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RESEARCH ARTICLE

ROLE OF MINIMAL INVASIVE PROCEDURES FAT GRAFT MYRINGOPLASTY AND TRICHLORACETIC ACID CAUTERIZATION IN CASE OF DRY SMALL CENTRAL TYMPANIC MEMBRANE PERFORATIONS

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Abstract

Background: Day care surgeries have now become an integral part of modern otolaryngology. Fat graft myringoplasty and trichloracetic acid cauterization are cost effective, safe minimal invasive procedures having a success rate comparable to that of conventional Tympanoplasty. Conventional Tympanoplasty is time consuming, has greater morbidity is costlier and require more days of absenteeism as compared to these two office procedures.
Material and methods: The study was carried out over a period of 2 years on 58 selected patients. All the selected patients were divided into two groups. Group A and Group B.Group A patients underwent fat graft myringoplasty and Group B patients underwent chemical myringoplasty by using trichloracetic acid cauterization.
Results: On Follow up after 3 month there was complete closure of perforation in in 26 out of 28 cases of group A and 26 out of 30 cases in group B. Comparisons of the results were done using Fisher Exact Test. The difference between the two results was statistically insignificant with a p value of 0.5532.This indicates that both the office procedures are equally effective.
Conclusion: Both these procedures are minimally invasive, safe and cost effective procedures and have results comparable to conventional tympanoplasty.

Introduction:-

Hippocrates (460-377 BC) was the first to regard the tympanic membrane as a part of organ of hearing and described it as a dry, thin spun web.[1] The tympanic membrane got its name from Gabriel Fallopius of Padua (1523-1562), who was the first to use the term "tympanum." The tympanic membrane is frequently injured and the relative incidence of myringeal lesions has been reported to range from 0.4% to 2.3% of all disorders of the ear .[2] Persistence of tympanic membrane perforation has long been a challenge to medical science. The central perforation can be divided into two groups on the basis of the causes: 1) traumatic and 2) inflammatory.

A perforation in the tympanic membrane makes it very difficult for the sufferer to take part in water sports. A person may be unfit for some skilled jobs such as air pilot or scuba diving if he or she is having a perforated drum.[3]For the closure of tympanic membrane perforation, a

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number of methods have been used.[4,5,6] Surgical repair of the tympanic membrane using various types of tissue grafts (e.g., skin, temporal fascia and perichondrium) by various researchers by using various techniques is generally accepted.[7] Okeneff in 1895 started the use of trichloracetoic acid for cauterization which have now become the agent of choice for removal of old epithelial margins helps in establishing the natural pattern of migration of epithelium of perforated tympanic membrane, hence helping to achieve healing.[8,9,10,11,12] Repeated cauterization is required at the rim of the perforation to close it, which often results in a very thin atrophic scar due to thinning of the lamina propria from its normal thickness of 100 μm to approximately 2-3 μm.[8,9] Different patching materials have also been used for promoting healing of tympanic membrane perforation,for example, absorbable gelatin sponge was introduced.[7]

Ringenberg in 1962 first reported the fat graft myringoplasty.[13] Several other others have also reported their experience with fat graft myringoplasty, and most of those investigators noted that the success rate of closure of the perforation ranged between 76 and 100 percent.. Fat graft myringoplasty is an easy, quick and cost-effective method of tympanic membrane perforation closure with minimal morbidity. It can be done as an out patient department or office procedure. The fat is readily available from ear lobule, abdomen, and buttocks.

Material And Methods:-

The study was carried out at dr ulhas patil medical college jalgaon in the department of ENT from january 2017 to jan 2019 for a duration of two years.The age of the patients included for the study were 15-50 years with mean age 28.4 years . All the patients had dry central central perforation of the size of 3-4 mm, with mild hearing loss . The causes of perforation were trauma, otitis media or post Tympanoplasty residual perforation. All the patients have for atleast six month perforation and all the patients agreed for follow up for 6 months post operatively were included in the study. Detailed ENT examination was done. Tympanic membrane perforations were assessed. Any pathology in the tympanic cavity was ruled out. Hearing assessment was carried out by tuning fork test and pure tune audiometry. Nasopharyngeal pathologies were ruled out in all the patients. Patients were divided into two groups, Group A and Group B. Written and proper informed consent were taken from all the patients. Fat myringoplasty was done under local anesthesia using 2% adrenaline and lignocaine solution 1:200000. About 3 ml of solution was injected in the ear lobule area and about 1-2 ml in the four quadrants of external auditory canal. About 1cm size incision was given on the posterolateral aspect of ear lobule. A single piece of fat of the size of double the perforation size was harvested.

The wound was closed by using a 3-0 ethylone. The edges of the tympanic membrane perforation were freshened by using a sickle knife. The harvested fat plug was then wedged snugly like a dumb bell. One part of the dumb bell was placed in the middle ear and other lateral to the tympanic membrane, supported by few pieces of gel foam on the lateral surface. The patients were started on a 7 day course of oral antibiotics and antihistaminic and were discharged 4-6 hours after the procedure. patients were advised to use antibiotic ear drops for at least 2 weeks .Patients were advised to keep ear dry , to avoid straining or nose blowing for at least 4 weeks. Patients were followed up regularly after every 14 days for first month, thereafter at 2 month, 3 months and then 6 months.

For chemical cauterization 50 % of TCA was used. After placing a cotton ball soaked in a solution containing 4% lignocaine 10 ml and one ampule of adrenaline for anesthetizing external auditory canal and tympanic membrane , under the operating microscope the edges of the perforation were cauterized by using cotton wool applicator dipped in trichloracetic acid solution by stroking in outward direction till a white rim of 0.5 mm width of cauterized margin was seen. Patients were advised to keep ear dry and to use aural antibiotic ear drops for two weeks. A course of antihistaminics were given for at least one week. The patients were followed up weekly for subsequent sittings. Maximum of six sittings were carried out and signs of healing were seen. If a red rim, which is a positive sign of healing was seen was seen then the procedure was repeated every week till complete healing and were followed up for six months. If no signs of healing were seen for consecutive 5 sittings then the procedure was abandoned and was subjected to conventional Tympanoplasty.

Results:-

Among the 58 cases the average age was 28.2 years. In group (A) there were 16 males and 12 females while in Group B 9 males and 21 females. The perforation was anterior in 17 patients, posterior in 19 patients and at the junction of anterior and posterior quadrants in 24 patients. Closure of perforation in patients with undergoing fat myringoplasty was seen in 26 patients and 2 patients got residual perforation because of fat displacement. Closure of

perforation in patients undergoing TCA cauterization was achieved in 26 patients and 4 patients didn't show any signs of improvement even at the end of 5 sittings.

Discussion:-

Gone are the days of excessive manipulation of middle ear for small perforations with hardly any hearing loss, inflicting a lot of morbidity to these patients leading to at least 2-3 weeks of absenteeism from work and lot of medications. Minimal interventions in the form of lobular fat graft myringoplasty and trichloracetic acid cauterization have decreased the agony of patients with small perforations, as they are day care procedures requiring a minimal hospital stay and are cost effective too. Morbidity is lesser and results are also comparable to that of conventional tympanoplsty. Ringenberg first described FM, with a success rate of 87% for small perforations[14]. Since then, studies have shown success rate ranging from 76% to 92% in cases of small perforation. Deddens et al. had reported that the size of TM perforation was a crucial factor[15,16]. Perforation in their cases were 5-30% of the drum surface which was a good prognostic factor for an FM as compared to larger perforations for fat graft alone as was also observed by us.[17] There are two histological theories of fat grafts. The host cell replacement theory of Neuhof and the cell survival theory of Peer[18,19] . The host cell replacement theory states all the original cells die and are totally replaced by new wondering adipocytes or by the fibroblasts. The cell survival theory states that not all the original adipose cells die.

Those fat cells which receive the adequate blood supply survive whereas the remaining cells degenerate thus explaining the loss of volume. The transplanted fat cells are not replaced by the scar tissue, instead a connective tissue capsule outside the fat graft begins to form three weeks after transplantation, which becomes progressively thinner over the course of a year and provides the basic platform for the grafting of tympanic membrane.[20]

The first recorded use of silver nitrate to stimulate the closure of tympanic membrane perforation was by William Wilde in 1884.The office chemical myringoplasty was introduced by Roosa in1876 and popularized by Derlacki in 1950 hence the procedure is also known as Derlacki method. The principle of chemical cauterization is that it breaks up fibrosis, promotes granulation and new tissue formation at the margins of perforation.

Conclusion:-

Fat myringoplasty and chemical myringoplasty using TCA is a simple, quick, economical procedure done under local anesthesia with a very good success rate and minimal or no morbidity and complications.

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