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RESEARCH ARTICLE

THE EFFECTIVENESS OF POVIDONE IODINE PAINT IN DECREASING RISKS OF OTITIS EXTERNA AND OTOMYCOSIS AFTER EAR SYRINGING

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ABSTRACT

Otitis externa and otomycosis are the common presenting complications of ear syringing encountered by otolaryngologists .So a prospective study carried out in three private ENT clinics in Baghdad from (January 2016 to february 2017) to evaluate effectiveness of povidone iodine 10% paint after ear syringing in reducing these complications . In this study , 300 ears syringing were performed .Our patients were divided in to groups , group A , constitutes 150 patients ,after preparation of them , ear syringing , moping, povidone iodine 10% paint on external ear canal was done for them. While group B, 150 patients, ear syringing , moping (without povidone iodine 10% paint) .Results : 10 patients (6.67%) from group B develop otitis externa within three days of syringing while no one from group A. Also 4 patients (2.67%) from group B develop otomycosis within 7 days after ear syringing while no one from group A develop otomycosis .So we find that povidone iodine 10% is very effective in reducing the risk of fungal and bacterial infection after ear syringing .

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INTRODUCTION

Applied Anatomy: The external ear consists of the auricle and the external ear canal. The auricle, with the exception of its lobule, is formed by a framework of elastic cartilage. The perichondrium is tightly bound to the cartilage on its lateral surface and more loosely bound to its medial surface. Sebaceous glands and hair follicles are found in the subcutaneous layer of the auricle. Adipose tissue is generally restricted to the lobule, Keratinizing squamous epithelium covers the auricle. The ear canal measures approximately 2.5 cm in length, with the anterior portion approximately 6mm longer than the posterior wall. The lateral one third of the canal possesses a cartilaginous skeleton, a subcutaneous layer containing hair follicles, sebaceous and apocrine glands, and a squamous epithelial surface layer. The hydrophobic, slightly acidic PH 6.0 to 6.5) cerumen is formed by glandular secretions and sloughed epithelium in this portion of the canal. Transverse slits on the floor of the cartilaginous canal (the fissures of Santorini) allow for spread of infection or neoplasms from the external canal to the soft tissues surrounding the ear canal. The osseous portion of the canal begins at the narrow isthmus and is formed mostly by the tympanic portion of the temporal bone and a thin layer of squamous epithelium continuous with the lateral surface of the tympanic membrane. It lacks a subcutaneous layer. The skin of the ear canal possesses a unique, self-cleansing mechanism. The sloughed keratinous layer of tympanic membrane migrates in a centrifugal fashion to the ear canal. This migratory process continues from the medial to lateral portions of the osseous canal, where the sloughed epithelium is deposited into the cartilaginous portion of the canal and is extruded as a component of cerumen (3).

Wax production: Wax is produced by the hair-bearing skin of the external auditory canal. Wax is a combination of desquamated skin and cerumen formed by glands in the base of the hair follicles. Hairs are present in the outer third of the external canal. Most external canals are self-cleaning with the desquamated skin migrating up to the hair follicles where it is separated from the dermis and mixes with the cerumen to form wax. The wax migrates down the hair and falls out of the ear canal . The most common finding is partial obstruction of the canal. This is amenable to removal by either syringing, probe removal or removal under microscopic control. Syringing is popular with general practitioners and nurses while specialists prefer removal by Jobson Horne probe or by suction under microscopic control. Other techniques such as the use of ear candles have been discredited and may actually cause harm (1)

Wax softening: Occlusive wax, especially if adherent to the canal wall, may need to be softened prior to removal.

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Randomized controlled trials have shown no difference between the effectiveness of water and the various commercial preparations as measured by the amount of water required for wax removal. However, softeners are more effective than no treatment in that they can reduce the need to syringe an ear.' To soften the wax, the patient is asked to turn their head on the side to allow the external canal to be filled with water and liquid soap (decreases surface tension of water) or a wax softener. The tragus is then pushed in and out to aid penetration into the wax. The patient should continue this for about 20 minutes prior to syringing. If the wax remains adherent and resistant to syringing, the patient should be sent home with instructions to repeat this manoeuvre regularly for the rest of the day and the next morning before syringing is attempted again. Failure again ensures a referral to an ear, nose and throat (ENT) surgeon for removal, usually under microscopic control.

Ear Syringing: Syringing is indicated in patients with ear symptoms where wax obstructs the view of the tympanic membrane. Care should be taken in patients who have had previous ear surgery, have only one hearing ear or perforation of the tympanic membrane as there may be pathology present which when recognized after syringing, could be attributed by the patient to the syringing. A syringe with a metal or plastic cannula is required. Care must be taken to ensure that the cannula is firmly fixed to the syringe to prevent it being shot off the syringe into the ear canal. A luer-lock syringe is preferred. The syringe is filled with warm water at body temperature. A headlight should be worn to illuminate the external canal adequately, while the canal is straightened by pulling the pinna posterosuperiorly. If a gap is present between the wax and the canal wall, the stream of water should be bounced off the wall at that point. This allows water pressure to be generated behind the wax plug and will result in its extrusion . If there is no gap, the stream of water should be directed at the junction of the wax and the canal and a gap created allowing the water to generate pressure behind the wax plug. Depending on the size of the wax plug, a number of syringefuls may be required before extrusion occurs. Once otoscopy confirms the clearance of the wax plug, the canal needs to be dried with either a piece of string placed down the ear canal or by mopping the canal.

Mopping the ear canal: A mop can be used to dry the ear canal after syringing or to remove discharge or debris from the ear canal. This allows visualization of the underlying canal and tympanic membrane, but also forms an important part of the treatment as drops that do not come into contact with the external canal skin but rather with debris or pus, will not be as effective in reducing patient symptoms." A mop is made by winding a thinned out piece of cotton wool around the end of an orange stick. Care should be taken to ensure that the stick extends only half way into the cotton wool mop and that the mop is about the same diameter as the stick. The protrusion of cotton wool beyond the end of the stick will ensure that if the mop touches either the deep canal skin or the tympanic membrane, no damage will occur or pain be felt.

Otitis Externa: Otitis externa is a spectrum of infection of the external auditory canal. The appearance of the canal varies according to the time course the of infection: acute, subacute, or chronic. Acute otitis externa is a bacterial infection of the canal caused by a break in the normal skin/cerumen protective barrier in the milieu of elevated humidity and temperature. Although commonly called "swimmer's ear," AOE may be caused by anything that results in the removal of the protective lipid film from the canal, allowing bacteria to enter the apo pilosebaceous unit. It usually begins with itching in the canal and is commonly caused by instrumenting the canal with a cotton swab or fingernail. This temporarily relieves itching but allows proliferation of bacteria in locally macerated skin and sets up an itch-Scratch cycle. The warm, dark moist setting of the canal is now a perfect medium for rapid bacterial growth. Later, pain ensues as the swollen soft tissues of the canal distract the periosteal lining of the bony canal. As the disease progresses, purulent discharge begins, and the auricle and periauricular soft tissues may become involved.

Incidence and Epidemiology

Acute otitis externa affects approximately 4 of every 1000 children and adults per year.' Approximately 80% of cases occur in the summer, particularly in warm, humid environments. Other predisposing factors include anatomic obstructions of the ear canal (e.g., stenosis, exostses, impacted cerumen), hearing aid or ear plug use, self-induced trauma (e.g., by cotton swabs), and swimming.

Investigations: Investigations are rarely required for cases of otitis externa. Cultures for bacteria and fungus are indicated in cases of persistent or refractory infection, particularly to identify fungal infection. Special reference must be made to the value of sensitivities of the infectious organism to various antibiotics provided by laboratory culture tests. These sensitivities are based on expected tissue levels of systemically administered he antibiotics. Sampling of otorrhea after administration of topical preparations has shown a concentration of antibiotic several orders of magnitude greater than can be obtained by systemic administration, however, even 8 hours after dosing. Organisms listed as resistant to a particular antibiotic are likely to be susceptible to the antibiotic when it is given topically. This is true for so-called resistant cases of Pseudomonas sp or methicillin-resistant Staphylococcus aureus. As long as the topical drop can reach the infected site, systemic antibiotics are unnecessary even in cases of infection by "resistant" bacteria. Biopsy of the external auditory canal should be undertaken in cases of presumed otitis externa that do not respond to appropriate antimicrobial therapy. Biopsy is done to exclude malignancy, most commonly squamous cell carcinoma of the ear canal skin, which may manifest with otalgia and otorrhea and may be misdiagnosed as infection.

Management Options

Aural toilet: Toilet remains the most effective single treatment for otitis externa. Although one primary care review claims irrigation of the ear canal is effective for the removal of debris." 'l expert opinion is generally against this and most specialists will perform aural toilet with or without microscopic assistance. There have been case reports of severe complications as a result of irrigation. As microscopic toilet is not readily available to most general practitioners, patients are often treated with steroid antibiotic medication in the form of drops or sprays without prior toilet

Topical medication: The sensitivity of the bacteria to the antibiotic in topical mediation does not seem to influence outcomes. Most otolaryngologists and to reserve microbiological investigation for resistant or high-risk cases.

The use of a wick such as 1-cm ribbon gauze or a Pope otowick is often used to hold medication in the external auditory meatus . Glycerol and ichthammol (90:10 percent) is commonly used with an aural wick for moderate and severe cases of otitis externa. It has proven dehydrating and antiinflammatory properties and antibacterial activity against Streptococci and Staphylococci, but poor activity against Pseudomonas. The dehydrating effect reduces canal oedema and also helps reduce pain, but oral analgesia is usually necessary in moderate or severe cases, Nonsteroidal anti inflammatories, if not contraindicated, are excellent analgesics for otitis externa. Aural medication commonly causes stinging or burning which may decrease compliance and topical sensitivity is a common feature,especially in resistant or recurrent cases.

Povidone-iodine: Povidone-iodine, is an antiseptic used for skin disinfection before and after surgery (4) (5) It may be used both to disinfect the skin of the patient and the hands of the healthcare providers (5) It may also be used for minor wounds (5) If may be applied to the skin as a liquid or a powder (5). Side effects include skin irritation. If used on large wounds kidney problems, high blood sodium, and metabolic acidosis may occur. It is not recommended in people who are less than 32 weeks pregnant or are taking lithium (5). Frequent use is not recommended in people with thyroid problems (5). Povidone-iodine is a chemical complex of povidone, hydrogen iodide, and elemental lodine.lt contains from 9% to 12% available iodine (6). It works by releasing iodine which results in the death of a range of microorganisms. Povidone-iodine came into commercial use in 1955 (7). It is on the World Health Organization's List of Essential Medicines, the most effective and safe medicines needed in a health system (8).

Medical uses: Povidone-iodine is a broad spectrum antiseptic for topical application in the treatment and prevention of wound infection. It may be used in first aid for minor cuts, grazes, burns, abrasions and blisters. Povidone iodine exhibits longer lasting antiseptic effects than tincture of iodine, due to its slow absorption via soft tissue, making it the choice for longer surgeries. Chlorhexidine provides similar results, but with equal toxicity concerns. Bacteria do not develop resistance to PVP. (9) Consequently, PVP-1 has found broad application in medicine as a surgical scrub; for pre- and post-operative skin cleansing, for the treatment and prevention of infections in wounds, ulcers, cuts and burns; for the treatment of infections in decubitus ulcers and stasis ulcers, in gynecology for vaginitis associated with candidal, trichomonal or mixed infections. For these purposes PVP- has been formulated at concentrations of 7.5-10.0% in solution, spray, surgical scrub, ointment, and swab dosage forms. Because of these critical indications, only sterile povidone-iodine should be used in most cases. Non-sterile product can be appropriate in limited circumstances in which patients have intact, healthy skin that will not be compromised or cut. It should be noted that the non-sterile form of Povidone iodine has a long history of intrinsic contamination with B. cepacia, and other opportunistic pathogens. Its ability to harbor such microbes further underscores the importance of using sterile products in any clinical setting.

Alternatives : There is tentative evidence that chlorhexidine and denatured alcohol used to clean skin prior to surgery is better than povidone-iodine with alcohol, however, the evidence is not strong enough as of 2015 to determine routine practice.

Contraindications: PVP-I is contraindicated in patients with hyperthyroidism (overactive thyroid gland) and other diseases of the thyroid, after treatment with radioiodine, and in patients with dermatitis herpetiformis (Duhring's disease) (11)

Side effects: The sensitization rate to the product is 0.7% (12).

Interactions: The iodine in PVP-I reacts with hydrogen peroxide, silver, taurolidine and proteins such as enzymes, rendering them (and itself) ineffective. It also reacts with many mercury compounds, giving the corrosive compound mercury iodide, as well as with many metals, making it unsuitable for disinfecting metal piercings. Iodine is absorbed into the body to various degrees, depending on application area and condition of the skin. As such, it interacts with diagnostic tests of the thyroid gland such as radioiodine diagnostics, as well as with various diagnostic agents used on the urine and stool, for example Guaiacum resin (11).

MATERIALS AND METHODS

This is a prospective comparative study of 300 ears syringing were performed in three private ENT clinics in Baghdad from (January 2016 to february 2017) to evaluate effectiveness of povidone iodine 10% paint after ear syringing in decreasing otitis externa and otomycosis.

We divided our patients in two groups

Group A: this group constitute 150 patients, after preparation of them, ear syringing, moping, povidone iodine 10% paint on external ear canal was done for them.

Group B: This group constitute 150 patients, after preparation of them, ear syringing, moping,((without povidone iodine 10% paint on external ear canal)) we are excluding the children below 10 years and old age more than 70 years old , also we exclude patients with hyperthyroidism (overactive thyroid gland) and other diseases of the thyroid

RESULTS

After analysis of data from the questionnaire formula, the following results are obtained.

Age Distribution: The commonest age group affected was between 61-70 years (old age) while the least common age group affected was between 10_20 years (young adults).

Age (years)	No.of patients	Percentage %
10_20	8	2.6 %
21_30	18	6%
31_40	40	13.3%
41_50	62	20.7%
51_60	72	24%
61_70	100	33.3%

Sex Distribution: Male patients were 188 (62.7%) while female patients were 112(37.3%), male: female ratio 1.68:1

Sex	*No.of patients*	*Percentage %*
Male	*188*	*62.7%*
Female	*112*	*37.3%*

Symptoms: most of patients in our study complaint from difficulty in hearing 250 patients (83%) and least of patients complaint of itchy ears 7 patients (2.3%).

Symptoms	no.of patients	percentage %
Difficulty hearing	250	83%
Pain	20	6.7%
Noises	13	4.3%
Dizziness	10	3.3%
Itchy ears	7	2.3%

Complication of ear syringing: The most serious complications of ear syringing in our study are otitis externa and otomycosis, all of then from group B, (otitis externa 10 patients (6.67%), within three days, and otomycosis 4 patients (2.67%), within seven days). while no one develop same complications in group A , that mean we can prevent these complications by using povidone iodine 10% paint after ear syringing , also many patients develop mild vertigo (15 %) from each group, A and B, resolve spontaneously after minutes of ear syringing . No one in our study develop sensitization to povidone iodine.

goup	otitis externa	otitis media	otomycosis	tympanic membrane trauma	vertigo
A	0	0	0	0	15 (10%)
B	10 (6.67 %)	0	4 (2.67 %)	0	15 (10%)

Microbiology of Otitis Externa and otomycosis

Organism	*percentage %*
Pseudomonas aeruginosa	*5 patients 35.7 %*
Staphylococcus epidermidis	*1 patient 7 %*
Staphylococcus aureus	*1 patient 7 %*
Coryneform (diphtheroids)	*1 patient 7 %*
Other gram-negative rods	*1 patient 7 %*
Streptococcus, Enterococcus	*1 patient 7 %*
Aspergillus, Candida	*4 patients 28.57 %*

DISCUSSION

Ear syringing is a common clinical procedure in primary health care, and otitis externa and otomycosis are common presenting serious complications encountered by otolaryngologists after ear syringing so by using Povidone-iodine paint after syringing we prevent these complications , also many patients (10%) in our study develop mild vertigo after syringing from each group (A and B) , so i advise to do other study for benefit of antivertigo drugs before ear syringing to reduce the risk of vertigo.

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