Myringoplasty [Risk factors and the effect of post operative follow up on the outcome of success rate in Erbil / Kurdistan of Iraq]

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Said M. Said Al-Jaaf * Arsalan A. Mustafa Shem* Lana abdulrazak Dabbagh*

ABSTRACT

Background and Objectives: The presence of a perforated tympanic membrane with intermittent discharge and hearing loss of conductive type are the indication for myringoplasty. The purpose of this study was to determine risk factors in candidates for myringoplasty and to evaluate the post operative myringoplasty success rate results in our local region in Erbil/Kurdistan, Iraq. The second objective is to appraise and assess the effect of close observation and post operative treatment and follow up on this result, to increase the success rate.

Methods: A prospective study, randomly taken 68 patients with unilateral perforated tympanic membrane, who are candidates for myringoplasty; patients of different age groups ranging [16 -55] years old, of different gender 30 males and 38 females., having dry unilateral perforated tympanic membrane of more than 3 months, underwent myringoplasty [underlay] between may 2006 and April 2009 at Rizgary teaching Hospital. Measurement of the post operative results and outcome were depend on the take rate and the hearing level at the last follow up visit in different time postoperatively and with dry clean non infected operated ear.

Results: Small, dry posterior perforation, with postauricular approach in well pneumatized mastoid and in well educated non-smoker patient with close observation post-operatively using BIPP has better success rate. The success rate increased from 72% in the 1st postoperative visit to 88% in the last postoperative visit.

Conclusion:-To increase the success rate, its necessary to determine the factors that affect the success rate preoperatively, also close observation with meticulous toilet of the operated ear post-operatively using BIPP is necessary to increase the success rate.

Key Words: myringoplasty, tympanoplasty, otological surgical procedures.

INTRODUCTION:

Tympanoplasty refers to any operation involving reconstruction of the tympanic membrane and/ or the ossicular chain. Myringoplasty is tympanoplasty without ossicular reconstruction[1]. The basic procedure is to excise the rim of perforation so that there is a raw surface from which new tissue will grow, and the mucosa on the undersurface of the remaining tympanic membrane near the perforation is removed or scraped with a sickle knife to provide a bed for the graft. The most widely used and accepted method is underlay graft of temporalis fascia or sometime perichondrium. The underlay procedure could be done through either post auricular or transcanal approach. In 1998, Roland Eavey [2] developed a new inlay technique for tympanoplasty using a cartilage graft through a transcanal approach, which had several practical advantages. The take rate and audiometric results after inlay cartilage tympanoplasty is similar to underlay tympanoplasty. The take rate is claimed

*Lecturer in medical college / Hawler medical university, Consultant in Rizgary Teaching Hospital / Hawler/ Iraq

than 83.3% to 100% [1- 9,] and the postoperative hearing results are generally good [4]. The goal of successful tympanoplasty is to create a sound conducting mechanism in a well-aerated mucosal-lined middle ear cleft. It also provides the possibility of improved hearing.[10]. The reported incidence of surgical success of myringoplasty ranges from 60% to 99% in adults.[11]Recently Kartush[12] developed middle ear risk index (MERI). Becvarovski and Kartush revised and updated MERI in 2001. Smoking is added as a middle ear risk. Furthermore, cholesteatoma and granulation tissue or effusion risk value has been increased in MERI 2001[13]. Successful outcome of the operation seems to be significantly influenced by the experience of the surgeon[14]. Long term follow up post operatively suggest that some ears which are initially intact develop recurrent perforation[15]. The closure rate is reported to be higher in small perforations 74% than large perforation [36%] [16]. Failure rate in anterior perforation is higher and can be greatly reduced by anchoring the anterior margin of the graft beneath the annulus [16]. Prophylactic antibiotics do not influence closure rate [17]. Revision myringoplasty success rate is much lower than usually clamed for the primary surgery [15]. Concerning the hearing benefit post operatively it is uncommon to get total closure of the air-bone gap in myringoplasty, as closure of the tympanic membrane perforation dose not make the ear a normal ear. The complication of myringoplasty is low in all series [18], mainly facial nerve palsy, or extradural abscess. Activity in the ear has been suggested as a cause of failure of myringoplasty.however some surgeon found no influence of the condition of the ear at the time of surgery on the subsequent graft take rate[19--20]. Many authors suggest that a cortical mastidectomy should be carried out at the same time as myringoplasty in active ears

MATERIALS AND METHODS:

[39], of different gender 30 males and 38 females, having dry unilateral perforated tympanic membrane of more than 3 months, their duration of disease ranging from [3months to 10 years].The patients underwent myringoplasty [underlay] technique, using temporalis fascia as graft with gel foam medial to the handle of malleus to prevent lateralization, between may 2006 and October 2009, at Rizgary Teaching Hospital, using chi-squared test and p-value for assessment as statistical analysis. Proper otological examination done to assess the site and size of the perforation (<25%, small, 25—75%, moderate to large, >75% subtotal. Preoperative and postoperative hearing assessment, clinically [Rinne, Weber, ABC] tests carried out, and classical otolaryngological and systemic examination done for each patient. Pure tone audiogram, pre and postoperatively after the last visit [6 weeks] to assess the hearing gain, it was difficult for us to follow the patients after 12 weeks which we thought it is the optimum time for complete healing . Mastoid x-ray was sent for all patients and some cases were sent for CT scan [to assess the degree of pnumatization for study purpose]. All operations done under general anesthesia. Transcanal approach was selected in cases of wide canal and posteriorly located perforation while post aural approach for others. In all the patients broad spectrum prophylactic antibiotics [Cefotaxime] used for 7 days postoperatively with simple general advices, and to be followed every 2 weeks until final decision. Frequent BIPP pack used in each visit with simple aural toilet and broad spectrum antibiotic locally [Ciprofloxacin] used accordingly on need and follow the patients for the next visit. Special informative questioner containing many questions to evaluate and assess preoperative and post operative results and variables such as age, sex, site of perforation according to the four quadrant, size of perforation, status of opposite ear, duration of the dry period, any associated

deviation, allergic signs and symptom, turbinate status, type of operation [post auricular or transcanal approach. Associated diabetes or any systemic disease, smooking [more than 10 cigarettes per day]. Inclusion criteria includes: patients with unilateral dry ear for the last 3 months, normal mastoid bone and age more than 12 years. Exclusion criteria includes: patients with active ottorhoea, abnormal tympanometry [type B or C] in the none perforated ear, significant Sinonasal diseases (sever septal devation, turbinate hypertrophy, recent Sinonasal infection) previous surgery on the same ear, mixed deafness in the perforated ear. Data collected about take rate and the hearing level during each visit in different times postoperatively. Concerning the pure tone audiometric study, the airbonegap [ABG], which is the mean gaps at frequencies at 500, 1000, 2000 were documented and the change or the improvement in the hearing or in the [ABG], was measured as preoperative ABG minus postoperative ABG at the last visit. All data analyzed statically using computer program

RESULT:

SPSS version 12 for windows.

from the total 68 patients, there were 30 male and 38 female patients in this study [fig 1] , the age range of the patients was [16 to 55] , post auricular approach done in 50 patients[73 %].while 18 patients [27 %] had transcanal approach [fig 2].

Success rate according to gender:

Concerning success rate according to the gender, we found that in the male [30 / 68] patients, the success rate was [26] [87%] in the 3rd visit 6wk postoperatively, while in the female [38/68] patients, success rate was [34] [89%], [Fig 3]. P value was [0.7] non significant according to fisher exact test as the chi square can not be apply here as the unexpected cell value is less than [5] and this is applied to all other followed results.

Success rate according to etiology of perforation:

success rate was in [24] patients in the 3rd visit, 6wk postoperatively. While in those with perforation due to chronic supurative otits media [44/68] patients the success rate was in [36] patients [fig 4]. Pvalue was significant [<0.05] , **Success rate according the size of perforation**

<25%, small [12/68] patients, success rate was in [12] patients 25—75%, moderate to large [39/68] patients, success rate was in [35] patients >75% subtotal, [17/68] patients, success rate was in [13] [fig 5]

Success rate according pnumatization of mastoid bone

In well pnumatized mastoid, [52/68] patients the success rate was in [49] in the 3rd visit., 6wk postoperatively. While in poor pneumatized mastoid [diplopic and sclerotic, [16/68] patients, success rate was in [11] [fig 6]. Pvalue was significant [<0.05]

Success rate in relation to smoking

Smokers [22/68] patients, successes rate was in [16] in the 3rd visit, 6wk postoperatively, while in non smokers, [46/68] patients, success rate was in [44] [fig 7]. Pvalue was significant

Success rate according in relation to residency

In urban resident [29/68] patients, success rate were [26]. In the last visit.

In Ruler resident [39/68] patients, success rate were [34], [fig 8]. Pvalue was non significant. Which mean there were no differences in the success rate in relation to residency.

Success rate according in relation to operative approach

Postaural approach [50/68] patients, the success rates was in [46] patients in the 3rd visit 6wk postoperatively, while in transcanal approach [18/68] patients, the success rates was in [14] patients [Fig 9]. P value was non significant [>0.05] , no differences in the success rate in relation to the approach of the operation [postaural or transmeatal]

The outcome in the postoperative visits [2nd w, 4th w, and 6th w, postop.]

the success rate of the operation in the term of outcome [graft taking and hearing improvement].is obvious from the results. Roughly in the next two visits at 4th and 6th weeks post operatively the number of success rates increase owing to the meticulous post operative aural toilet and specifically the usage of BIPP Pack., with short course of systemic claforan or according to culture and sensitivity test for the aural discharge. The total success rates of myringoplasty in our locality were as bellow in [fig 10]. According to Mc Nemara test. Pvalue was significant [<0.05].

Hearing gain of 10 — 25 dB was achieved in [55] patients 85 % of the cases, only three patients got lateralization of the graft, the hearing gain not studied here in details we just calculate the final result and in this study we depend also on Weber and Renée [tune fork test] mostly to assess the hearing .

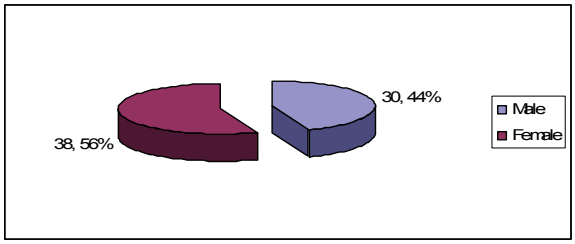

Figure 1: gender distribution

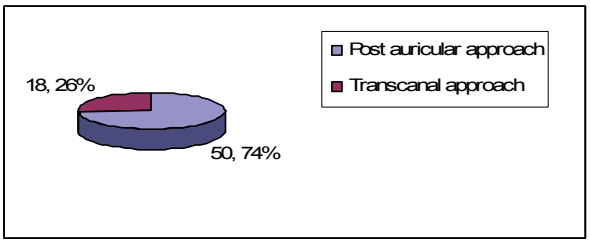

Figure 2 : surgical approach distribution

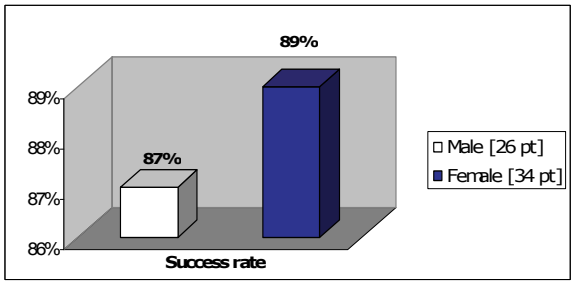

Figure 3: success rates according to gender

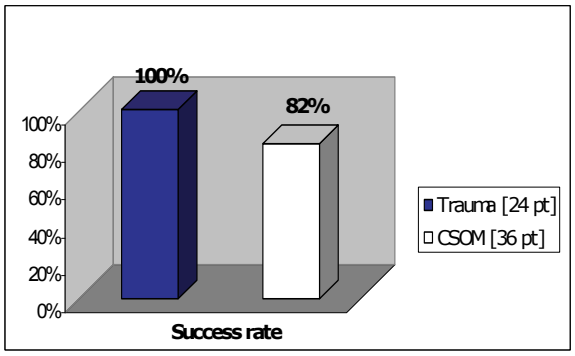

Figure 4: success rates according to etiology of perforation

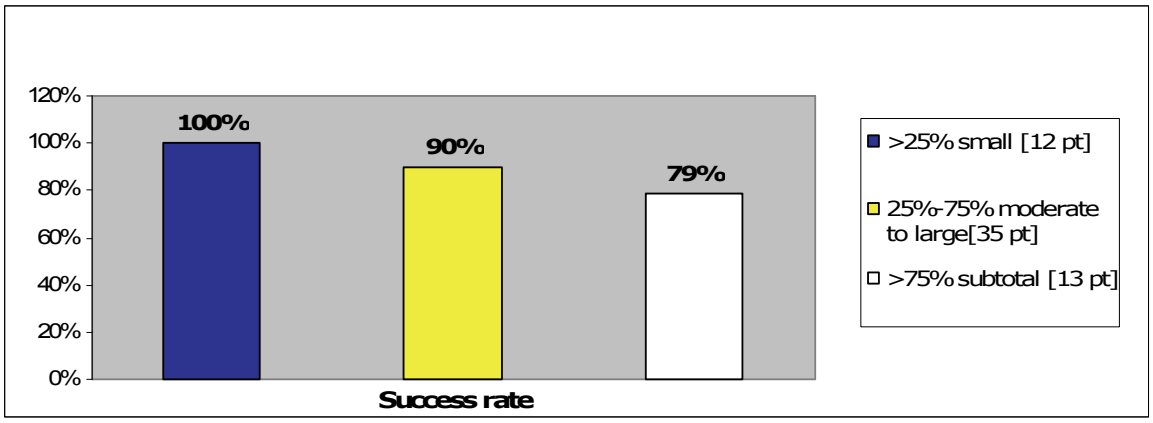

Figure 5 : Success rates in relation to the size of perforation

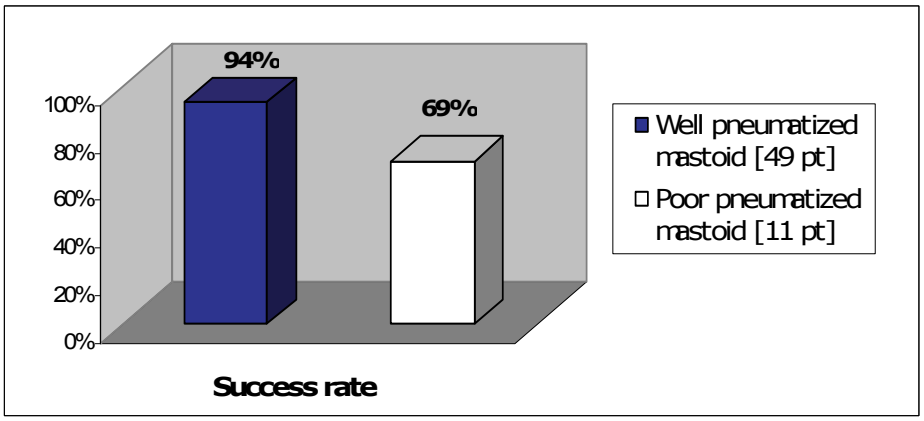

Figure 6: Characteristic of patients and success rate according to mastoid pnumatization

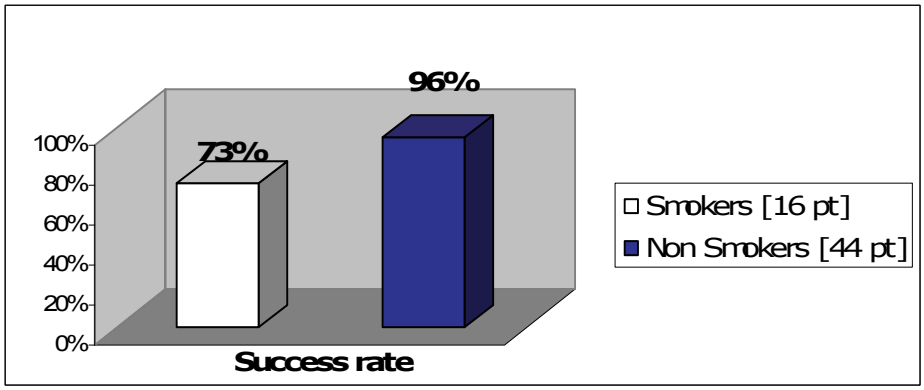

Figure7 : success rate in relation to smoking habit

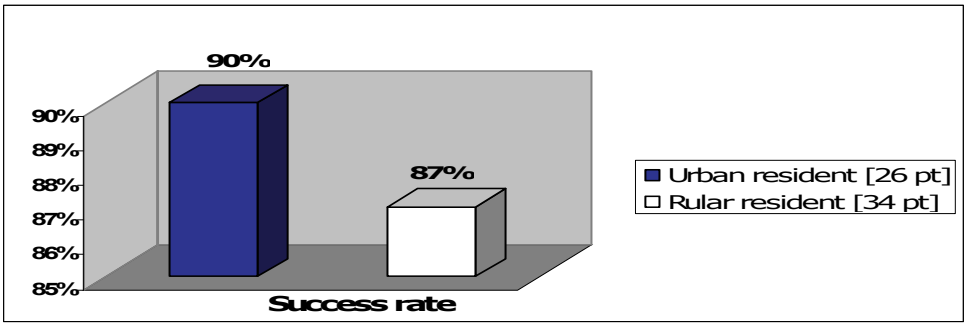

Figure 8 success rates according to residency

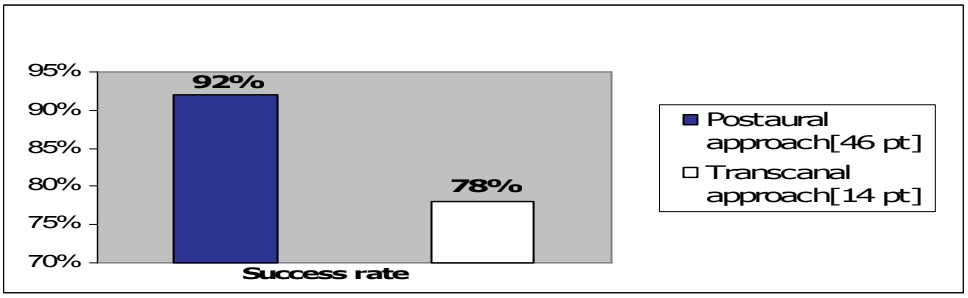

Figure 9 : Success rate in relation to surgical approach

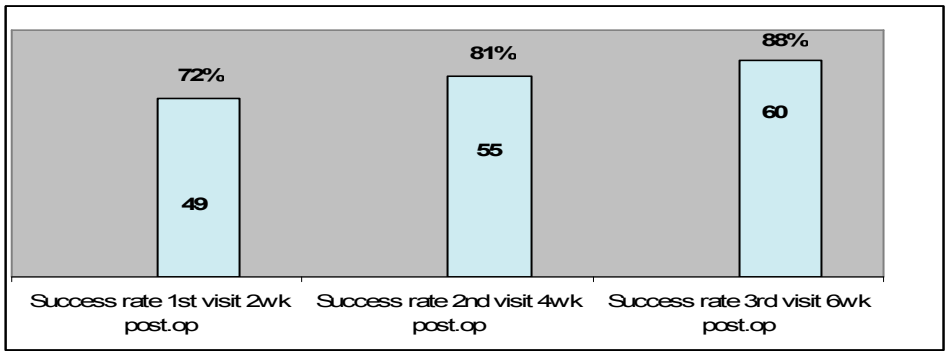

Figure 10: Total success rates

DISSCUTION:

There have been many studies discussed the risk factors, success rate and prognostic factors in myringoplasty. Here we studied the relation of age, gender, aetiology of the perforation [traumatic or inflammatory], size of perforation, degree of mastoid bone pnumatization,relation to smoking habit,recidensy of the patient, and surgical approach to prognosis, also we concentrate on the follow up and post operative close observation to see whether it is significant in increasing the success rate or not. M. Yung, C. Neumann and S.L. Vowler , concluded that patient age did not influence the surgical success of tympanoplasty[22,23 24]. We also did not find a relationship between success rate of surgery and patient age. The location and size of the perforation have been frequently examined in the literature.

perforations are more difficult to access and place grafts. Surprisingly, previous studies[25;26] reported that the location of the perforation had no effect on the surgical or hearing result, while a recent study [27] reported that anterior perforations had lower success rate than posterior and inferior perforations. With respect to size, Lee et al[28] and Onal et al[29]demonstrated a significantly higher success rate with perforations smaller than 50%, Sedman et al[30] mentioned that larger perforations are often associated with lower success rate, perhaps due to the extent of the problem and the surgical difficulty it entails. We also found a significant relationship between graft success and smaller perforation¸ this may be explained by the increasing complexity in larger perforations, that require more graft material, and consequently takes longer to become incorporated. A larger perforation is often also associated with poorer condition of the remaining tympanic membrane.

However, no statistically significant association was found between perforation size and successful myringoplasty in recent studies.[24, 31, 32 and 33] Many otolaryngologist believe that dry ear is critical for graft uptake, whereas some believe it plays little role in the success of myringoplasty. Uyar et al[39]found that there was a significantly higher rate of graft uptake in patients who had dry ear for 3 months preoperatively. We also found a significant association between dry ear and success of myringoplasty similar to this study. On the other hand, there are also studies that found no statistically significant correlation with respect to dry ear.[24, 29] The perforation which should not be left for a long duration with out interference as it causes continuous inflammation, which may result in progressive conductive hearing loss [31]. The success rate by conventional methods was in the range of 83-97% in past reports [35, 36]. Several articles indicate that perforation size affects the closure rate in myringoplasty cases[37, 38]. In our results, significant difference was found regarding

A recent study found no significant difference between the success rate of postaural and transcanal repair of the tympanic membrane in patients aged (5-18 years) [39]. While in our study we perform transcanal and postaurcular underlay, and both approach shows no significant difference in success rate. Our study shows higher success rate in non smoker patients, which agrees with other studies that revealed that smoking was associated with a three fold increase in the chance of long-term graft failure [40] .A recent study by Kaylie et al[41] found that smokers have significantly worse chronic ear disease than nonsmokers and surgery in smokers is more extensive and leads to worse hearing outcomes than nonsmokers and this may be due to the fact that Cigarette smoking has local, regional and systemic effects on the middle ear and the Eustachian tube, by the changes in amount and viscosity of mucous and the change in mucociliary clearance caused by the destruction of the ciliated epithelium. [42]. Nicotine can promote thrombosis and carbon monoxide inhaled in cigarette smoke also reduces the oxygen-carrying capacity of the blood, which in turn causes inadequate oxygenation of the graft. [43] .Cigarette smoking regionally causes chemical irritation and negative mucociliary effects described above, leading to nasal pathology and Eustachian tube obstruction, thus the full relevance of smoke on nasal mucosa has yet to be fully understood. [42, 44]. Cigarette smoking also may cause increased preoperative anesthetic problems, including coughing and bucking upon extubation and on postoperative period during which the ossicular prosthesis and a fascia graft may be disturbed. [45] Regarding the meticulous aural toilet and usage of BIPP pack locally in the post operative visit frequently, from the results it is obvious that this was significantly important in increasing the success rate of graft up taking. A Study done by Nakhla V. et al revealed that tri-adcortyl ointment (TAO) is a suitable

myringoplasty, the success rate was 79% for BIPP and 83% for TAO. [46] The prognostic significance of the size of mastoid air cell system in the results of myringoplasty has been a matter of debate, this study shows that the success rate is higher in well aerated and pnumatized mastoid than the sclerotic one, and that was not agreed with new study done in India whom conclude that the size of Pnumatization of mastoids had no correlation with, post operative result[47], another study shows that Pnumatization of mastoids, had a direct relationship with post operative hearing gain, which ranged from 10-30 dB,in 95% of the cases.[48]

CONCLUSION

1. The larger the size of perforation the less is the success rate of the operation [increase size of perforation decreases the chance of success]. Although larger perforations are associated with lower success rate, it is advisable to nevertheless perform myringoplasty for these, since the hearing improvement is significant even if complete closure is not achieved.

2., Perforations which are traumatic in origin with good aerated mastoid bone and being the patient non smoker increases the chance of success rate. While the approach of the operation shows no significant difference regarding the success rate.

3. Close follow up, meticulous aural toilet and BIPP pack with antibiotic cover systemically is necessary, to increase the success rate.

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