Original article

A Comparison of Acetic Acid Verses Topical Antibiotics for Otorrhea Resolution in Active CSOM-A Randomized Control Trial

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Abstract

Introduction: Chronic Suppurative Otitis Media (CSOM) is a long -standing middle ear infection causing hearing loss, often in developing countries. Treatment includes aural toilet, topical antibiotics, and antiseptics. Drug resistance and ototoxicity are concerns, with acetic acid as a potential alternative.
Study design: Randomized control trials.
Material and methods: Study was conducted in ENT Department of Rawalpindi Teaching hospital.
Results: A total of 186 patients with tubotympanic type of CSOM were randomly divided into two groups. In group A patients were treated with topical acetic acid while in group B patients were treated with topical Gentamycin ear drops.
Conclusion: This study concluded that both acetic acid and topical gentamicin are effective in resoling otorrhea but acetic acid presented as viable alternative especially for those with concerns about ototoxicity or antibiotics resistance.

Key words: CSOM, Topical Acetic acid, Topical Gentamycin, Otorrhea resolution, tubotympanic type of CSOM.

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1. Introduction

CSOM is estimated to have a total disease burden of anywhere between 1% and 46% worldwide, with over 90% cases occurring in Third Word, and it's thought that the prevalence in countries like Pakistan may be as high as 7%[1, 2]. It is among the leading causes of deafness globally that can be prevented, causing individuals to have poor performance at work/school, having direct detrimental effects on cognition, defective or delayed speech and language development[3, 4]. It characterized as long standing infection (greater than 6 weeks) of middle ear cleft which includes Eustachian tube, middle ear, and mastoid antrum, associated with tympanic membrane perforation and ear discharge resulting in the most commonly symptoms of ear discharge and hearing loss[5, 6]. Numerous bacteria including aerobes and anaerobes can cause the disease, among which Pseudomonas aeruginosa and Staphylococcus aureus are the most common pathogenic organism[7]. Hearing loss associated with CSOM is multifactorial. Initially it is conductive as middle ear fills up with discharge produced by infection[8]. Prolonged inflammation results in damage to the cochlea and later on, hearing loss become sensorineural[9].

Various conservative treatment modalities have been used in the treatment of CSOM, which are mostly a combination of aural toilet and various topical antibiotics[10]. Systemic antibiotics may be used in severe cases of CSOM but are rarely required as the combination of aural toilet and topical antibiotics is able to achieve significant higher tissue concentrations[11]. Recent studies have shown that there may be a role for topical antiseptics in the treatment of CSOM, alone or in combination with antibiotics[12, 13]. Topical aminoglycosides, such as gentamycin and tobramycin, are common antibiotics used in the treatment of CSOM, while drug resistance has been a major emerging problem with most of antibiotics. Ear isolates have a sensitivity of up to 94.4% to gentamycin, an aminoglycoside of susceptible bacteria[14, 15]. However, even topical therapy with these drugs is associated with adverse effects, the most important being ototoxicity. Thus medical practitioners are always to lookout for similarly effective but safer alternatives[16]. Acetic acid has been used extensively in wound dressing and infected wound management. It is effective, safe, cheap and readily available, with good activity against resistant organism such as *Pseudomonas aeruginosa*[17, 18]. Adverse effects related to acetic acid therapy use are minimal, and limited to case reports[19]. The objective of this study is to compare topical acetic acid therapy with topical antibiotic therapy in patients with Tubotympanic type of Chronic Suppurative Otitis Media in terms of efficacy.

2. Materials & Methods

The study was carried out in Otorhinolarngology Department of Rawalpindi Teaching Hospital from 1st

March 2024 to 24th September 2024. A total of 186 patients suffering from CSOM was included in this study and divided into two groups randomly. Group A patients underwent treatment with topical acetic acid eardrops and Group B received topical Gentamicin eardrops.

Inclusion criteria:

- Patients age between 18 years to 70 years.
- Patient of all ethnicities.
- Patient of both genders.
- Patient with tubotympanic type of CSOM.
- Patient with an initial ontological score of ≥ 6.

Exclusion criteria:

- Patients with CSOM who have a dry ear or those with underlying cholesteatoma
- Patients who have received topical or oral antibiotics or any other ear drops in the past two weeks
- Patients who have Serous Otitis Media
- Patients who are suffering for the atticoantral type of CSOM
- Patients not giving consents
- Patients who have otomycosis and suffering from vertigo
- Patients with allergies to aminoglycosides or acetic acid
- Patients with documented resistance to aminoglycosides on culture
- Patients who are pregnant or breast feeding
- Patients who are immunocompromised i.e suffering from HIV/AIDS, inherited or acquired immunity defects, concurrent chronic disease of the heart, lung, kidney or liver
- Patients with an initial ontological score of ≤ 5.

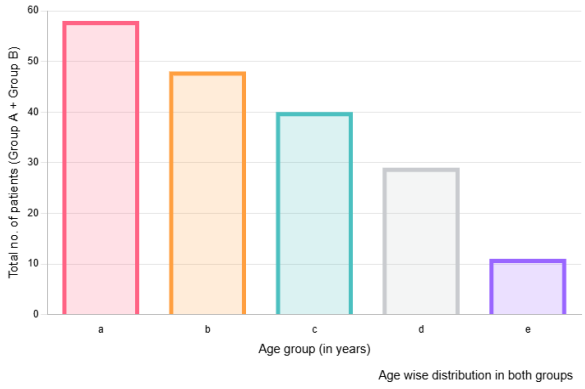

Fig 1: Age wise distribution in both groups

3. Results

In this study Patients included were in between the age group of 15-65 (Figure 1). Maximum numbers of patients were in the age group of 25-35 years. Out of 186, cases 102 were males and 84 were females (Figure 2). In group A, 50 were males and 43 females. In group B, there were 52 males and 41 females. In our study, various symptoms like earache, discharge, TM perforation, were observed. In Acetic acid group and in topical antibiotic group, number of patients suffering from different symptoms are mentioned in Table 3. Pre-treatment and post-treatment Ological Symptoms Score is mentioned in Table 4a and Table 4b.

According to this study, in group A, topical Acetic acid was found to be comparatively better regarding discharge resolution in 92% of the patients with healed perforation in 23% of them. While in group B discharge resolution was seen in 87% of the patients with healed perforation in 17% of the patients but statistically both the topical agents are equally effective.

In our study of 186 patients, in topical antibiotic group consisting of 93 patients, complaints of irritation were observed in 10 patients, ear-ache in 14 patients, bad taste in mouth in 15 patients and vertigo in 3 patients. 51 patients had no complain with topical antibiotic ear drops. Whereas amongst 93 patients in acetic acid group complain of irritation was seen in 18 patients, ear-ache in 11 patients, bad taste in mouth in 17 patients and vertigo in 2 patients. 45 patients had no complain with acetic acid drops instillation.

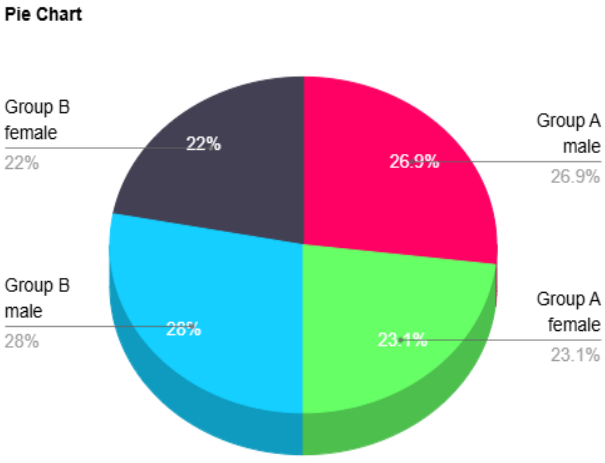

Fig 2: Gender wise distribution in both groups

Table 3: Symptoms wise distribution in both group

Symptoms	No. of patients (Group A) each out of 93	No. of patients (Group B)each out of 93
Earache	23	25
Perforation Right ear	47	42
Perforation Left ear	34	36
Both ear	12	15
Discharge	44	57

Table 4a: Pre-treatment Otological Symptoms Score

Feature	Group A				Group B			
Score	0	1	2	3	0	1	2	3
Discharge Quantity	39	22	18	14	36	24	20	13
Discharge Type	39	16	30	08	36	17	29	11
Congestion Degree	22	55	16	_	25	53	15	_

Table 4b: Post-treatment Otological Symptoms Score

Feature	Group A				Group B			
Score	0	1	2	3	0	1	2	3
Discharge Quantity	68	19	04	02	60	24	06	03
Discharge Type	68	06	16	03	60	09	18	06
Congestion Degree	71	20	02	_	63	24	06	_

Table 5: Side effects in both groups

	Irritation	Earache	Bad taste	Vertigo	None
Group A	18	11	17	02	45
Group B	10	14	15	03	51

4. Discussion

This study examined the efficacy of acetic acid versus topical antibiotics in treating otorrhea associated with chronic suppurative otitis media (CSOM), comparing their effects on symptom relief and side effects among patients. The findings offer critical insights into non-antibiotic alternatives for CSOM management, highlighting acetic acid as a viable treatment option in settings with antibiotic resistance concerns or ototoxicity risks.

The study's findings reveal comparable efficacy between acetic acid and gentamin drops in reducing otorrhea

symptoms, with a slight advantage in patient's comfort favoring gentamicin. The rates of side effects such as irritation, earache, and bad taste were similarly distributed between the two groups, suggesting both treatments' tolerability. However, the slightly higher incidence of irritation among the patients treated with acetic acid, though statistically non-significant, might influence patient's adherence to treatment in long-term management. This supports previous research underscoring acetic acid's effectiveness against resistant organisms, particularly *Pseudomonas aeruginosa*.

Importantly, the study draws attention to the emerging role of antiseptics in CSOM management, especially in resource-limited settings where antibiotic access and resistance are substantial barriers. While antibiotics like gentamicin remains highly effective, acetic acid's affordability, accessibility, and minimal side effects, position it as a valuable alternative, especially when ototoxicity is a concern. This aligns with recent studies promoting antiseptics as a safer, equally effective approach in select CSOM cases.

A study conducted by Gupta et al. in 2015 on 100 patients with CSOM, compared a topical antiseptic with aural toilet versus topical and systemic antibiotics for 3 months. Those patients who were treated with topical antiseptic showed otorrhea resolution in 84% of patients, healed perforation in 26% and a failure rate of 16%. Those who received antibiotics showed discharge cessation in only 58% patients, healed perforation in 14% and failure rate of 32%. The author concluded that perhaps aural toilet in combination of topical antiseptic is a superior choice as compared to oral and topical antibiotics for CSOM[20].

Vishwakarma et al. in 2015 had a similar study format with the same drugs, but the results were very different. As opposed to Gupta et al., which showed that topical antiseptics were vastly superior to topical antibiotics, this study showed that topical antiseptics were not superior, but that the results were comparable. It was that at day 14 both topical acetic acid and topical gentamycin showed and equal effect on the ontological symptom score with a non-significant p= 0.56[21].

The result of the above mentioned study are in contrast to the review conducted by Adriztina et al., which demonstrated that the efficacy of topical antiseptics to be at best variable[22] as well as Macfadyen et al. who reported that topical antibiotics were superior to topical antiseptics[23]. Overall, this study contributes to the ongoing exploration of cost-effective, safer CSOM treatments.

5. Conclusion

The study concludes that both acetic acid and topical gentamicin are effective in resolving otorrhea in patients with chronic suppurative otitis media (CSOM). While gentamicin showed a slight edge in terms of patient comfort, acetic acid presented as a viable alternative, especially for those with concerns about ototoxicity or antibiotic resistance. Given acetic acid's affordability, accessibility, and minimal side effects, it could be an effective option in resource-limited settings or where long-term antibiotic use is a concern. Future research with extended follow -up is suggested to further confirm these findings and evaluate the long-term efficacy and safety of acetic acid in CSOM management.

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