

EMERGENCY MANAGEMENT OF OTOGENIC INTRACRANIAL ABSCESES IN ENT SETUP

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ABSTRACT

Objective: To evaluate the demographic features, clinical presentation, site of abscess and bacterial isolates in patients with otogenic intracranial abscess and to assess the outcome of emergency treatment of these cases.

Material and Methods: This study was conducted in the department of ENT and Head & Neck Surgery, Khyber Teaching Hospital, Peshawar from January 2005 to December 2010. A total of 42 diagnosed cases of otogenic intracranial abscess admitted to the ENT department were included in the study.

Results: Out of 42 patients 29 (69%) were male and 13 (31%) female, the age range was from 04 to 50 years. More of the patients belonged to rural areas. Majority of the patients had purulent, foul smelling and scanty discharge, associated with earache, headache and vomiting. Attic or posterior marginal perforation, cholesteatoma or granulation or cholesteatoma and granulation both were the commonest otological examination findings. General physical and neurological examination revealed that more than half of the cases had bradycardia and subnormal body temperature, a few had neck rigidity, staggering gait, unconsciousness and almost 40% of them had developed papilloedema. Lab investigation showed low haemoglobin concentration in blood in many cases and raised ESR in 10 (23%) cases. Only 24 (57%) cultures gave pathogenic growths. The commonest pathogen was *Proteus*, *E. coli* and *Pseudomonas*. Regarding the site of abscess, extradural was the commonest followed by cerebellar and temporal. Subdural was the least common.

Conclusion: The complications of Chronic Suppurative Otitis media may occur in either sex and at any age. Any patient presenting with scanty, purulent and foul smelling discharging ear associated with earache, headache, vomiting and nystagmus should be suspected of intracranial abscess of otogenic origin. These cases should be considered serious emergency and immediate emergency measures should be taken.

Key Words: Intracranial, Abscess, Otogenic, Brain, Suppurative, Otitis Media, Cholesteatoma, Emergency.

INTRODUCTION

Otogenic Intracranial Abscess (OIA) is the gravest complication of chronic suppurative otitis media. It is a major cause of morbidity and mortality in otolaryngological practice worldwide¹. The incidence is higher in underdeveloped world representing more than 8% of the cases of all intracranial space occupying lesions². The prevalence of otitis media in South Asia is 15-20% and 5-10% of these patients present with intra-cranial complications¹. The site of Otogenic Intracranial Abscess (OIA) include extradural, cerebellum, cerebrum and subdural.

Since the advent of antibiotic therapy it is rarely seen in acute suppurative otitis media. Majority of the cases are seen as a complication of chronic suppurative otitis media with cholesteatoma³. In

otogenic intracranial abscess infectious agents gain access intracranially by spreading from suppurative otitis media either directly by erosion or by an emissary vein⁴. Acute exacerbations in chronic suppurative otitis media (CSOM) usually lead to a rapid intra-cranial extension of the disease⁵. Otogenic abscess is usually solitary and is located superficially⁶. Sir William McEwen was the first who in 1893 realized the problem of otogenic intracranial abscess formation and described his mastoid approach through McEwen's triangle to eradicate the infection⁷.

It was before the establishment of neurosurgery as a specialty and availability of CT scan and other advanced imaging techniques in Peshawar, the capital city of the province of Khyber Pakhtunkhwa that emergency management of all otogenic complications of chronic suppurative otitis media including otogenic intracranial abscesses were managed by ENT department.

With the development of neurosurgery now the standard treatment of otogenic intracranial abscess involves two surgeons, otolaryngologists deal only with the primary focus in the mastoid and its complication,

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intracranial abscess is dealt by neurosurgeon. They may do it in a single stage joint venture⁸ or separately each with its own anaesthetic and surgical morbidity and mortality⁹. The aim of this study was to present our experience with the management of otogenic intracranial abscess in emergency situation in an ENT setup and compare it with the current concepts of treatment.

MATERIAL AND METHODS

This is a retrospective study of otogenic intracranial abscess. These cases were received in the department of ENT & Head and Neck Surgery of Khyber Teaching Hospital, Peshawar from January 2005 to December 2010.

We retrieved 42 consecutive cases of OIA from the hospital record, operated for intracranial complications of chronic suppurative otitis media in emergency situation. The medical charts of all these patients were reviewed. All the diagnosed and operated in emergency cases were included in the study of either sex and any age. Cases of suppurative otitis media with complications other than OIA and non-emergency were not included in the study.

The cases were carefully analyzed for demographic features, clinical presentation in terms of symptoms and positive signs, fundoscopy, lab reports and microorganisms involved, per operative findings, site of abscess and amount of pus drained and outcome of the treatment. The data was recorded on a proforma for the purpose of analysis.

RESULTS

The age range was 04 to 50 years and males were 29 and to females 13 with the ratio of 2.2: 1. The demographic distribution of the disease is shown in Table 1. Clinical features are shown in Table 2, 3 and 4. Laboratory investigations, worth mentioning were, 11 patients had blood haemoglobin less than 10 gm% and ESR greater was than 50 mm 1st hour in 10 patients. Only 24 cases gave positive isolates. Amongst the positive isolates *Proteus*, *E.coli* and *Pseudomonas* were common pathogens. Seven deaths occurred out of all 42 (17%).

DISCUSSION

Although rare in developed countries, intracranial abscess is still a significant health-care problem in developing countries. This is evident from our current study. Living in a developing country, we studied 42 cases of otogenic intracranial complications in emergency situation in ten years in a tertiary care hospital. Rebecca Sin Mei Lim et al studied only 05 cases in ten years in Australia¹⁰. A few other studies, Kao et al., 2003; Seneviratne et al., 2003; Sinha et al., 2003; Bhand, 2004 had also reflected that the incidence

Table 1 - Demographic Distribution

| District | No. of patients & percent |
|---------------|---------------------------|
| Bannu | 02(4.76) |
| Charsdda | 03(7.14) |
| DI Khan | 04(9.52) |
| Dir | 03(7.14) |
| Hangu | 01(2.38) |
| Karak | 01(2.38) |
| Kohat | 03(7.14) |
| Khyber Agency | 01(2.38) |
| Kurram Agency | 01(2.38) |
| Lakki Marwat | 01(2.38) |
| Mardan | 02(4.76) |
| Nowshera | 04(9.52) |
| Peshawar | 10(2.38) |
| Swabi | 03(7.14) |
| Swat | 03(7.14) |
| Total | 42(100) |

Table 2: Ear Discharge and associated symptoms

| District | No. of patients & percent |
|-------------------------|---------------------------|
| Right Ear discharge | 13(30.95) |
| Left Ear discharge | 19(45.24) |
| Bilateral discharge | 10(23.81) |
| Blood Stained discharge | 03(07.14) |
| Mucopurulent | 02(04.76) |
| Purulent | 27(64.29) |
| Scanty | 29(69.05) |
| Profuse | 03(07.14) |
| Foul Smelling | 30(71.43) |
| Deafness | 16(38.10) |
| Earache | 26(61.90) |
| Vertigo | 11(26.19) |
| Tinnitus | 02(04.76) |

Table 3: Findings in the ear

| Sign | No. of patients & percent |
|------------------------------|---------------------------|
| Postero-superior perforation | 06(14.29) |
| Posterior perforation | 14(33.33) |
| Attic perforation | 16(38.10) |
| Subtotal perforation | 03(07.14) |
| Central perforation | 02(04.76) |
| Mastoid Cavity | 01(02.38) |
| Cholesteatoma | 18(42.86) |
| Granulations | 20(47.62) |
| Foul Smell | 08(19.05) |
| Mastoid Abscess | 01(02.38) |
| Mastoid Tenderness | 02(04.76) |
| Aural Polyp | 01(02.38) |

Table 4: General and neurological findings

| Findings | No. of patients & percent |
|---------------------------------|---------------------------|
| Bradycardia | 25(59.50) |
| Tachycardia | 13(30.95) |
| Fever | 08(19.05) |
| Subnormal Temperature | 27(64.28) |
| Impaired level of consciousness | 06(14.28) |
| Unconsciousness | 03(07.14) |
| Pallor | 17(40.48) |
| Ataxia | 11(26.19) |
| Neck Rigidity | 05(11.90) |
| Dysdiadochokinesia | 05(11.90) |
| Hemiparesis | 01(02.38) |
| Papilloedema | 19(42.24) |

is higher in under developed countries¹¹. Osama et al (2000) reviewed 2890 cases of chronic otitis media from 1990-1999 and found that 57 cases had intracranial complications¹². The incidence is higher in South Asia as the prevalence of otitis media over there is 15-20% and 5-10% of these patients present with intra-cranial complications¹.

In our study more than half of the patients were from younger age group, 04-20 years of age. Sennoroglu et al, Nesic et al found higher incidence of brain abscess in children and young patients^{1,7}. This finding is identical to that in our study. Some people report predominance in favor of older age group¹³. In children otogenic causes constitute 25% of the abscesses, whereas in adults they constitute 50%^{14,15}.

In our study male to female ratio was 2.2:1. This supported in literature. Males are more vulnerable to brain abscess irrespective of the geographical region¹¹. Some studies are in favor of more male predominance in this disease. Males are 4-8 times more affected than female as shown by Kempf et al, Nesic et al, Kurien et al^{4,7,8}. Males are affected five times as female¹⁶.

Almost all the patient in the current study had headache, vomiting and nystigmus along with discharge from ear, few had impaired consciousness and features of meningitis. A study found almost the same, presentation of the patients may be with headache, vomiting, malaise, meningism, seizure, deterioration of conscious level along with focal neurological deficits⁶. Headache and vomiting in association with cholesteatoma is very suggestive of intracranial complications¹⁷. The spread of an otogenic infection in the ear may be facilitated through an erosion of the bony architecture of the temporal bone. This also depends on the virulence of the organism and immunity of the patient. Cases may also present as a complication of surgical treatment, such as mastoidectomy or tympanoplasty¹⁸.

We advocate urgent CT scan of temporal bone and brain to be done and are mandatory in any patients presenting with ear discharge, moderate to severe headache, otalgia and fever¹². Radiological investigations such as CT and MRI play vital role in the diagnosis¹⁹. Use of CT scan has reduced misdiagnosis of intracranial abscess in acute mastoiditis²⁰. CT scan has dramatically increased the pickup rate of intracranial abscess even at the early stage of its formation. As mentioned earlier due to non availability CT scan was done in none of the cases in our study.

Only 24 (57%) cases gave positive isolates. Amongst the positive isolates Proteus (29%), E.coli (12%) and Pseudomonas (10%) were common pathogens in our study. Organisms isolated are usually streptococci, bacteroids, fusobacterium, facultative gram negative bacilli, staphylococci and pseudomonas⁵. According to the literature, the main microbial aetiologies of otogenic abscesses include Pseudomonas aeruginosa, Staphylococcus, Streptococcus species, and Proteus mirabilis²¹. Pathogens were identified in 43% cases, another study identified in 53% specimen¹³. Five out of six ear swabs grew proteous, streptococcus, E.coli, Bacteriod species and one grew pseudomonas and klebsiella¹⁶.

We did a few laboratory investigations which were no specific, mainly from anaesthesia point of view. Laboratory investigations add little to the diagnosis of brain abscess¹².

Polymicrobial infection is common in suppurative otitis media and its complications. Therefore broad-spectrum antibiotic coverage for aerobic and anaerobic organisms is recommended. Combination drug therapy may be necessary to accomplish this goal¹². The empirical antimicrobial regimens vary from unit to unit. The basis for selecting the antibiotics is usually the previous scientific data and the local experience. The patients in the current study were started on ampicillin, metronidazole and ceftioxaonein combination immediately on arrival to the department. As an empirical therapy a combination of ampicillin, metronidazole, and either ceftazidime or gentamicin is recommended for otogenic abscesses²². Once the results of culture of pus and susceptibility of isolates are available, antibiotic therapy can be adjusted, if necessary, to address more appropriately the bacteria present. Use of steroid may be useful in reducing the intracranial pressure²³.

Mastoid exploration, aspiration and excision of the abscess are surgical modes of treatment^{9,10}. It is now well established that selection of treatment modality depends on the stage of evolution of the abscess. Not all abscesses require drainage. Mastoid exploration has to be done in all cases. This is supported in literature. In 5 patients, mastoid exploration was the primary surgical treatment and the brain abscesses were treated non-surgically. In the other 5 patients, craniotomy and drainage was performed followed by mastoid exploration when their neurological conditions had stabilized²⁴.

In our study the commonest site of abscess was extradural followed by cerebellar and temporal. Six of the 10 patients had cerebellar abscesses and 4 had temporal lobe abscesses¹².

Mortality rate in our study was (7) 17%. In literature there is a wide range morbidity and mortality¹⁶. There was no mortality in one study but in other studies were 31% and 10% reported by Jaran et al (1995) and Levent and Bulent (2000) respectively¹². In another study the mortality of otogenic brain abscess was in the range of 30-40%².

The multidisciplinary approach, involving a neurosurgeon, neuro-radiologist, otolaryngologist, paediatrician and an infectious-disease specialist, will help in the early identification and targeted treatment and to reduce the morbidity and mortality of this clinical condition¹¹.

CONCLUSION

Any patient presenting with discharging ear associated with earache, headache, vomiting and

nystagmus should be suspected of intracranial abscess of otogenic origin. These cases should be considered serious emergency and immediate emergency measures should be taken to overcome the danger of abscess. Mastoid exploration is performed only when their neurological condition is stable.

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