Maximum patients were of lower socio-economic class (39.4%). Most common symptom observed other than ear discharge was hearing loss amounts for 91.8%. The average disease duration before presentation was 8.24 years. Recurrent attack of acute otitis media is by far most common etiological risk factor with presence in 67 (71.3) of cases. Increased financial burden is the most common morbidity 26 (27.6%). Perforations involving pars tensa were more, in that 50 (40.7%) were medium sized. 73 (59.3%) ears had safe verity of CSOM and 50 (40.7%) ears were unsafe. Deviated nasal septum was most common finding in 56 (59.6%) cases, the most common predisposing factors in nose and throat. 16.96 (78%) ears have conductive hearing loss. Majority of cases 54 (43.9%) have moderate amount of hearing loss we found a statistically significant association between duration of disease and sensorineural component in hearing loss. We found a statistically significant association between severity of hearing loss and size of perforation. Abscess related to mastoid is the most common complication accounts for 14 (66.6%) of total complications.

Conclusion: In the present study we conclude that chronic suppurative otitis media still prevalent in people of low socioeconomic strata. Recurrent attacks of acute otitis media being most common etiological risk factor, the poor living state enhance these factors. Chronic otitis media is an important cause of morbidity

Keywords: CSOM, Etiology, Safe CSOM, Unsafe CSOM

1. Introduction

It is a surprising feel that although mankind has suffered from infection of the middle ear at least since the day of Rhodesian Man and that it is such a common disease, still its aetiological factors are by no means clear. Though considerable knowledge of anatomy of the ear had been acquired already in the 17th century and Valsalva & Contugno had early established an anatomical basis for some of its diseases systematized knowledge of structure and function of the organ in health and disease is still scanty.

Chronic SOM is still major causes of acquired hearing impairment in children especially in developing countries.

The global burden of illness from CSOM involves 65-330 million individuals with draining ear. 60% of whom 39-700 million suffer from significant hearing impairment. CSOM accounts for 28000 deaths and a disease burden of over 2 million daily. Over 90% of the burden is borne by countries in the South-east Asia and western pacific region.

Chronic suppurative otitis media ranges from a relatively benign condition to a cause of death. In most cases it is painless otorrhoea only when an upper respiratory tract infection occurs. The effect on hearing is variable; the hearing loss is often slight even though both ears are affected. It may be accepted that the longer the ear discharge persists the worse the

Hearing gets and in some cases the deafness may be profound. The number of cases therefore, suffer little more than the annoyance of running ears, the group as a whole are handicapped for various occupation. They may have subnormal health, headache giddiness and deafness and continued presence of pus, which is often offensive is distressing. Hence this study was conducted to establish clinicopathological factors for CSOM over the period 14 months.

2. Material and Methods

The study was conducted on 94 patients with 123ears of CSOM attending O.P.D of Department of Otorhinolaryngology, Gajra Raja Medical College and associated J.A. Group of Hospitals, Gwalior (M.P.) from August 2009 to October 2010. Patients selected on the basis of criteria, 1. Patients having discharge for more than 3 months. 2. Patients not received antibiotics for past 5 days. 3. Patient not underwent any surgical treatment for CSOM. Patients of all the age, sex, religion and different socioeconomic status were selected. Detailed history regarding the illness was taken then clinical examination was carried out on the patient in a systemic manner, otoscopic examination, Tuning fork test and pure tone audiometry was done. All the findings are noted in proforma.

Results and Discussion Tables

Table 1: Age Distribution

| Age in Years | Number of cases | Percentage of cases |
|--------------|-----------------|---------------------|
| 1-10 | 8 | 8.5 |
| 11 – 20 | 39 | 41.4 |
| 21 – 30 | 29 | 30.8 |
| 31 – 40 | 8 | 8.5 |
| 41 – 50 | 2 | 2.2 |
| 51 – 60 | 4 | 4.4 |
| 61 – 70 | 3 | 3.1 |
| 71 – 80 | 1 | 1.1 |
| Total | 94 | 100 |

Table 2: Occupation wise Distribution

| Occupation | Number of cases | Percentage of cases |
|---------------|-----------------|---------------------|
| Student | 42 | 44.6 |
| Manual Labour | 13 | 13.8 |
| Farmer | 11 | 11.7 |
| Businessman | 10 | 10.6 |
| House wife | 9 | 9.5 |
| Office worker | 5 | 5.4 |
| Unemployed | 2 | 2.2 |
| Police | 2 | 2.2 |
| Total | 94 | 100 |

Table 3: Socioeconomic Status

| Class | Number of Cases | Percentage |
|--------------------|-----------------|------------|
| Upper(I) | 3 | 3.2 |
| Upper Middle (II) | 12 | 12.8 |
| Lower Middle (III) | 26 | 27.6 |
| Upper Lower (IV) | 37 | 39.4 |
| Lower (V) | 16 | 17 |
| Total | 94 | 100 |

Table 4: Distribution of Symptoms

| Symptoms | Number Of ears | Percentage |
|-------------------------|----------------|------------|
| Ear discharge | 123 | 100 |
| Hearing loss | 113 | 91.8 |
| Ear ache | 45 | 36.5 |
| Tinnitus | 29 | 23.5 |
| Swelling around the Ear | 15 | 12.2 |
| Head ache | 11 | 8.9 |
| Fever | 10 | 8.1 |
| Vomiting | 9 | 7.3 |
| Itching | 7 | 5.6 |
| Vertigo | 7 | 5.6 |
| Convulsion | 3 | 2.4 |
| Facial weakness | 2 | 1.6 |

Table 5: Duration of disease

| Duration | No. of ears | Percentage |
|------------|-------------|------------|
| < 1years | 12 | 9.7 |
| 1-5 Years | 25 | 20.3 |
| 6-10 Years | 28 | 22.8 |
| >10 years | 58 | 47.2 |
| Total | 123 | 100 |

Table 6: Risk factors associated with CSOM

| Risk Factor | No. of Cases | Percentage |
|--------------------|---------------------|-------------------|
| Recurrent AOM | 67 | 71.3 |
| Over crowding | 54 | 57.4 |
| Low social status | 53 | 56.3 |
| Recurrent URTI | 48 | 51.1 |
| Indoor cooking | 42 | 44.7 |
| Malnutrition | 35 | 37.2 |
| Allergy | 17 | 18.1 |

Table 7: Morbidity associated with CSOM

| Morbidity | Number of cases | Percentage |
|------------------------------------|------------------------|-------------------|
| Increased financial burden | 26 | 27.6 |
| Decreased school performance | 23 | 24.5 |
| Could not take part sport activity | 15 | 15.9 |
| Could not attend social functions | 12 | 12.7 |
| Could not go to work | 8 | 8.6 |
| Affect daily activity | 6 | 6.4 |
| No Morbidity | 4 | 4.3 |
| Total | 94 | 100 |

Table 8: Examination Findings of Ear

| Findings | No. Of Ears | Percentage (%) |
|------------------------------|--------------------|-----------------------|
| Discharge | | |
| Mucopurulent | 63 | 51.3 |
| Purulent | 45 | 36.5 |
| Mucoid | 15 | 12.2 |
| Foul smelling | 38 | 30.8 |
| Blood mixed | 17 | 13.8 |
| Perforation | | |
| Small | 36 | 29.3 |
| Medium | 50 | 40.7 |
| Large | 19 | 15.4 |
| Subtotal | 5 | 4 |
| Attic | 13 | 10.6 |
| Others | | |
| Mastoid tenderness | 15 | 12.2 |
| Swelling around the ear | 14 | 11.4 |
| Granulation tissue | 12 | 9.8 |
| Polyp | 8 | 6.5 |
| Posterior canal wall sagging | 3 | 2.4 |
| Facial N. Palsy | 2 | 1.6 |

Table 9: Predisposing factor in Nose and Throat

| Factors | No. Of cases | Percentage |
|--------------------------|---------------------|-------------------|
| Deviated nasal septum | 56 | 59.6 |
| Hypertrophied turbinates | 33 | 35.1 |
| Enlarged Tonsils | 8 | 8.5 |
| Adenoid Hypertrophy | 3 | 3.1 |

Table 10: Complications associated with CSOM

| Intra cranial | Number of Cases | Percentage |
|--|-----------------|------------|
| Meningitis | 2 | 9.5 |
| Sigmoid sinus thrombosis/abscess | 1 | 4.7 |
| Brain Abscess | 1 | 4.7 |
| Extra cranial | | |
| Mastoid complication | 11 | 52.5 |
| Neck Abscess | 1 | 4.7 |
| Facial N. Palsy | 1 | 4.7 |
| Multiple complications | | |
| Sigmoid sinus thrombosis/abscess+ Mastoid complication | 2 | 9.5 |
| Meningitis + Facial N. Palsy | 1 | 4.7 |
| Meningitis + Mastoid complication | 1 | 4.7 |
| Total | 21 | 100 |

Table 11: Relationship between unsafe ear with the complication

| | Complication | |
|--------|--------------|----|
| | Yes | No |
| Unsafe | 13 | 37 |
| Safe | 8 | 65 |

Age-In this study Majority of the patient were in the age group 11 to 20 years 39 (41.4%) irrespective of sex. There after a decline in the incidence in relation to age was observed. In 21 to 30 years age group there were 29 (30.8%), in 31 to 40 years it is 8 (8.5%).

The mean age of presentation is 38 years. Aberg¹ reported a mean age of 41 years. Vartiainen² a mean age of 38 years, Alho³ a mean age of 42 years, Maharjan M⁴ reported a mean age of 34 years.

The reason for highest incidence of patients in 10 to 20 years of age group may be due to multiple reasons like low resistance or increased awareness in young patients about disease, seek treatment before joining jobs or accessibility to hospital is more easier for this group of patients come to the hospitals.

In present of study the sex incidence among the cases was males 59.5% and females 40.5%. Making a male & female ratio of 1.4:1, there was no significant difference between both sex group.

Study conducted in Singapore⁵, Pakistan⁶, Iran and other parts of India⁷ gave the similar results.

In the present series study maximum i.e. 42(44.6%) cases were students, followed by manual labours 13 (13.8%) in second, followed by farmers 11(11.7%) in third position.

The majority of cases were students. The probable reason may be the education play a significant role in taking medical advice. Also higher incidence among farmers and manual labourer reflects low socioeconomic status plays role in middle ear infections.

In the present study maximum number i.e. 37(39.4%) belong to upper lower socio-economic class. Followed by lower middle class 26(27.6%). Lower class 16(17%) socio-economic status was the only risk factor which showed a statistically significant association with development of

CSOM. This is similar to reports from Britain, Nigeria⁸, Pakistan⁶, USA and Southern part of India³¹ of greater severity of CSOM in people from lower social classes with less formal education and parents who are unemployed. The contribution of low socio-economic status to increased severity of CSOM might be multi factorial. Families of a lower social class often have more children and live in more congested homes with poor sanitation and hygiene, all of which create environmental conditions conducive to transmission of infectious agents. In addition malnutrition, which commonly accompanies low socio-economic status, suppresses the immune system and places poor children at greater risk of disease.

In the present study most common symptom observed other than ear discharge was hearing loss amounts 113(91.8%). Next common symptom is ear ache 45(36.5%). 29(23.5%) patient complained of tinnitus. 30(24%) patient had more than two symptoms.

Since we have considered discharging ear for our study it was common in all cases (100%). Sheahan P. *et al.* (2001)^[9] reports hearing loss as most common symptom (78%).

In this study 65(69%) cases disease was unilateral and 29(31%) bilateral. In this study we did not find any significant predominance of one ear, both left and right ears were almost equally affected.

Study done by Akinpelu OV *et al.* (2007)^[10] and Maharjan M. *et al.* (2009)^[4] have similar results.

In the present study maximum number of ears 58(47.2%) had disease for more than 10 years. The average ear disease duration at presentation was 8.24 years. Range, 6 months to 18years.

Study by Vikram BK *et al.* (2007)^[7] shown the average ear disease duration at presentation 7.74 years.

Recurrent attack of acute otitis media is by far most common with 67(71.3) of cases. Other risk factors like overcrowding (57.4%), Low socio economic status (54.3%) present in many of the cases. These data shows multifactorial aetiology of CSOM. Study done by Lasisi AO (2007)^[11] and Daly KA *et al.* (1997)^[12] showed similar positive relationship between various risk factors and CSOM.

Hearing loss is the most common morbidity in present study.

Increased financial burden comes next 26 (27.6%) in the morbidity. Followed by decrease in school performance in 23(24.5%) of cases. Only 4 (4.3%) cases did not have any morbidity issues.

Hearing loss makes difficulty in their job of most patients. In students it disturbs their school performance. They were avoiding take part in sports activity, especially water sports. Many young adults are declared unfit for their job due to CSOM. Increased financial burden make these patient of low socioeconomic strata push further down in their financial condition.

In the present study we did not find any mortality. Mortality in CSOM is largely due inadequately treated intracranial complications. A study by A. Mustafa *et al.* (2008)^[13] reported a mortality rate of 3.3% among the patients with complications. U.Osma *et al.* (2000)^[14] reported a mortality rate of 26.3% among patients with intracranial complications. SP. Dubey *et al.* (2010)^[15] reported a mortality rate of 31.2%. The no mortality rate in our study is due to efficient treatment of complication under the supervision of neurosurgeon and neurophysician as our institute has super speciality in these two branches. Also may be due to small group consisting of complication.

Discharge was mucopurulent in 63 (51.2%) of the ears. Other findings mastoid tenderness was present in 15(12.2%) of cases. Swelling was present in 14 (11.4%) cases. Granulations tissue were noted in the 12 (9.8%) of cases. Polyp was seen in 8 (6.5%) ears. Granulations tissue were identified as independent risk factor in the study, it appeared that their simultaneous existence in the same ear compounded the risk of developing complication. This effect might be due to facilitating bone eroding effects.

Diagnostic examination of nose and throat was performed. Deviated nasal septum was most common finding with 56 (59.6%) cases. Also other actors like adenoids and enlarged tonsils were noted in 3 (3.1%), 8(8.5%) respectively. The contributing disease focus in the nose and throat was found most commonly in uncomplicated cases and with safe type of perforations. Study by Vikram BK *et al.* (2007)^[7] showed similar results.

In the present study 96(78%) ears have pure conductive hearing loss. 26(21.1%) had mixed hearing loss.

Study done by Maharjan M. *et al.* (2009)^[4] showed conductive hearing loss in 87%, Mixed in 10% of cases. Vikram B.K.*et al.* (2007)^[7] found 93.1% pure 93 conductive hearing loss. Lassi A.O *et al.* (2007)^[11] found conductive in 82% of cases.

We found a statistically significant association between duration of disease and sensorineural hearing loss. Signify there is a increased sensorineural component with increase in duration of disease. (Fisher Exact Probability Test $p=0.03316$) On calculation of relative risk 2.08 and odds ratio 2.533 showed an increased risk among cases with longer duration of disease to have mixed hearing loss.

The sequelae of CSOM, such as fibrosis of the middle ear, ossicular erosion, ankylosis of the ossicular joints and

labyrinthitis owing to diffusion of toxins and bacterial breakdown products have been reported to cause deafness in these patients. Clinical and histopathological evidence has linked SHL in CSOM to entry of toxic materials through the round window membrane into the inner ear, leading to biochemical alteration of the inner-ear fluids, serofibrinous precipitates and inflammatory cells in the scala tympani, all of which result in gradual end-organ dysfunction and accentuated threshold shift. Similar to other reports, the mean duration of CSOM is greater in patients with SHL, suggesting that the severity of hearing loss may be associated with increasing duration of the disease, although the association between duration of disease and degree of SHL has not been confirmed by all.

Majority of cases 54(43.9%) have moderate amount of hearing loss. 29(23.6%) have mild hearing loss. Moderately severe in 25 (20.4%) cases, severe in 11(8.9%) cases.

Lassi A.O *et al.* (2007)^[11] study showed mild in 37% and 53% were of normal hearing. Maharjan M. *et al.* (2009)^[4] showed more than 26% with mild degree of hearing loss, moderate amount of hearing loss in 52% of cases.

We found a statistically significant association between severity of hearing loss and size of perforation. (Chi-Square test applied, $P<0.05$)

In the present study 21 (22.34%) patient had complication due to CSOM. In that 4(19%) had exclusive intracranial complication, 13 (62%) had exclusive extra cranial complications 4(19%) had both. Study by Siba. P. *et al.* (2007)^[16] showed 56% had exclusive extra cranial complication, 11% had intra cranial complications. But study done by Ustun Osma MD *et al.* (2000)^[14] showed higher percentage of intra cranial complication (61%) compared to extra cranial complication (41%).

We found an increased risk among the unsafe ear to have complication related CSOM. Relative risk 2.38 and Odds ratio 2.854 (Fisher's exact test, $p=0.0273$).

Abscess related to mastoid is the most common complication accounts for 14(66.6%) of total complications, 84.6% of extra cranial complication. Ustun Osma MD *et al.* (2000)^[14] showed mastoid abscess 64% of extracranial complications. The development of subperiosteal abscess with or without fistula leads to reduction of pressure of pus within the middle ear cleft, which in turn reduces the chances of infection spreading intracranially. The mastoid antrum is shallower in younger people. It reaches adult thickness by the age of 16 years. Consequently, we found younger patients frequently develop mastoid abscess and postaural fistula than intracranial complications.

Although only 9.5% of patients in our series had otitic facial palsy, its incidence is variable. Facial nerve palsy as a result of chronic otitis media is associated with dehiscence or destruction of the bony facial canal by cholesteatoma. Various explanations were given as to the exact cause of it. Kangsanarak *et al.*^[17] found facial palsy as the most common complication in 0.26%. Savic and Djeric^[18] and Altuntas *et al.*^[19]. Reported facial palsy incidence as 5.1%

and 1.7% respectively.

Meningitis is the most common intracranial complication in our study. It is 19% of overall complication and 50% of intracranial complications. Siba.P. *et al.* (2007) ^[16] reported otitic meningitis in 20% of the complications. Headache, neck stiffness, and fever are the most important clinical features of otitic meningitis. Otitic meningitis is often associated with other intracranial complications. Therefore, computed tomography scan is necessary to rule out other intracranial complications.

In the study 4(18%) of the patient had multiple complications due to CSOM. Study done by Mustafa A. *et al.* (2008) ^[13] showed multiple complications in 11% of total complications. The combination of sigmoid sinus abscess and mastoid abscess one of the most often occurred complication.

3. Conclusions

In the present study we conclude that chronic suppurative otitis media still prevalent in people of low socioeconomic strata. Recurrent attacks of acute otitis media being most common etiological risk factor, the poor living state enhance these factors. Chronic otitis media is an important cause of morbidity in very large group of Indian population in the form of preventable hearing loss. This morbidity is severe as duration of disease progresses. Student with CSOM are facing learning difficulties due to deafness, which affect their education resulting in increased burden over country. Abscess related to mastoid is still the most common complication of CSOM followed by intracranial complications. These complications were more in patients with unsafe perforations. These complication mandates close cooperation between ENT surgeons and neurosurgeons.

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