

# A Study of Closure of Tympanic Membrane Perforation by Potassium Carbonate ( $K_2CO_3$ ) Cauterisation



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## Introduction

Tympanic Membrane Perforation is Common in Otolaryngological Practice. Perforation of tympanic membrane is categorized into acute & chronic. Traumatic perforations of tympanic membrane are often encountered as emergency & in primary care setting. A perforated tympanic membrane results in loss of hearing due to decreased drum area & liability to recurrent infection of middle ear mucosa. Surgical closure of tympanic membrane perforation still remains the choice of management, effective closure of tympanic membrane perforation can be achieved using chemical cautery. In Ayurveda “Sushrutacharya (Ancient Surgeon/father of Surgeon)” has mentioned the importance of “Potassium carbonate ( $K_2CO_3$ )” in the name of “Yavakshar” in different diseases. A 52 year old lady who underwent this mode of treatment as simple office procedure is discussed in this article [1-6].

## Case Report

A Hindu, married, 52 year old lady patient visited (August 22, 2017) the outpatient department of ENT with OP Number 201716317 for the complaint of Ringing noise, Earache, difficulty in hearing in left Ear. There was a history of being slapped on left ear one day before her first visit. Her vital signs were normal. She was Afebrile, not pale. Abdomen was full & move with respiration. There was no palpable peripheral lymph nodes. The chest was clear with good air entry & Heart sound were normal. Both pinnae appeared normal. Otoscopy of left ear External auditory meatus revealed ecchymosis around the wall of tympanic membrane with fresh central perforation of about 25-30% in the pars tensa with irregular margins. Rinnes test was negative in left ear & webers test lateralised to left ear. Audiogram done on following day showed conductive hearing loss of 20db [7,8].

Potassium carbonate ( $K_2CO_3$ ) is a white salt, soluble in water which forms strongly alkaline solution. Yavakshar is made with whole plant of barley (*Hordeum Vulgare*). Whole plant is dried, burnt in open air, ash is added with water, left over night. sedimented portion is discarded clear liquid is filtered many times. After getting a clear liquid, it is heated and solid powder which is left over at

the bottom of the vessel is called as Yavakshar. The technique was carried out as an OP procedure. For the initial application, 4% xylocaine was used to anaesthetize the tympanic membrane by adding a few drops into a small cotton ball & placing it into external canal wall over the surface of tympanic membrane for about 5 min, while subsequent application did not require local anaesthesia [9].

The rim of the perforation was cauterized using a cotton tip applicator dipped in liquid form of Potassium carbonate ( $K_2CO_3$ ) care was taken not to scar the promontory. The patient was evaluated on every 7th day & the technique was repeated for a five times. On the second follow up, the patient reported reduction in the symptom of Otagia. Ringing in ear was seen once in 4 days or occasionally. Improvement was observed in Hearing loss. Marked improvement was seen in healing of perforated Tympanic membrane from second setting of cauterization. The patient was on follow up till five weeks, without any single episode of relapse [10].

## Discussion

Perforation of tympanic membrane causes a conductive hearing loss that can range from negligible to 50db. Local application of Potassium carbonate ( $K_2CO_3$ ) at the site of perforation causes irritation which in lead helps in de-epithelisation process. Histopathological study of newly form perforation shows proliferation of squamous epithelium within 12h at the edge of perforation, granulation formation within 18h, while the inner mucosa of the membrane takes several days to regenerate. The principle of chemical cauterization is that when on application, it breaks up fibrosis, promotes granulation & new tissue formation at the margins of perforation.

## Conclusion

Based on clinical signs & symptoms and on Otoscopic examination of healed Tympanic membrane, it may be consider as a first line in the management of small to moderate size perforation before attempting surgical closure. Apart from the fact that multiple sitting is required which is a disadvantage, this procedure of cauterization by Potassium carbonate ( $K_2CO_3$ ) is a relatively safe,

simple & economical technique. As it can be done as an office procedure with minimal sophisticated equivalents.

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