

CHEMICAL CAUTERISATION OF TYMPANIC MEMBRANE PERFORATIONSVikramjit Singh Parmar¹, T. L. Parmar², Gopal Singal³, Poonam Pathania⁴**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Cauterisation of 144 ear perforations (Right and Left) with 20 percent TCA (Trichloroacetic acid) was tried in patients having 2 to 6mm perforations. Perforations were dry for 3 weeks-3 months or more. 30 patients were having traumatic perforations such as slap on face, blast injuries or associated with head injuries. Most of the patients were having perforations due to inflammation. Few of them had recent attack of otitis media which were effectively treated by suitable antibiotics, anti-histamines and subsequently taken for cauterization of perforation. Site of perforation was mostly on the anteroinferior quadrant, next the inferior quadrants. Still less number in the entire four quadrant, least no. in P. S. quadrant. Traumatic perforations were irregular in shape varying from 2-6mm in size and were elliptical in shape. Hearing loss ranged from 15dB-45dB (Depending upon size and site of perforation). Main presenting symptoms in inflammation cases were intermittent discharge as well as deafness. In traumatic case history of pain and deafness was the main symptom. We did wait for 1 month in traumatic cases to achieve spontaneous closure. In inflammatory cases cautery was considered first line of treatment. It has to be done several times at 10 days interval. Most of the times closure of perforation was achieved with 3 attempts, inflammatory cases 5th or 6th attempt. In one case as many as 23 attempts. In 6 cases of perforation after partial take of graft in myringoplasty occurred after 3 months cauterization was attempted and we got closure in 5 of them. In one case re myringoplasty had to be done.

KEYWORDS: T. C. A, T. M perforations.

INTRODUCTION: Various irritating agents have been used. Out of all silver nitrate (50 percent) and T. C. A has gained popularity. Okuneff 1895 was the first to use T. C. A solution. Still it remains the most popular cautery agent.⁽¹⁾

Etiologically otitis media (Inflammatory) is the commonest cause of perforation. Trauma being the next (Iatrogenic or accidental or blast injuries or head injuries. Perforation has tendency to heal by virtue of the change in migration of epithelium from centripetal to centrifugal. Because of drum perforation (Wound of T. M) is having no base. It has got tendency to heal spontaneously as epithelium grows from all directions at the rate of 1mm/day⁽⁵⁾ – unless and until it is hindered by union of skin epithelium on to the middle ear epithelium and poor eustachian tube function in about 3 weeks' time.

Closure of perforation by repeated cauterization every week or 10 days or 2 weeks is most gratifying to the patient as well as surgeon. The patient gets gain in hearing by 25dB besides getting discharge free ear.⁽²⁾

Cauterization is just an O. P. D procedure but patient needs coming number of times. If patient can't come repeatedly or bigger perforations, it is better to go for tympanoplasty.

Sellar S. L (1969) has to repeat cautery nine times before he could achieve healing.⁽³⁾

Derlacki (1953) even did 64 attempts before getting final closure of perforation. In one of his cases series of 129 cases.⁴

ORIGINAL ARTICLE

Category	Unilateral	Bilateral	Total
Ch. SOM	81	6	93
Ch. SOM with allergy	11	2	15
Traumatic origin	17	3	23
Blast injuries	5	1	7
Post myringoplasty	6	-	6

Table 1: Showing category of patients selected for study

METHOD AND MATERIAL: 144 ears both unilateral and bilateral from 16yrs -60 yrs attending E. N. T OPD of Agroha Medical Colleges. Patients were examined in detail for ear, nose and throat. Few cases which had allergic rhinitis or D. N. S were treated for diseases than 3 months taken for study.

Table 1 Hearing was assessed by T. F tests and audiometry and it ranged from 15dB-45dB. Care was taken almost not more than 60 percent of drum was gone and perforations were dry for 3 weeks, 3 months or more.

Auto endoscopic examination was carried out to rule out any underlying disease of mastoid (Cholesteatoma or Tympanosclerosis).

Under operating microscope edges of perforation were cauterized with 20 percent T. C. A. Local anaesthesia was needed on first application by keeping cotton wool moist in 4 percent xylocaine and kept over the edges for 10 minutes. TCA was applied with cotton wool on applicator kept over the edges for 40-50 seconds or till the whitening of margins for 1-2 mm occurred.

Small gel foam piece crushed and moistened by antibiotic solution was kept bridging the perforation. Patient was given anti histaminics and antibiotics and vitamin c for 7-10 day.

When patient came for 2nd application. It was repeated patient did not require I. A. it was repeated till we get closure of perforation.

In bilateral cases one ear was treated first and after gap of six weeks second ear was taken up. In six cases of myringoplasty where graft was partially taken up. Procedure was done in them also. In one case we have to cauterize 23 times (patient has 60 percent loss of TM). After closure of tympanic membrane perforation tuning fork tests and audiometric assessment was done.

RESULTS: Average no. of attempts was 4-8. In smaller perforations of inflammatory origin relatively less no. of attempts and also in traumatic cases.

It was more in cases having allergy rhinitis and bigger perforation. Out of 93 ear drum perforations 81 had unilateral perforations and six had bilateral perforation.

As many as 29 ear perforations of unilateral cases did not get healing while 3 bilateral cases did not show any closure or improvement even after repeated attempts on cauterization.

Out of 15 cases of otitis media with allergic rhinitis as many as seven did not show any recovery despite best efforts on repeated cauterization. It healed in eight cases.

In traumatic group as many as 28 healed out of 30 cases, giving more than 90 percent success rate. Out of 6 post myringoplasty cases, 5 healed completely. In one re- myringoplasty have to be done.

One case with bilateral perforation due to trauma and associated with head injuries did not heal and later on tympanoplasty had to be done.

ORIGINAL ARTICLE

Attempts	No. of cases
1	7
2	11
3	18
4	21
5	17
6	11
7	8
>7	9

Table 2: Show in number of attempts for healing of perforations

Average 4.8 attempts. In one case 23 attempts (Having allergic rhinitis).

Category of patients	Total cases	Healed	percentage	Failed
Ch. SOM	93	61	65.8 percent	32
Ch. SOM with allergy	15	8	55	7
Traumatic including blast injuries	30	28	93	2
Post myringoplasty	6	5	83	1

Table 3: Showing results of T. C. R cautery

All patients have follow up of 6 months.

Patients were assessed for hearing on audiometry. Valsalva's was also advised in all successful cases.

Hearing improved to 15 to 20 decibels in successful cases (air borne gap closed by 25 decibels or so. Traumatic perforation in left ear was common.

DISCUSSION: Tympanic membrane perforation can cause deafness ranging negligible to 50dB. This is due to loss of coupling which is again due to loss of sound pressure difference across the TM which provides primary drive to the motion of drum and ossicles. In addition perforation causes hearing loss due to its size frequency and middle ear space. TM has also got shielding effect which causes loss 10 - 20 decibels. Maximum loss 40 -50 decibels. Volume of middle ear space affects the hearing. Smaller volume of middle ear results in larger air bone gap for given sound pressure.⁽⁵⁾ In the ear canal and given perforation, the resulting sound pressure within the middle ear cavity is inversely proportional to middle ear volume.

ORIGINAL ARTICLE

So trans-tympanic middle ear pressure which remain smaller with smaller middle ear volume. Identical perforation in 2 different ear can have conductive hearing loss differing 20 -30 decible. Size of peforation is also important causing hearing loss.¹

Graffin 1979 in series of 107cases of central perforation observed hearing loss negligible to 50 decible while Uppal KS (1997)⁶observed 0 to 36 deciblesin his series of 50 cases. We have hearing loss air borne gap 15-45 decibles. Tendency to heal⁽⁶⁾ spontaneously by large perforation was noted by Roosa 1876.⁽⁸⁾

Toynbee noted Five Layers of Tympanic Membrane:

1. Outer epidermis.
2. Dermis of fibrous tissue, blood vessels and nerves.
3. Outer radiate fibrous layer.
4. Inner circular fibrous layer.
5. Innermost endothelial layer.²

Larger perforation heals with a thin atropic scar which lacks the fibrous layer having only (Outer epidermis and inner endothelial). This may rupture by slightest trauma or valsalvas maneuver but perforation closed by repeated cautery usually results nearly normal tympanic membrane with all five layers. Histopathologically studies of newly formed perforation shows proliferation of epithelium within 12 hours. Granulation tissue with 18 hours while inner mucosa takes several days to regenerate.¹ In chronic tympanic membrane perforation outer epithelium joins the endothelium leaving no raw area and hence persistence of perforation. Dunlop and schunecht 1944.²

By cauterization we break the union causing the necrosis of edges of all the layers and promotes formation of new tissue at the margins of perforations (Marra S 2002).⁹ while cauterizing the squamous epithelium which has grown inwards should be destroyed repeatedly to allow fibrous tissue to proliferate. Hyperemia of edges stimulates proliferation of fibroblasts and need to be instituted by irritants. If more than 65 percent tympanic membrane is gone and patient cannot come repeatedly myringoplasty should be preferred.

Derlacki⁷ 1953, 129 cases of inflammatory origin and 14 of traumatic cases he repeated cautery with hundred percent TCA at biweekly intervals he has got record of highest attempt i. e 64 to achieve in one case. Average attempt was 14. 3. He also got healing in 2 attempts in few cases.⁸ He reported recovery in 75 percent cases. Juers 1958⁽⁵⁾ reported 88 percent success with average 3 attempts. His interwell between two applications was 2 weeks. In age group of 8- 56 years. In present study age group was 16-60 years. We preferred spontaneous healing up to 16years. Sellar (1969)⁽³⁾ reported optimum interval of 1-2 weeks.

If patient does not come by two weeks perforations may enlarge.

Healing by migration of epithelium towards center occurs in lacks fibrous tissue and endothelium and is more vulnerable to subsequent application in future or trauma. Sellar 1969³ reported 8left ear and 11 right. In present study only in traumatic cases we have pre-pordrance of left ear, possibly because of slap which more often affects the left ear. No significant difference in inflammatory group.

Kuljeet S. Uppal⁶ reported 78 percent healing in his series of 50 cases. He used saturated TCA and with no anaesthesia. He also observed higher groups of traumatic perforation. T. V Santhan and K.

ORIGINAL ARTICLE

V. Rajan reported 73.7 percent success rate by using 50 percent silver nitrate. He also reported better healing in traumatic perforation and less in allergic cases.¹⁰

In present study of 144 cases we observed highest cure rate in traumatic perforations (28 out of 30).

Uppal et al 1997⁶ and Santh and Rajan (2012)¹⁰ has also similar observations.

In the inflammatory group 1 repair out of 93 cases i.e., 65.5 percent whereas in SOM with allergy rhinitis only 8 patients got repair i.e., 55. (Percent).

In six cases of myringoplasty as many as five (83%) got complete closure. In one case when there was no response myringoplasty has to be done.

We had overall recovery (102/144) nearly 69.3 percent. We preferred 20 to 50 per TCA. With higher concentration. The patient becomes more uncomfortable though it requires few seconds application. Also we did second application after 10 days we have recovery of hearing loss to 15 decibels in most of the cases. We have follow up of more than 6 months. In cases where perforation occurs after gap of 3 months TCA applied in them with antibiotic cover and healing was achieved. We have tried many attempts more than 7. In one case we could achieve healing in 23 attempts (Patient did not want surgery).

CONCLUSION:

1. In our opinion we must try cauterization before attempting myringoplasty especially in small to medium size perforation.
2. Smaller the perforation better healing and with fewer attempts.
3. Those with traumatic origin heal much faster. Success rate 90 percent.
4. Correction of primary etiological factor hastens healing.
5. May be tried in patients who are unfit for surgery or where facility of micro surgery of ear not available in remote areas. So this is simple opd procedure with no complication and no sophistication.

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ORIGINAL ARTICLE

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