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THERAPEUTIC EFFECT OF LIMITED SURGICAL DEBRIDEMENT AND LONG TERM INTRAVENOUS ANTIBIOTIC THERAPY IN IMPROVING TREATMENT OUTCOME OF NECROTISING OTITIS EXTERNA (NOE).

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ABSTRACT

AIMS

To study the therapeutic effect of limited surgical debridement and long term intravenous antibiotic therapy in improving treatment outcome of Necrotising otitis externa (NOE)

SETTINGS AND DESIGN

Retrospective study on data collected from 10 cases with NOE who underwent ear canal debridement in our tertiary care institute.

METHODS AND MATERIAL

Newly diagnosed cases of NOE were included in the study and they were started on anti-pseudomonal antibiotic therapy. Surgical intervention was planned after 2 weeks of antibiotic therapy. During surgery, a linear incision was made along the posterior-superior wall of ear canal and incision was deepened up to bony depth. Underlying granulation was scrapped and sent for HPE. Data collection included patients age, sex, clinical symptoms, culture and sensitivity report, chandler`s staging, antibiotics used, imaging findings, surgical intervention and outcome.

STATISTICAL ANALYSIS USED

Categorical variables were presented in percentages and continuous variables were presented in mean and range.

RESULTS

We included 10 patients (6 males and 4 females) in the age group of 58-85 years for this study. Clinical symptoms of ear pain and ear discharge were present in all the patients and facial palsy was present in four patients (40%). The disease was staged as per Chandler`s staging and stage 2 disease was present in 3 patients, stage 3 in 4 patients and stage 4 in 3 patients. In Culture & sensitivity Pseudomonas species was the most common isolate (40%) followed by fungal infections (20%). Biopsy of the debrided tissue showed inflammatory tissue in all the patients. Biopsy also showed presence of fungal infection in 2 patients and malignancy, tuberculosis in one patient each. Treatment modification was done in these 4 patients. After treatment completion, complete recovery was seen in 50% of the patients. Out of the four patients with facial palsy, 2 had complete recovery and one had improved functioning.

CONCLUSIONS

Treatment of NOE is fraught with lot of challenges and the outcome is often unpredictable. However, results from our study

shows that improved outcome can be achieved with a combination of long-term intra venous antibiotic therapy and limited surgical debridement.

KEY-WORDS:
Necrotising otitis externa, ear canal debridement, Malignant otitis externa

KEY MESSAGES:

- Treatment of necrotising otitis externa is quite challenging.
- There is need for long term intravenous (6 weeks), oral antibiotics therapy (6 weeks) and adequate glycaemic control to achieve disease remission.
- Limited debridement of ear canal is essential to get adequate swab for culture- sensitivity, to get tissue for biopsy and to improve clinical outcome

INTRODUCTION

Necrotising otitis externa (NOE) is a severe debilitating condition affecting diabetic patients. It is commonly caused by Pseudomonas aeruginosa. Infection starts from the ear canal and then spreads to middle ear, mastoid and adjacent skull base. Factors like poor glycaemic control, virulence of the organism and altered immunity favour spread of infection beyond ear canal1. Clinical features include severe ear pain, ear discharge, hearing loss and oedema of ear canal. Neurological deficits and lower cranial nerve palsy are seen in cases with extensive skull base involvement. Treatment includes long term intra venous antibiotic therapy, strict glycaemic control and pain management. Treatment is very difficult as most of the patients don't tolerate and cannot afford long term higher antibiotics. Presence of co-existing renal/ cardiac diseases and other co-morbidities precludes usage of appropriate antibiotics and analgesics and they are associated with poor clinical outcome2. Hence early diagnosis and treatment are crucial in preventing disease related mortality and morbidity. This study describes the additional benefits of combining ear canal debridement along with intra venous antibiotics in patients with NOE

MATERIALS & METHODS

It is a retrospective study on cases of Necrotising otitis externa who were evaluated and treated in our tertiary care hospital for the past 2 years. Inclusion criteria included newly diagnosed cases of NOE who underwent ear canal debridement in our hospital. Patients with recurrent disease and incomplete treatment were excluded from the study. Data collection included patients age, sex, clinical symptoms, culture and sensitivity report of aural swab, chandler`s staging, antibiotics used, imaging findings, surgical intervention and outcome after surgery.

TREATMENT GIVEN

Patients were started initially on intravenous antibiotics (Piperazillin and Tazobactum combination, ciprofloxacin) and antibiotics were switched once culture report became available. In patients showing poor response after 2 weeks of IV antibiotics, treatment modification in the form of change of antibiotics and endoscopic/ microscopic surgical intervention was done. Surgical intervention was done under local anaesthesia. A linear incision was made along the posterior-superior wall of ear canal using size 11 surgical blade. Incision was deepened up to bony depth and underlying granulation was scrapped. Unhealthy skin of ear canal was excised. (Fig 1) TM becomes visible after complete curettage. If TM is intact, Myringotomy was done and fluid in middle ear (if any) was let out. Excised tissue was sent for HPE. Ear canal was packed with ciprofloxacin-soaked ear wick.

Fig 1:

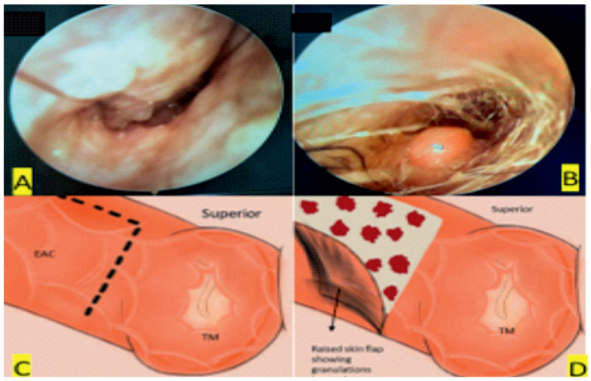

Fig 1: A. endoscopic picture showing oedematous and narrow ear canal in NOE. B. Endoscopy showing granulation in ear canal C. Illustration showing incision marking for ear canal debridement. D. Illustration showing underlying granulations after skin flap elevation.

RESULTS:

In this study, we included 10 patients with NOE who underwent mini debridement in our hospital. Among them, 6 of them were males (60%) and the remaining 4 were females (40%). Age group of the patients ranged from 58 to 85 years and majority of the patients were in their sixties. In the clinical symptoms, ear pain and ear discharge were present in all the patients and facial palsy was present in four patients. The disease was staged as per Chandler`s staging and stage 2 disease was present in 3 patients, stage 3 in 4 patients and stage 4 in 3 patients. In Culture & sensitivity of ear swab, Pseudomonas species was the most common isolate (4 patients) followed by fungal infections (Table 1).

Table 1: Table showing treatment outcome in patients with NOE

Case No.	Culture report	Biopsy report	Treatment	Treatment outcome
1	Pseudomonas	Chronic inflammation	Piperazillin and Tazobactum combination, ciprofloxacin	Complete disease resolution with recovery of facial palsy. Control of Diabetes, hypertension.
2	Pseudomonas, Staph. aureus	Chronic inflammation	Cefotaxime, Piperazillin and Tazobactum combination,	Complete disease resolution with recovery of facial palsy.
3	Klebsiella. Pneumoniae	Chronic inflammation	Piperazillin and Tazobactum combination, ciprofloxacin	Improved pain score and recovery
4	Pseudomonas,	Chronic inflammation	Piperacillin and Tazobactum, Meropenem	Partial recovery
5	Aspergillus species	Granulation tissue	Meropenem, Itraconazole	Complete recovery
6	Pseudomonas	Chronic inflammation	Piperacillin and Tazobactum, Meropenem, cefaperazone and salbactum	Disease progression
7	No growth	Chronic inflammation	Ciprofloxacin, cefuroxime	Complete recovery
8	Aspergillus species	Fungal granuloma	Piperacillin and Tazobactum, Fluconazole	Complete disease resolution
9	Escherichia.coli	Malignant cells	Piperacillin and Tazobactum, ciprofloxacin	Referred to tumor clinic
10	No growth	Granuloma formation suggestive of tuberculosis	Piperacillin and Tazobactum, ciprofloxacin	Started on anti-tuberculosis drug regimen. Complete resolution of ear granulations

HRCT of temporal bone was done in all the patients and CT scan findings include presence of ear canal edema, soft tissue density in middle ear and mastoid. Evidence of bony erosion and soft tissue extension into parotid region, temporal fossa and extra cranial extension were seen in few cases. Biopsy of the debrided tissue showed inflammatory tissue in all the patients. Biopsy also showed presence of fungal infection in 2 patients and malignancy, tuberculosis in one patient each. Patients continued to receive intra venous antibiotics after the biopsy and treatment modification was done in 4 patients based on their biopsy report.

Oral Itaconazole (antifungal drug) was started for fungal MOE. Anti- tubercular drug (ATT) was started for tuberculosis. After 6 months of ATT, patient showed resolution of ear canal edema, granulation and pain. Patient with malignancy was referred for palliative therapy. After treatment completion, complete disease recovery was seen in 50% of the patients. Out of the four patients with facial palsy, 2 had complete recovery and 1 patient had improvement in facial functioning. Treatment outcome is summarized in **table 2**

Table 2: Clinical profile of patients with NOE

Case no	Age	Sex	Clinical symptoms	Stage of disease (Chandler)	Culture report
1	65	M	ear pain, facial weakness, uncontrolled Hyper tension	stage 3	Pseudomonas. aeurogenosa
2	72	M	ear pain, d/c- 6-months, facial palsy-3 months	stage 2	Staphylococcus.aureus, Pseudomonas. aeurogenosa
3	62	M	ear pain, head ache, vomiting	stage 4	Klebsiella.pneumoniae
4	58	F	ear pain, facial weakness, uncontrolled DM	stage 4	Pseudomonas. aeurogenosa
5	63	M	ear pain, d/c	stage 3	Aspergillus species
6	66	M	ear pain, facial swelling, facial palsy & lower cranial nerve palsy	stage 4	Pseudomonas. aeurogenosa
7	60	F	ear pain, d/c	stage 2	No growth
8	58	F	ear pain, discharge	Stage 2	Aspergillus species
9	85	F	ear pain, d/c for 3 months	stage3	Escherichia.coli
10	60	M	ear pain, d/c for 3 months	Stage 3	No growth

DISCUSSION

Treatment of NOE is fraught with lot of challenges. Currently patients are treated with long term intra venous antibiotics and surgical debridement is reserved for selected cases. Surgical debridement is quite challenging and at times impossible, in view of the vital structures in skull base. Other factors like virulence of the bacteria, antibiotic resistance, immunocompromised status and poorly vascularized skull base bone also contributes to diseases severity3,4.

Most common bacteria responsible for NOE is Pseudomonas aeurogenosa. Other organisms like Staphylococcus.aureus, Klebsiella, E coli and fungus (Aspergillus) have also been implicated in NOE5,6,7. In our study Pseudomonas was the commonest organism followed by fungal infections and culture did not yield any growth in 2 cases. Reasons for negative culture includes previous antibiotic therapy, usage of topical antibiotic ear drops and difficulty in collecting adequate swab due to severe ear canal edema.6 Choosing antibiotics becomes difficult when culture did not show any growth. In such situations patients were started on anti-pseudomonal antibiotics (Piperazillin-Tazobactum / Ceftazidime and ciprofloxacin)8. Antibiotics were escalated after 10-14 days if they don't show any improvement. HRCT of temporal bone gave information about disease extension

We resorted to mini debridement in cases not showing improvement with 2 weeks of antibiotic therapy. Mini debridement was done to take tissue for biopsy and culture & sensitivity. But surprisingly patients showed significant improvement in their pain score, ear canal edema and clinical outcome after mini debridement. Other advantages of surgical curettage include better control of Diabetes, hypertension, tissue availability for biopsy and improved cure rate.

Biopsy altered the diagnosis in 4 cases and among them, 3 cases showed recovery after treatment modification. This is one of the major advantages of debridement which provides sufficient tissue for histopathological examination. Biopsy also helps in diagnosing temporal bone malignancy as it can be misdiagnosed as NOE due to their common clinical symptoms9. Facial nerve is one of the commonly affected cranial nerves in NOE10. Among the patients with facial palsy, three of them showed recovery of facial nerve function after treatment completion and it took 3 to 6 months for the recovery. Some of the patients did not show any improvement, the disease showed rapid progression and deterioration. All these patients had stage 4 disease with lower cranial nerve palsy.

Extensive surgical debridement is fraught with lot of challenges and hence not recommended routinely. But curettage can be done easily under local anaesthesia with negligible risk11. Such limited curettage does not clear the disease completely and intra venous antibiotics must be continued for 6 weeks for complete recovery8,11,12.

CONCLUSION

Treatment of NOE is fraught with lot of challenges and the outcome is often unpredictable. However, results from our shows that improved outcome can be achieved with a combination of long-term intra venous antibiotic therapy and limited surgical debridement.

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AUTHORS DECLARATIONS

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Consent to Participate: Obtained

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