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RESEARCH ARTICLE

ROLE OF TRICHLOROACETIC ACID AND PAPER PATCHING IN CLOSURE OF TYMPANIC MEMBRANE PERFORATIONS: OUR EXPERIENCE

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ABSTRACT

Perforations of tympanic membrane are a common cause for seeking otologic consultation, the etiology being infectious, traumatic or iatrogenic. Surgical repair of the tympanic membrane using various types of tissue grafts (e.g. temporalis fascia, perichondrium, cartilage etc.) by various researchers by using various techniques is generally accepted. Surgery however has its own inherent morbidity, besides being expensive and time consuming. Failure rates increase with history of recurrent infections and revision myringoplasty.Considering the above factors, chemical cauterization using TCA of margins of perforation with paper patching of perforation , not only avoids the above mentioned complications, but is cost effective and time saving for both the doctor and the patient. The most widely used chemical for closure is trichloroacetic acid (TCA).The purpose of this study was to report the results of chemical cauterization with TCA and paper patch myringoplasty performed as an out-patient procedure. This study was carried out in a tertiary care hospital (SHKM GMC NUH, Haryana, India) from november 2017 to june 2018.Patients with small central perforation involving single quadrant of pars tensa not exceeding 4 mm in diameter (estimated using calipers under microscope) with AB gap < 40 db were selected. Under microscope, the margins of perforation were de-epithelialised with 50% TCA. Cigarette paper patch (pre-sterilized by placing in ethylene oxide gas chamber) was trimmed to provide approximately 1-2 mm overlapping margins along the periphery of the perforation.

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INTRODUCTION

Perforations of tympanic membrane are a common cause for seeking otologic consultation, the etiology being infectious, traumatic or iatrogenic. Surgical repair of the tympanic membrane using various types of tissue grafts (1) (e.g. temporalis fascia, perichondrium, cartilage etc.) by various researchers by using various techniques is generally accepted. Surgery however has its own inherent morbidity, besides being expensive and time consuming. Complications of surgical myringoplasty include injury to ossicles, chorda tympani nerve, besides the risk of anesthesia. Failure rates increase with history of recurrent infections and revision myringoplasty (2). Considering the above factors, chemical cauterization using TCA of margins of perforation with paper patching of perforation, not only avoids the above mentioned complications, but is cost effective and time saving for both the doctor and the patient.

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The most widely used chemical for closure is trichloroacetic acid (TCA). The use of TCA for chemical cauterization of margins of perforation was introduced by Okuneff in 1895 (3).

AIMS AND OBJECTIVES: The purpose of this study was to report the results of chemical cauterization with TCA and paper patch myringoplasty performed as an out-patient procedure.

MATERIAL AND METHODS

This study was carried out in a tertiary care hospital (SHKM GMC NUH, Haryana, India) from november 2017 to june 2018.Patients with small central perforation involving single quadrant of pars tensa not exceeding 4 mm in diameter (estimated using calipers under microscope) with AB gap < 40 db were selected. Under microscope, the margins of perforation were de-epithelialised with 50% TCA. Cigarette paper patch (pre-sterilized by placing in ethylene oxide gas chamber) was trimmed to provide approximately 1-2 mm overlapping margins along the periphery of the perforation.

Subsequently, a cotton-tipped applicator soaked in ciprofloxacin ear drops was used to wet the paper to enable it to adhere to the remaining tympanic membrane. The paper patch was secured with 1-2 pieces of gelfoam. The patients were followed up weekly till the perforation was completely healed or till 8 weeks. If the perforation did not heal in maximum 8 weeks, it was considered as treatment failure and patient was taken for surgical tympanoplasty. Once the perforation healed, a repeat PTA was performed after 3 months to compare pre and post procedure hearing status.

RESULTS

During the study period, 50 patients were enrolled. Of these, 22 were males and 28 were females with age ranging from 16 to 58 years. All patients had central perforations and surrounding pars tensa was well vascularized. Perforations were classified based on the quadrant of pars tensa involved (as depicted in Table 1), and etiology of perforation (as depicted in Table2). Most commonly involved quadrants were antero-inferior and postero-inferior. Most common etiology of perforation was inflammatory, followed by traumatic. In all cases, the procedure was tolerated well without any complications. The procedure was successful (i.e. closure of perforation and air-bone gap within 15 db) in 45 cases (90%). The 5 cases with failure were taken up for surgical myringoplasty later.

Table 1. Distribution of Patients based on quadrant of pars tensa involved

Quadrant involved	No. Of patients
Antero-superior	5
Antero-Inferior	20
Postero-Superior	10
Postero-Inferior	15
Total	50

Table 2. Distribution of patients based on etiology of tympanic membrane perforation

Etiology	No. Of patients
Inflammatory	28
Iatrogenic	2
Traumatic	14
Residual perforation Post- surgery	6
Total	50

DISCUSSION

In permanent perforation, the outer epithelial layer grows medially along the edge of the perforation to contact the inner layer preventing spontaneous closure. This epithelium should therefore be removed using chemical cauterization (TCA used in this study). This also stimulates epithelial proliferation. The paper patch acts as a scaffold for the epithelium to grow over (4). For some patients, the risks, cost and inconvenience of myringoplasty are significant concerns. These patients benefit from simple , inexpensive non-surgical office based procedures, with the topical application of TCA found to be the best individual procedure (5). Here we combine it with paper patching to bridge the perforation and promote healing. The size of tympanic membrane perforation has been reported to be the prognostic indicator for successful patch procedure. In study by Golz et al, the closure rates were 55.7% in small perforations while that for larger perforations (>5mm) the closure rate was 12.5% (6). They recommended paper patching as the first treatment option for tympanic membrane perforations smaller than 5 mm. Lee et al evaluated only chronic otitis media and followed up the cases through five trials of paper patching., concluding that tympanic membrane perforations less than 4 mm had significantly higher closure rates (7). Park et al have also reported that the outcome predictor of paper patch myringoplasty was perforation size (8). We did not use any oral antibiotics post procedure based on the study of Kotecha et al concluding that prophylactic antibiotic did not influence the success rate of myringoplasty (9) Iatrogenic trichloroacetic acid injury causing necrotizing otitis media, hearing loss and facial paralysis has been reported. This did not occur in our series (10).The success rate of procedure in our study is 90% which is similar to or better than that reported by various authors. We have not performed this procedure in pediatric patients. So no conclusion can be made regarding results in these patients. The possibility of performing this as an out-patient procedure has cut down the waiting list and created time and space for other procedures.

CONCLUSION

In carefully selected patients with small central perforation of tympanic membrane, chemical cauterization with TCA and paper patching can yield results comparable to that of surgery , while abating the morbidity and and psychological trauma of surgery. Though multiple visits are required, it is a safer, more economical procedure. Since it can be performed as an out-patient procedure, it saves the patient from long waiting periods for surgery.

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