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Comparision of effectiveness of topical acetic acid instillation with topical antibiotics in madical management of tubotympanic chronic suppurative otitis media (CSOM)

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ABSTRACT

Introduction: Chronic Suppurative Otitis Media (CSOM) is typically a persistent disease, insidious in onset, often capable of causing irreversible sequel and severe destruction that clinically manifests with discharge and deafness. CSOM is a major health problem in developing countries causing serious local damage and life-threatening complications. In developing countries, it accounts for 60-80% of middle ear diseases. Its incidence to some extent depends on racial and socioeconomic factors.
Materials and Methods: The study was carried out in ENT Department, Sir T Hospital, Bhavnagar.
Results: A total of 200 patients having complain of ear discharge were randomly distributed in two groups. In one group (group A) patients were treated with topical acetic acid ear drops and in other (group B) patients were treated with topical antibiotics ear drops. Among 200 patient's majority of the cases were in age group of 18 to 30 yrs. Male patients are predominantly affected than other patients.
Conclusion: The study was prospective and observational based on symptomatic relief of problems caused by the pathogens in CSOM by removing or killing the related pathogens and making the ear dry.

1. Introduction

A WHO/CIBA Foundation workshop in 1996 defined Chronic suppurative otitis media (CSOM) as a stage of disease in which there is chronic infection of the middle ear cleft, i.e., Eustachian tube, middle ear, and mastoid, in which a non-intact tympanic membrane (e.g., perforation or tympanostomy tube) and discharge (otorrhea) are present for at least 2 weeks or more which can lead to thickening of the middle ear mucosa and mucosal polyps. A perforation is called permanent when squamous epithelium covers edges of tympanic membrane and does not heal spontaneously. This is one of the most common community health disorders of childhood in many developing countries.[1,2]

Its incidence to some extent depends on racial and socioeconomic factors. Factors like overcrowding, inadequate housing, poor hygiene, lack of breast feeding, poor nutrition, impaired immunological status, passive smoking, frequent upper respiratory tract infection, high rates of nasopharyngeal colonization with potentially pathogenic bacteria and inadequate or unavailable health care services have attributed to high incidence of chronic otitis media in developing countries. It is a matter of serious concern, especially in paediatric population, because it may have long term effect on early communication, language development, auditory processing, psychosocial and cognitive development of children.

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Patients with CSOM may consult a doctor with one of the following: 1). A newly discharging untreated ear, 2). A persistently discharging previously treated ear, 3). A recurrently discharging ear. The first two scenarios are best managed at the primary health care level by proper history taking, examining the eardrum, and administering topical anti-microbials or topical antiseptics for 2 to 4 weeks. The type of antimicrobial and the route of administration should be selected to suit the specific infecting organism. The third scenario requires careful assessment of the middle ear by an ENT specialist for middle ear disease that has not resolved. Antimicrobial/Antiseptic therapy may still be initiated, but the patient must be given the benefit of otological assessment for possible elective mastoidectomy.[3,4]

Different group of drugs are included in the medical management of CSOM; such drugs include analgesics, anti-histamines, anti-allergens, antiseptics and oral, topical and i.v. antibiotics. Topical antiseptics are recently being used in place of topical antibiotics and are quite effective in the resolution of the disease symptoms. Acetic acid (plain, white household vinegar) is an antiseptic that treats infections caused by bacteria or fungus. This medication will not treat a middle ear infection (otitis media) but it is used as irrigation antiseptic for patients suffering from ear discharge in CSOM. Patients with CSOM respond more frequently to topical antibiotic therapy. Several topical agents such as antifungal, antibacterial, steroids and acid media ear drops are widely used.[5]

2. Objectives

Study is conducted to evaluate the efficacy of topical acetic acid instillation in comparison with topical antibiotics instillation in medical management of Tubo-tympanic chronic suppurative otitis media (CSOM) and to evaluate the role of acetic acid instillation in medical management of Tubo-tympanic chronic suppurative otitis media (CSOM).

3. Materials and Methods

The study was carried out in ENT Department, Sir T Hospital, Bhavnagar, between 1st January 2022 to 1st June, 2022. A total of 200 patients having complain of ear discharge were randomly distributed in two groups. In one group (group A) patients were treated with topical acetic acid ear drops and in other (group B) patients were treated with topical antibiotics ear drops.

3.1. Inclusion criteria

Patients with Tubo-tympanic chronic suppurative otitis media of both sexes with age between 18 to 60 years. Both outpatients and inpatients are included.

3.2. Exclusion criteria

Age group below 18 and above 60 of all sexes. Patients having Atticoantral type of CSOM, cholesteatoma, marginal perforation in tympanic membrane. Immunocompromised individuals. Known cases of hypersensitivity to acetic acid and prescribed antibiotic ear drops. Pregnant or lactating mothers.

Detailed history of patient including chief complain like ear discharge and associated complains (ear ache, headache, etc.) was taken. The selected patients were subjected to clinical, audiological and laboratory investigations. Examination of tympanic membrane with otoscope and under microscope was done along with hearing evaluation using tuning fork tests. Specific investigations were done such as- pure tone audiometry, pus for culture & sensitivity, x-ray mastoid.

The discharge in external auditory canal was thoroughly cleaned by either dry mopping or by suctioning prior to a swab of the middle ear being taken for microscopy and culture. Proper otoscopic examination of ear was done to look for tympanic membrane and type and size of perforation. Patients were randomly distributed in 2 groups as mentioned above. The patients were advised for self-instillation of their respective ear drops 5 drops at a time and hold it up to 10-15 minutes by tilting their head to one side or by putting a cotton plug. This has to be done three times in a day.

4. Results

Patients between the age group of 18-60 years were included in this study. Maximum numbers of patients were seen in the age group of 18-30 years. In our study gender wise distribution of patients showed that out of 200 cases 126 were males and 74 were females. In Acetic acid group 62 were males and 38 females. In topical antibiotic group, there were 64 males and 36 females.

In our study of 200 patients, various symptoms like hearing loss, earache, headache, tinnitus, rhinitis, DNS (diverted nasal septum), perforation, granulation etc., were observed. In Acetic acid group and in topical antibiotic group, number of patients suffering from different symptoms mention in Table 3

In our study of 200 patients, amongst 60 right ears in topical antibiotic group, on Pure Tone Audiometry and Amongst 64 right ears in acetic acid group, on Pure Tone Audiometry. Amongst 57 left ears in topical antibiotic group, on Pure Tone audiometry amongst 58 left ears in acetic acid group, on Pure Tone Audiometry.

In our study of 200 patients, pus for culture and sensitivity was done. Amongst 100 patients in topical antibiotic group, in 39% Staph aureus followed by Pseudomonas in 30% patients, were the most common organism detected on Culture and sensitivity. 12% cases had mixed growth, 4% Klebsiella, 5% CoNS, 5% E. coli, 2% Proteus, 1% Providenta were other organisms cultured. Amongst 100 patients in acetic acid group, in 36% Staph aureus followed by Pseudomonas in 30% were the most common organism detected on Culture and sensitivity. 10% cases had mixed growth, 11% Klebsiella, 7% CoNS, 1% E. coli, 1% Providencia were other organisms cultured.

In our study of 200 patients, amongst 100 patients in topical antibiotic group complain of irritation was observed in 13 patients, ear-ache in 11 patients, bad taste in mouth in 10 patients and vertigo in 4 patients. 72 patients had no complain with topical antibiotic ear drops. Whereas amongst 100 patients in acetic acid group complain of irritation was seen in 17 patients, ear-ache in 10 patients, bad taste in mouth in 15 patients and vertigo in 2 patients. 70 patients had no complain with acetic acid drops instillation.

Table 1: Age wise distribution in both group

Age group (in years)	No. of patients (TA)	No. of patients (AA)
18 – 30	40	41
31 – 45	35	33
46 – 60	25	26
Total	100	100

Table 2: Gender wise distribution in both group

Sex	No. of patients (TA)	No. of patients (AA)
Male	64	62
Female	36	38
Total	100	100

5. Discussion

Chronic suppurative otitis media (CSOM) is a serious healthcare concern worldwide especially in developing countries. Not only it causes distress to the patient and family but also because of the substantial economic burden quantifiable and unquantifiable, financial, and nonfinancial imposed on the affected individuals. It is one of the ENT diseases known for increased incidence of resistance to current antibiotics used in otitis media treatment. CSOM can cause severe destruction and sequelae of manifestation of Deafness, Discharge and Perforation of tympanic membrane. In this study we have discussed an adjuvant treatment (Acetic acid and Topical antibiotics) in management of CSOM.[6]

Table 3: Symptoms wise distribution in both group

Symptoms		No. of patients (TA) each out of 100	No. of patients (AA)each out of 100
Hearing loss		85	83
Earache		30	28
Headache		05	08
Tinnitus		10	08
Rhinitis		12	10
DNS		15	12
Perforation	Right ear	60	64
	Left ear	57	58
	Both ear	17	22
Granulation	Right ear	15	08
	Left ear	07	05

In our present study the efficacy of both the topical agents are evaluated in their respective groups i.e., Group A for antiseptic, Acetic acid & Group B for topical antibiotics according to their sensitivity profile were compared based on patient's treatment success rate. Various clinical aspects are kept in view such as, overall success rate, symptomatic relief in discharge, pain, and congestion. According to this study clinically ototopical Acetic acid was found to be comparatively better regarding otorrhea resolution in 94% patients with healed perforation in 22% of them. While in topical antibiotic group otorrhea resolution was seen in 88% with healed perforation in 15% patients but statistically both the topical agents are equally effective. Similar results were observed in the study done at Mahatma Gandhi medical college, Jaipur, where otorrhea resolution in acetic acid group was seen in 92% patients with healed perforation in 22% patients and otorrhea resolution in 88% patients in topical antibiotic group with healed perforation in 14% patients.[7] The study done by Chhavi Gupta et al., 2014 showed that the resolution of otorrhea by Acetic acid was 84% and healing of tympanic membrane perforation was 26% while failure rate of 16%.[8] In the present study 1% Acetic acid showed that resolution of CSOM was higher than the study done by C. Gupta et al. as treatment success rate in 94% patients while failure rate 8%. Aminifarshidmehr's study in, 1996 showed that the acetic acid works on principle on their ability to reduce the pH in the ear, as low pH restricts the growth of bacteria and fungi, which flourish in a basic environment (pH 8- 10).[9–11]

The present study showed that both the topical antibiotics and Acetic acid groups were equally effective (p-value < 0.05), the difference in effectiveness for otological symptom score between two groups are narrowed after one week of treatment, but was statistically significant till the end of treatment. The effectiveness of present study (<0.05) of topical Acetic acid (antiseptic) versus topical antibiotics support the study done by Eason et al (OR = 0.67, 95% CL = 0.2, 2.25); Topical antiseptics were

Table 4: Pure tone audiometry of both the ear

			Normal	Mild	Moderate	Moderately severe	Severe	Profound
Pure tone audiometry	Right EAR	TA	10	24	16	07	03	00
		AA	12	28	18	04	02	00
	Left Ear	TA	08	24	15	07	03	00
		AA	09	27	13	05	03	01

Table 5: Pus culture (Organism wise distribution)

Organism isolated	No. of patients (TA)	No. of patients (AA)
Staph aureus	39	36
Pseudomonas	30	30
Klebsiella	04	11
Mixed	12	10
CoNS	05	07
E. coli	05	01
Proteus	02	00
Providentia	01	01

Table 6: Side effects in both group

	Irritation	Earache	Bad taste	Vertigo	None
TA	13	11	10	4	72
AA	17	10	15	2	70

found to be just as effective as topical antibiotics; however, ofloxacin/ciprofloxacin produced high cure rates.

6. Conclusion

The study was prospective and observational based on symptomatic relief of problems caused by the pathogens in CSOM by removing or killing the related pathogens and making the ear dry. By this study we have come to a conclusion that medical management of CSOM without cholesteatoma by frequent aural cleaning and instillation of drops of 1% acetic acid can be a more desirable choice than topical and oral antibiotics. It is a safe and low cost without producing any side effects. Alteration of pH of the ear canal is one of the main factors for healing and mechanical disruption of biofilm and removal of deep-seated debris in poorly vascularized sites such as bones.

7. Source of Funding

None.

8. Conflict of Interest

None.

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