Bismuth Iodoform Paraffin Paste [bipp] Wick versus Topical Levofloxacin Drops in Rapid Drying of Wet Ear in Tubotympainic Chronic Suppurative Otitis Media

Said Mustafa Said Al Jaff
Ass. Professor, College of Medicine/ Hawler Medical University, Consultant Otolaryngologists, Rizgary Teaching Hospital. Email: Elaf3d@yahoo.com.

Abstract

Background and objectives: Topical ear drops have been the mainstay in the medical management of actively discharging chronic suppurative otitis media with central perforation. Bismuth Iodoform Paraffin Paste has been used over the past 30 years for various clinical purposes on skin and mucosa without any serious local or systemic adverse effects. The aim of this study was to evaluate if Bismuth Iodoform Paraffin Paste can be used topically in the treatment of chronic superlative otitis media–tub tympanic disease and to compare it with Levofloxacin ear drops.

Methods: Prospective comparative study was done in academic tertiary medical center and private clinic from March 2014 to March 2016. Sixty patients with chronic suppurative otitis media tub tympanic type were randomized into 2 groups. One group (30 patients) received Bismuth Iodoform Paraffin Paste wick after meticulous aural toilet by suction clearance and dry mopping with or without using microscope accordingly, while the other group (30 patients) received topical Levofloxacin ear drops. Results: Clinical improvement at the end of fourth day study was 90% in the BIPP group and 67% in the levoxacin group, and was 97%, 93% in BIPP, Levofloxacin group respectively, at the end of 10 day. The most commonly isolated organism was Pseudomonas aeruginosa. Conclusion: The results show that clinically, topical Bismuth Iodoform Paraffin Paste is more effective than topical levoxacin in this short time, besides; there is the benefit of low cost of therapy.

Keywords: araffin Paste; Chronic Suppurative Otitis Media.

Introduction

Topical ear drops have been the mainstay in the medical management of actively discharging chronic suppurative otitis media (CSOM) with central perforation[1]. Irreversible tissue damage and fibrosis caused by infection renders systemic therapy less effective. Bacterial pathogens in CSOM vary considerably and can be a combination of both aerobic and as anaerobic bacteria[2]. Gentamicin, ototopical preparations despite being proven to be ototoxic[3] until the introduction of ciprofloxacin hydrochloride. This drug is presently considered to be the gold standard, with studies proving its superior clinical and bacteriological efficacy as well as absence of ototoxicity[4-5]. However, with increasing clinical usage, quinolone resistance has been reported, especially following long-term therapy[6]. Bismuth Iodoform Paraffin Paste [BIPP] has been used over the past 30 years for various clinical purposes on skin and mucosa without any serious local or systemic adverse effects[7]. The antimicrobial spectrum of this agent is universal, including gram-positive and gram-negative bacteria, anaerobes, spores, mycobacterium, fungi, viruses, and protozoans[7]. In contrast to other antiseptics such as chlorhexidine and benzalkonium chloride, development of resistance has not been detected for polyvinyl pyrrolidone [PVP-I][8]. Experimental studies have demonstrated that PVP-I aqueous solution does not show any ototoxic potential[9-10] , BIPPS was the mastoid dressing of choice[11]. Povidone-iodine is readily available, chemically stable, and relatively inexpensive. On these grounds, 5% BIPP) was evaluated as a topical agent in the treatment of active CSOM–tubotympanic disease in comparison with topical 0.3% Levoxacin hydrochloride. Bismuth iodine paraffin paste is routinely used to pack nasal cavities. This was first used by James Morrison Rutherford [12] to dress First World War soldier's wounds. This is sterile gauze (ribbon) impregnated with a paste containing[13] [One part bismuth sub nitrate .Two parts Iodoform. One part sterile liquid paraffin by weight]. Bismuth sub nitrate is a topical astringent and antiseptic. It is not completely safe from complications[14] as can cause neurotoxicity because it isknown to interfere with oxidative metabolism of brain.

This complication is very rare when BIPP pack is used to pack the nasal cavity.

Iodoform: Its chemical name is triiodo methane. This is another component of BIPP pack. Iodine toxicity is common when BIPP packing is used to pack large wounds. BIPP pack can be left in situ safely without fear of infection either in the ear or nasal cavity for a period up to 10 days[15]. Contraindications for using BIPP Pack[16]: pregnancy, states of hypo / hyperthyroidism, and patients with known allergy to iodine.

Levoximed drops [Levofloxacin]: -Each ml contains Levofloxacin 5 mg. Used in otitis externa, acute and chronic otitis media, prophylaxis of infectious otitis before and after surgery, at ear traumas for local use. Otology: For otitis externa: Adults: 10 drops are instilled into effected ear 1 times per day during 7 days. Children from 1 year to 12 years old: 5 drops are instilled into effected ear 1 times per day during 7 days. For chronic suppurative otitis media (with perforation of tympanic membrane): patients at the age of 12 years and older 10 drops are instilled into effected ear 2 times per day during 14 days[17].

Patients and Methods

This comparative prospective study was conducted in the otolaryngology outpatient department of Academic tertiary medical center and private clinic, for two years from March 2014 to March 2016, to assess if BIPP could be used in the medical treatment of active CSOM–tubotympanic disease. The appropriate ethical approval is achieved from Hawler Medical College. Inclusion criteria for the study were confined to patients older than 12 years and having recurrent attacks of actively discharging CSOM with moderate to large central perforation. Exclusion criteria was chronic suppurative otitis media associated with cholesteatoma, aural polyp, or impending complications, patients with renal failure or those with known allergy to iodine or Fluoroquinolone. Patients who had recent systemic or topical antibiotic therapy within 10 days of starting the study. Ear swab was taken for culture and sensitivity before starting the treatment. After obtaining informed consent, the 2 drugs (BIPP and Levofloxacin) were randomly distributed among the study groups Of the 60 patients who entered into the study. Thirty were given BIPP Wick, sterile gauze (ribbon) impregnated with a paste, and thirty patients had Levofloxacin ear drops. All 60 patients who entered the study underwent meticulous aural toilet by suction clearance and dry mopping with aid of microscope some times. After an audiometric assessment, the patient was given either levoxacin ear drops and instructed to instill 7 drops [5mg per ml] 2 times daily by the tragal displacement method after dry mopping for a period of 10 days. Drops are instilled into effected ear two times per day during 10 days. The solution should be instilled into acoustic meatus. The patient lies down, directing the affected ear upwards and should stay in such position at least 5 minutes after drug instillation. The drops should flow down after instillation into acoustic meatus, pulling off earlap down and backwards. Cotton swab may be placed into acoustic meatus. It is recommended to warm the solution before instillation, holding it in hands for 1-2 minutes. Or, only putting BIPP pack as a wick inside the ear and informing the patent to remove it after 72 hours. These patients were asked to come back 4 days after commencing therapy. During their review visits, outcomes were evaluated by thorough examination by auoroscope and or microscopic and graded as actively discharging or inactive. Aural toilet was done at subsequent visits for both groups of patients if the ear was still discharging. Specific inquiries were made about any symptoms of ototoxic effects or allergy to the drug. At the end of 4 days, if the ear was still producing discharge, we continue in the same policy of the treatment according to groups for the next days until the end of ten days and follow up again. Communication done by cellphone and attending to clinic accordingly. A post study pure tone audiogram was done for comparing with the pre study audiogram to assess any change in hearing or any sensory neural deafness as side effect of any of both drugs. We have to mention that we prepare the BIPP with aid of special pharmacy according to international concentration which is BIPP Pack: This is sterile gauze

(ribbon) impregnated with a paste containing One part bismuth sub nitrate. Two parts Iodoform. One part sterile liquid paraffin[13].Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 20). Both T-Test (2 independent samples) and Chi square test of association were used to compare between proportions and means of the study groups & Fishers exact test. P-value of 0.05 or less was considered statistically significant.

Results

The study collects data of different aspect involving age, gender, information about the perforation and mucous membrane status. But we concentrate mainly about the outcome and the results of treatment [dryness of the middle ear] at the fourth day and after tenth day. As in tables and figures below which summarize different distributions of samples according to base line characters of the patients. P-value was non-significant regarding the age or gender of the patients affected by the disease.

Table (1): Distribution of sample by gender according to age groups.

	BIPP				Levofloxacin			
	Male		Female		Male		Female	
Age (years)	No.	%	No.	%	No.	%	No.	%
< 20	5	31.25	2	14.28	5	41.7	9	50
39-21	8	50	7	50	5	41.7	6	33.3
40	3	18.75	5	35.72	2	16.6	3	16.7
Total	**16**	**100**	**14**	**100**	**12**	**100**	**18**	**100**
	P = 0.4217				**P = 0.8854**			

The history of ear discharge period was non-significant regarding both groups randomly it was long history of frequent ear discharge between 5 to 10 years, Figure 1. While the episodes and the severity of ear discharge were nearly equally distributed in both group, Table 2 & Figure 2, respectively.

Figure (1): Distribution of sample by total duration of the ear discharge.

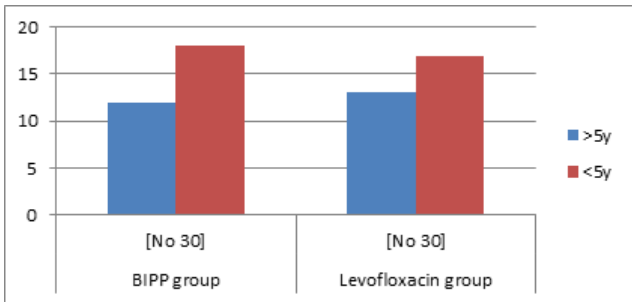
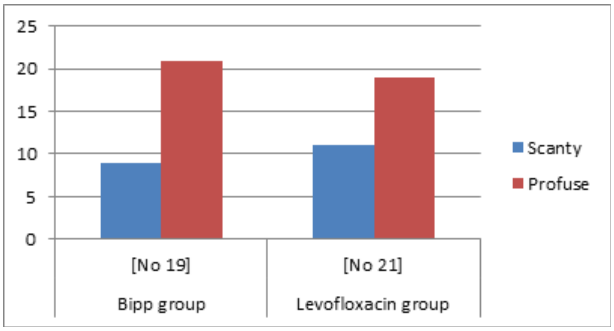


Table (2): Distribution of sample by episodes of ear discharge.

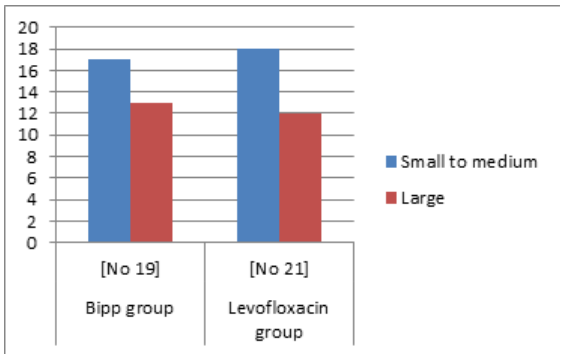
Episoid per Ws	Bipp group [No 30]	Levofloxacin group[No 30]
>1	9	10
4-2	17	15
<4	4	5

Figure (2): Distribution of sample by severity of ear discharge at presentation.



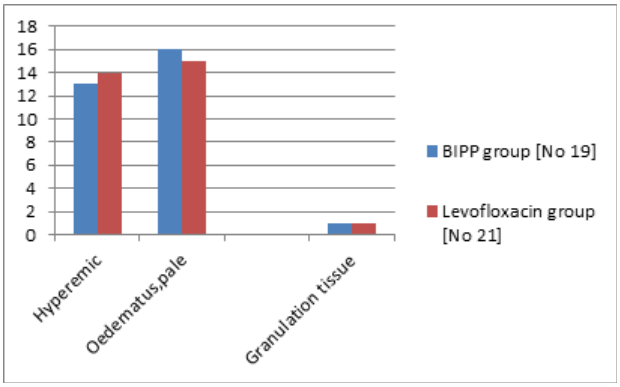
Regarding the size of perforation, no significant difference found regarding both groups it was ranging between small to medium and those with large perforation, almost equally distributed in both groups, Figure 3.

Figure (3): Distribution of sample by size of perforation.



Regarding the status of middle ear mucosa, it was mostly hyperemic edematous mucosal changes, and only two cases were with simple granulation tissue changes which also were almost equally distributed in both groups, Figure 4.

Figure (4): Distribution of sample by Status of middle ear mucosa.



At the end of the fourth day of the study, clinical improvement was 90% in BIPP group and 67% in Levofloxacin group, with the difference being statistically significant (P values 0.028), while at the end of ten day the improvement was 97% in BIPP group patients and 93% of the Levofloxacin group with the difference being statistically non-significant and the (P-value was 1), Table 3.

Table (3): Outcome after Treatment

BIPP group		Levofloxacin		drops group	
Days	Total	Inactive	Total	Inactive	P-value
4	30	%90)27)	30	%67)20)	0.028
10	30	%97)29)	30	%93)28)	1

Other factors such as age of the patient, total duration of disease, duration of present episode of ear discharge, severity of otorrhea at initial presentation, size of perforation, and status of middle ear mucosa were not found to significantly alter the outcome in both groups. The study not concentrates on bacteriological study of the discharge regarding the analysis of the causal organisms and their sensitivity to various antibiotics. Out of 60 swabs examined, the major organisms isolated were Pseudomonas aeruginosa (27.2%), followed by Staphylococcus aureus (23.6%), coli forms, [Escherichia coli, Klebsiella species, Enterobacter species. Only one patient in the BIPP group did not show clinical response. This patient had P aeruginosa which was susceptible to ciprofloxacin. No patient developed allergic manifestations or ototoxic effects. There was no deterioration of hearing as assessed by pure tone audiometric examinations.

Discussion

The results of this study confirm the efficacy of meticulous suction clearance [aural toilet] with BIPP pack in the ear versus daily use of ototopical agents in the treatment of actively discharging chronic suppurative otitis media [CSOM] with central perforation. Topical Levofloxacin is the gold standard in the antimicrobial treatment of active disease; It`s daily use can lead to emergence of resistant organisms and super infection with fungus. In addition, Levofloxacin is relatively expensive for use in developing countries. Therefore, BIPP is costeffective, non-antibiotic preparation with effective antimicrobial properties but with no potential to develop drug resistance and ototoxicity and it would be an ideal alternative in the treatment of CSOM–tubotympanic disease. In our hospital we have been using a combination of bismuth, Iodoform, and paraffin (BIPP) to pack mastoidectomy cavities following surgical procedures on the ear for over 30 years with no incidence of ototoxicity. In their study comparing xeroform and BIPPS, Chevretton et al[11] have concluded that BIPPS was the mastoid dressing of choice. Povidone-iodine is readily available, chemically stable, and relatively inexpensive. On these grounds, 5% BIPP) was evaluated as a topical agent in the treatment of active CSOM tubotympanic disease in comparison with topical 0.3% Levoxacin hydrochloride. Questions may arise in mind about how this BIPP act on middle ear mucosa while it is in external canal. Simply, this may be due to vaporizations of active ingredient of the BIPP in the body temperature and doing its action of disinfection and drying activity on middle ear mucosa. Study done by C. Jaya, on the evaluation of topical Povidone-Iodine in Chronic Suppurative Otitis Media[18] concluded that their study was the first study to evaluate the efficacy of (polyvinyl pyrrolidone) PVP-1 in local treatment of Chronic Suppurative Otitis Media. The results show that clinically, topical PVPI is as effective as topical ciprofloxacin, with a superior advantage of having no in vitro drug resistance. Also, there is an added benefit of reduced cost of therapy. Clinical improvement at the end of study was 88% in the PVPI

group and 90% in the ciprofloxacin group. The most commonly isolated organism was Pseudomonas aeruginosa[18] .Chronic suppurative otitis media (CSOM) is a perforated tympanic membrane with persistent drainage from the middle ear (i.e., lasting >6-12 wk)[19-20]. So the aim is to make the ear dry and inactive then to close the perforation later on the chronically draining ear in CSOM can be difficult to treat[21] .Much of the morbidity of CSOM comes from the associated conductive hearing loss and the social stigma of an often fetid fluid draining from the affected ear. The mortality of CSOM arises from associated intracranial complications. CSOM itself is not a fatal disease. Although some studies report sensorineural hearing loss as a morbid complication of CSOM, other evidence conflicts with this claim[22].In our study, BIPP was found to be clinically as effective as Levofloxacin (97% vs.93%) at the end of 10 days while it was more effective in short period of time as drying the ear in fourth day of examination and use [90% to 67%] with no adverse effects. Although no definite cause for treatment failure in these groups could be ascertained, it is possible that these patients were noncompliant.

Conclusions

The results show that clinically, topical BIPP Wick is more effective than topical levoxacin regarding the time and not of daily using the drops and in short time with no mentioned resistance. Also, there is a benefit of low cost of therapy. This study which was performed on a small sample suggests that topical BIPP is effective for treatment of CSOM and may be considered as an alternative to antibiotic therapy.

References

1. Youngs R. Chronic suppurative otitis media-mucosal disease. In: Ludman H, Wright T, editors. Diseases of the Ear. 6th ed. London, England: Edward Arnold Publishers
Ltd; 1998: pp. 374-385.

2. Jokipii AMM, Karma P, Ojala K, Jokipii L. Anaerobic Bacteria in Chronic Otitis Media. Arch Otolaryn
gol.1977;103(5): 278-80.

3. Rohn GN, Meyerhoff WL, Wright CG. Ototoxicity of topical agents. Otolaryngol Clin North Am. 1993 Oct;26(5):747-58.

4. Fradis M, Brodsky A, Ben-David J, Srugo I, Larboni J, Podoshin L. Chronic otitis media treated topically with ciprofloxacin or tobramycin. Arch Otolaryngol Head Neck Surg. 1997;123(10):1057-60.

5. Tutkun A, Ozagar A, Koç A, Batman C, Uneri C, Sehitoglu MA. Treatment of chronic ear disease. Topical ciprofloxacin vs topical gentamicin. Arch Otolaryngol Head Neck Surg. 1995;121(12):1414-6.

6. Paton JH, Reeves DS. Fluoroquinolone antibiotics. Microbiology, pharmacokinetics and clinical use. Drugs. 1988;36(2):193-228.

7. Fleischer W, Reimer K. Povidone-iodine in antisepsisstate of the art. Dermatology. 1997; 195 Suppl 2:3-9.

8. Kunisada T, Yamada K, Oda S, Hara O. Investigation on the efficacy of povidone-iodine against antiseptic-resistant species. Dermatology. 1997; 195 Suppl 2:14-8.

9. Perez R, Freeman S, Sohmer H, Sichel JY. Vestibular and cochlear ototoxicity of topical antiseptics assessed by evoked potentials. Laryngoscope. 2000;110 (9):1522-7.

10. Aursnes J. Ototoxic effect of iodine disinfectants. Acta Otolaryngol. 1982; 93(1-6):219-26.

11. Nigam A. Mastoidectomy packs: Xeroform or BIPP? J Laryngol Otol. 1992; 106 (4):387-8.

12. Sharma RR, Cast IP, Redfern RM, O'Brien C. Extradural application of bismuth iodoform paraffin paste causing relapsing bismuth encephalopathy: a case report with CT and MRI studies. J Neurol Neurosurg Psychiatry. 1994; 57(8):990-3.

13. PVM Lim et al. Hypersensitive allergic reaction following use of BIPP pack following ear surgery. The journal of laryngology and otology. 1998; 112:88-98.

14. Wilson AP. The dangers of BIPP. The Lancet. 1994; 344(8933):1313-4.

15. Chevretton EB, McRae RD, Booth JB. Mastoidectomy packs: Xeroform or BIPP? The Journal of Laryngology & Otology. 1991;105 (11):916-7.

16. Stanbury JB, Ermans AE, Bourdoux P, Todd C, Oken E, Tonglet R, et al. Iodine-induced hyperthyroidism: occurrence and epidemiology. Thyroid. 1998; 8 (1):83-100.

17. Anonymous. Levoximed (Levofloxacin) eye/ ear

drops. [Internet]. [cited 2017 Jan 17]. Available from: http://www.wmophthalmics.com/levoximed_eye_eadrops.asp.

18. Jaya C, Job A, Mathai E, Antonisamy B. Evaluation of topical povidone-iodine in chronic suppurative otitis media. Archives of Otolaryngology–Head & Neck Surgery. 2003;129(10):1098-100.

19. Matsuda Y, Kurita T, Ueda Y, Ito S, Nakashima T. Effect of tympanic membrane perforation on middle ear sound transmission. J Laryngol Otol Suppl. 2009; (31):81-9.

20. Wright D, Safranek S. Treatment of otitis media with perforated tympanic membrane. Am Fam Physician. 2009;79(8):650, 654.

21. Vikram BK, Khaja N, Udayashankar SG, Venkatesha BK, Manjunath D. Clinico-epidemiological study of complicated and uncomplicated chronic suppurative otitis media. J Laryngol Otol. 2008; 122 (5):442-6.

22. Jensen RG, Koch A, Homøe P. The risk of hearing loss in a population with a high prevalence of chronic suppurative otitis media. Int J Pediatr Otorhinolaryngol. 2013; 77 (9):1530-5.