Case Study

MANAGEMENT OF TRAUMATIC PERFORATION OF TYMPANIC MEMBRANE THROUGH AYURVEDA

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ABSTRACT

Traumatic tympanic perforations can occur due to various reasons, such as concussion, insertion of objects, temporal bone fractures, barotrauma, etc. Slap injuries are a common cause. Symptoms include sudden conductive deafness, pain and/or blood-stained discharge. Tinnitus and vertigo may complicate the condition. Appropriate and timely management is crucial to reduce the risk of permanent impairment, as studies indicate that spontaneous healing occurs within 1.5 to 3 months. While Ayurvedic texts don’t directly mention traumatic tympanic perforations, they can be categorized as ‘Agantuja Vrana’ (wounds caused by external factors). Ayurvedic treatment includes both local and systemic approaches. In this case study, medicines were used internally for 2 months: Sarivadi Vati, Lakshadi Guggul, Mahayograj Guggul, Gandha Taila, Mahayograj Guggul.

INTRODUCTION

The tympanic membrane is a delicate, translucent membrane separating external ear and middle ear. This membrane helps in conduction of sound through increasing sound pressure by hydraulic action by about 14 times. Anatomically, it is a part of external ear and functionally, it is a part of middle ear. It can be perforated due to various reasons. Apart from middle ear infections, tympanic membrane can be perforated due to penetration injuries, temporal bone fractures or pressure wave injuries (caused by air or fluid). Slap injuries accounting to barotrauma caused by air pressure changes are more common among them. Among traumas, about 50% are attributable to slap injuries or direct blows. Other reasons may be self-inflicted penetrating injuries account for about 25%, with 25% being due to causes that include diving and aviation barotrauma, foreign bodies such as button batteries, other caustic substances, insects, welding debris, and blast injuries.[1]. Symptoms include sudden conductive deafness, pain and/or blood-stained discharge. Tinnitus and vertigo may complicate the condition. The perforation also increases the risk of otitis media. In modern science, it has been mentioned that spontaneous healing rates are good, but with increasing age and perforation size, and middle ear infection the healing becomes slower. Large studies indicate that spontaneous healing occurs within 1.5 to 3 months. The non-healing perforations need surgeries i.e., myringoplasty and tympanoplasty.

In Ayurvedic texts, Nidana of Karna Roga (ear diseases) has been mentioned in detail. One among them is Mithyayoga of Shastra (improper use of instrument). It can lead to trauma in the ear. This trauma may result in injury to either the wall of the external auditory canal (EAC) or perforation of the tympanic membrane. Based on the Nidana, it can be categorized as Agantuja Vrana (wound caused by external factors). These wounds result from external causes, such as trauma, chemical exposure, insect bites or other external agents.[2].

After the trauma, the repair process starts which is thought to be controlled by the epithelial layer. After 48 hours, the epithelial hypertrophy starts

Access this article online

Quick Response Code

https://doi.org/10.47070/ijapr.v12i5.3218

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and the edges of the TM begin to close, and then these are followed by the development of the fibrous component of the lamina propria. The closure rate of the perforation is affected by many factors. The two main factors that affect the recovery of the perforation are the size of the perforation and the secondary developed infections. The small perforations have better closure rates and close earlier as expected[3].

Here in this case study, Sarivadi Vati, Lakshadi Guggul and Mahayograj Guggul, Gandha Taila mentioned in Various Ayurvedic texts and Churna combinations including Mulethi, Ashwagandha and Vatari Churna was used for their Shotha-hara, Ropana, Vata-shamaka and Dhatu-poshaka properties. This treatment follows the approach of Sanshamana Chikitsa.

Available modalities for traumatic perforation vary in safety, affordability and efficacy. Not all the patients respond equally to these treatments. Thus, continuous research is necessary to find effective combinations of treatment for managing this condition.

MATERIALS AND METHODS

Case Study

A 38-years-old female patient visited the Out Patient Department (OPD) of Shalakya-tantra Department of Patanjali Ayurved Hospital, Haridwar, Uttarakhand, with the complaint of air leakage from right ear when she filled air in mouth. She gave the history of being slapped on the right ear by her 4-years-old son 1 month ago. She was not being diagnosed for any type of ear disease prior to this accident. After the accident, she had itching in right ear and air leakage on filling air in the mouth. For that she went to Government Multi-specialty Hospital, Sector-16, Chandigarh. There a big central perforation with no discharge was noted in the right ear tympanic membrane. Left ear was recorded normal. She was given Ciprofloxacin ear drops for instillation in the right ear for 1 week along with precautions to keep the ear dry and was advised to seek surgical intervention. PTA was done 1 month ago which read mild conductive hearing loss (28dB) in right ear. Left ear audiometry was normal.

After the prescribed measures, she wasn’t relieved of the symptoms. On clinical examination, there was no swelling in pinna, pre-auricular and post-auricular areas in both ears. On otoscopy, in right ear tympanic membrane there was a big central perforation with no discharge, ear canal was normal. Left ear canal and tympanic membrane was normal.

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Figure 1: Right TM showing single central perforation and intact left TM

Therapeutic Intervention and its Duration

After observing all the clinical features, following medicines were given to the patient for 2 months: (see table 1)

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Yoga</th>
<th>Dose</th>
<th>Anupana</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sarivadi Vati</td>
<td>250mg twice a day after food</td>
<td>Lukewarm water</td>
<td>2 months</td>
</tr>
<tr>
<td>2.</td>
<td>Lakshadi Guggul</td>
<td>1000mg twice a day after food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Mahayograj Guggul</td>
<td>300mg twice a day after food</td>
<td>Lukewarm water</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Gandha Taila (Capsules)</td>
<td>1 capsule (300mg) twice a day</td>
<td>Lukewarm water</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Combination of:</td>
<td></td>
<td>Lukewarm water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ashwagandha Churna 100gm</td>
<td>All of them were mixed and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5gm twice a day after food</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vatari Churna 100gm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mulethi Churna 50gm</td>
<td></td>
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</tr>
</tbody>
</table>

OBSERVATIONS AND RESULT

The case was evaluated after 2 months of Sanshamana Chikitsa. Significant relief was observed in the feeling of air leakage and itching within 1 month and complete perforation was healed in 2 months. Research suggests that the prognosis is better if the patient is young and perforation is new. Here the patient was in middle age. Studies suggest that the outcome is significantly good if medical management is commenced within 3 or 4 days after the perforation[4].

In the current study, the patients showed significant changes, improving from perforation to healed perforation but it took 2 months as the patient visited for the treatment after 1 month of trauma (see figure 2 and 3). During the treatment, the patient diligently refrained from inserting her finger or any other object into the ear canal. Dry ear canal precautions were taken. These precautionary measures were essential to prevent further harm to the already compromised
tympanic membrane (eardrum). Adhering to these
guidelines contributes significantly to the healing
process and overall recovery. During the entire study
period and follow-up, no adverse reactions were
reported by the patients. This positive outcome
indicates the safety and well-tolerated nature of the
treatment.

![Figure 2: Right ear healed perforation](image)

![Figure 3: Left ear intact TM with TS patch](image)

**DISCUSSION**

Studies have reported that at least 85% of
TTMP close spontaneously and heal without any active
intervention within 3 to 4 weeks of injury. Animal
studies have demonstrated that perforations heal by
means of epithelial migration which starts from the
outer epithelial layer, with later healing of the lamina
propria and the mucosal layer. The epithelial
generation centre is located near the annulus and the
handle of the malleus.

The approach we took to manage traumatic
tympanic membrane perforations was conservative. It
involved inactive intervention allowing for
spontaneous closure. We avoided any packing or
dressing within the ear canal. This allowed the natural
healing process to occur without interference. We
emphasized strict hygiene and infection control.
Preventing infection was crucial for successful healing.
We administered systemic Dravyas with Shotha-hara,
Ropana, Vata-shamaka and Dhatu-poshaka properties.
We followed the approach of Sanshamana Chikitsa for
Agantuja Vrana. Here, Rakta dosha vitiation along with
Tridosha Prakopa is being considered in related ear.
This conservative approach aims to promote natural
healing while minimizing unnecessary interventions.
Consultation with a healthcare professional is essential
for personalized management based on individual
circumstances.

The treatment was given for 2 months. After
that, patient was re-evaluated and outcome of
treatment was noted.

**Mode of Action of Drugs**

**Sarivadi Vati**[^6]

It is a reference from Bhaisajya Ratnavali. The
drug is specifically mentioned for Karna Rogas under
Vati preparations. The contents include: Sariva,
Mulethi, Kushtha, Tvak, Ela, Tejapatra, Nagakesara,
Priyangu, Neelotpala, Giloy, Lavanga, Haritaki,
Vibhitaki, Amalaki, Abhraka Bhasma and Loha Bhasma.
So probable mode of action of Sarivadi Vati can be said
as all the contents are having mainly Madhura (sweet),
Kashaya (astringent) and Tikta (bitter) rasa and Laghu
(easily digestible and causes lightness in the body) and
Ushna (heat) Guna. Therefore, it acts as Kleda-shoshaka
(absorbs putrefaction) and Vrana-shodhaka (wound
purifier).

Sariva acts as Rakta-stambhak (haemostatic),
Kushtha as Lekhana (scraping) and Kandu-hara, Giloy
as Rasayana (rejuvenator) and Krimi-hara (anti-
microbial), Mulethi as Uttama Ropana (best for wound
healing), Rasayana (rejuvenator) and Shonita-sthapanan
(haemostatic and blood enhancer), Lavanga as Shoola-
hasha (analgesic), Ela as Kandu-nashaka (anti-
pruritic), Tvak as Vrana-shodhaka (wound purifier)
and Vrana-ropaka (wound healer), Tejapatra as
Vatakapha-nashaka, Nagakesara as Kundughna (anti-
pruritic) and Rakta-stambhak (haemostatic), Priyangu
as Shonita-sthapanan (haemostatic and blood enhancer)
and Sandhanyi (property of repairing and healing),
Haritaki as Tridosha-nashaka, Rasayana (rejuvenator)
and Vrana-ropaka (wound healer), Vibhataki as Krimi-
hasha (anti-microbial), Amalaki as Rasayana
(rejuvenator), Tridosha-nashaka and Shonita-sthapanan
(haemostatic and blood enhancer) Dravyai[^7]. Abhraka
Bhasma acts as Rasayana (rejuvenator), Tridosha-
nashaka and Sarvaroja-hara. Loha Bhasma is Uttama
Rasayana (great rejuvenator), Krimi-hara (anti-
microbial), Shotha-hara (anti-inflammatory), Balya
(property of strengthening) and Deepana (improves
metabolism and digestion)[^8].
Lakshadi Guggul

It is referred from Bhaisajya Ratnavali. The drug is mentioned for fractures, bone diseases, injuries and pain related to them, Dhatu-ksheenta (debility) and Vata disorders. This signifies its action in fibrous and bone healing. Here we can consider its fibrous healing action. The main contents are Laksha, Ashthirshrinkhala, Arjuna-chhal, Ashwagandha, Nagabala-mulatwaka and Guggul. All of them possess Ropana (healing) and Rasayana (rejuvenator) properties.

Laksha acts as Uttama Vrana-ropaka (best for fibrous healing), Asthishrinkhala (Hadjoda) as Asthi-sandhankara (best for fibrous and bone repairing), Arjuna-chhal as Vrana-hara (wound healer), Ashwagandha as Rasayana (rejuvenator), Brimhana (property of nourishment) and Balya (property of strengthening), Nagabala-mulatwak as Uttama Rasayana (great rejuvenator), Guggul as Bhagna-sandhankrita (property of fracture healing), Rasayana (rejuvenator), Deepana (improves metabolism and digestion), Balya (property of strengthening), Kleda-hara (removes putrefaction), Krimi-nashaka (anti-microbial) and Sarvadosha-hara Dravya.

Mahayograj Guggul

The preparation is mentioned in Sharangdhara Samhita. It has been recommended for its Tridosha-hara action, Mandagni-Aruchi-nashaka (improves metabolism and digestion), Shotho-hara (anti-inflammatory), Shoola-prashamana (analgescic) and Rasayana (rejuvenator) properties. It contains Shunthi, Pippali, Pippali-mula, Chavya, Chitraka-mula, Ghista Bhrishta Hingu, Ajmoda, Peeta Sarshapa, Jeeraka-dvaya, Renuka, Indrayava, Patha, Vyayavidanga, Gajapiipalli, Kutki, Ativisha, Bharangi-mula, Murva, Vacha, Haritaki, Vibhiti, Amalaki, Vanga Bhasma, Rajata Bhasma, Nagabala Bhasma, Vrana Bhasma, Mandoora Bhasma, Rasa Sindoora, Guggul and Ghrita.

Shunthi, Pippali, Pippali-mula, Chavya, Chitraka-mula acts as Deepana (improves metabolism and digestion), Ghrita Bhrishta Hingu as Shoola-hara (analgescic), Ajmoda as Kaphavata-nashaka and Krimi-hara (anti-microbial), Peeta Sarshapa as Kandu-hara (anti-pruritic and anti-venom), Jeeraka-dvaya as Balya (property of strengthening), Renuka as Kandu-nashaka (anti-pruritic), Indrayava as Shonita-sathapana (haemostatic and blood enhancer) and Shoola-hara (analgescic), Patha as Shoola-hara (analgescic), Kandu-hara (anti-pruritic), Vrana-ropaka (wound healer) and Krimi-hara (anti-microbial), Vyayavidanga, Gajapiipalli, Kutki and Ativisha as Krimi-hara (anti-microbial), Bharangi-mula as Raktadosha-hara and Shotho-hara (anti-inflammatory), Murva as Kandu-hara (anti-pruritic), Vacha as Krimi-hara (anti-microbial), Shoola-ghna (analgescic) as Vanga Bhasma acts as Kapha-hara, Krimi-hara (anti-microbial), Deepana (improves metabolism and digestion) and Vrana-ropaka (wound healer), Rajata Bhasma as Deepana (improves metabolism and digestion) and Sarvaro-ga-hara, Naga Bhasma as Deepana (improves metabolism and digestion), Vatakapha-nashaka, Vrana-ropaka (wound healer) and Balya (property of strengthening), Loha Bhasma as Uttama Rasayana (great rejuvenator), Krimi-hara (anti-microbial), Shotho-hara (anti-inflammatory), Balya (property of strengthening) and Deepana (improves metabolism and digestion), Abhraka Bhasma as Rasayana (rejuvenator), Tridosha-nashaka and Sarvaroga-hara, Mandoora Bhasma (same as Loha Bhasma), Rasa Sindoora as Tridosha-nashaka, Shotho-hara (anti-inflammatory), Shoola-hara (analgescic), Uttama Vrana-ropaka (great wound healer and Rasayana (rejuvenator)) as Guggul acts as Bhagna-sandhankrita (property of fracture healing), Rasayana (rejuvenator), Deepana (improves metabolism and digestion), Balya (property of strengthening), Kleda-hara (removes putrefaction), Krimi-nashaka (anti-microbial) as Sarvadosha-hara Dravya and Ghrita (cow ghee) has lipophilic action, so it helps in ion transportation to a target organ and facilitates entry of drug in to cell and its delivery to mitochondria, microsome and nuclear membrane. Also, it helps in restoring the normal texture of the structure.

Gandha Taila

This formulation is mentioned in Ashtanga Hridayam Uttarsthana 27/36-41 in Bhagya Pratishedha Adhyaaya.

This is mentioned as Uttama Asthi-sthairyakara and Vatapitta-nashaka. It can be administered through oral route, nasal route and can be applied locally. The ingredients are Yashthi, Namala, Valaka, Manjishtha, Nakha, Mishi, Mustaka, Kushtha, Bala, Atibala, Mahabala, Aguru, Kumkuma, Chandana, Sariva, Sarala, Sarjarasa, Devdaru, Padmakari Gana, Eladi Gana, Shailiya, Rasna, Shalparni, Kaseruka, Kalanusari, Nata, Patri, Lodhra, Kakali (Ksheershukla), Durva, Godugdha and Krishna-Tila Taila.

Yashthi acts as Uttama Ropana (best for wound healing), Rasayana (rejuvenator) and Shonita-sathapana (haemostatic and blood enhancer), Namala as Raktaprakopa-nashaka and Vranapahama (wound healer), Manjishtha as Shonita-sathapana (haemostatic and blood enhancer), Nakha as Vrana-hara (wound healer), Mishi as Shoola-hara (analgescic), Vrana-ropaka (wound healer) and Krimi-hara (anti-microbial), Mustaka as Jantu-hara (anti-microbial and vermifuge) and Kaphapittaraka-nashaka, Kushtha as Lekhana (scrapping) and Kandu-hara, Bala, Atibala, Mahabala as Balya (property of strengthening), Vrana-ropaka (wound healer) and Raktavikara-nashaka, Aguru as...
Karna Roga-nashaka, Kumkuma as Vrana-nashaka (wound healer) and Krimi-hara (anti-microbial), Chandana as Vrana-hara (wound healer), Sariva as Rakta-stambhaka (haemostatic), Sarala as Vrana-hara (wound healer), Sarjarasa as Shoola-hara (analgesic), Vrana-ropaka (wound healer) and Bhagna-sandhankara (property of fracture healing), Devdaru as Kundu-hara (anti-pruritic) and Shotha-hara (anti-inflammatory), Padmakadi Gana as Kushta-Vrana-Daha-Raktapitta-nashaka, Eladi Gana as Kaphavisha-nashaka and Kundu-hara (anti-pruritic), Shaileya as Kundu-hara (anti-pruritic) and Daha-shamaka (relieves burning sensation), Rasna as Vata-hara, Shalparni as Rasayana (rejuvenator) and Krmi-hara (anti-microbial), Kaseruka as Pitta-shonita-dahaghna, Kalanusari as Krmi-hara (anti-microbial), Patra as Vatakapha-nashaka, Lodhra as Shotha-hara (anti-inflammatory) and Raktavikara-nashaka, Kakoli (Ksheershukla) as Rakta-pitta-daha-nashaka (relieves burning sensation), Durva as Rakta-stambhaka (haemostatic) and Pittarakta-nashaka dravya.

Godugha acts as Vata-pitta-rakta-nashaka and Sarvaroga-nashaka. Tila Taila acts as Balya (strengthening), Brimhana (nourishment), Lekhana (property of scraping), Deepana (improves metabolism and digestion), Vrana-hara (wound healer), Karnasdoolu-nashaka (relieves earache) [7].

**Vatari Churna**

It is a patent formulation of Divya pharmacy. It contains Shunthi, Vidhara, Kutki, Ashwagandha, Methi and Suranjana.

Shunthi acts as Kaphavata-hara, Vidhara as Shotha-hara (anti-inflammatory), Kutki as Krimi-hara (anti-microbial), Ashwagandha as Rasayana (rejuvenator), Brimhana (property of nourishment) and Balya (property of strengthening), Methi as Kapha-nashaka and Suranjana as Vatarakta-nashaka Dravya [7].

**Ashwagandha Churna**

It has Rasayana (rejuvenation), Brimhana (nourishment) and Balya (strengthening) properties [7].

**Mulethi Churna**

Mulethi is Uttama Ropana (best for wound healing), Rasayana (rejuvenator) and Shonita-sthapana (haemostatic and blood enhancer) in properties [7].

These medications are rich in Shodhana (purification), Ropana (wound healing), Krimi-hara (anti-microbial), Shotha-hara (anti-inflammatory), Rasayana (rejuvenator), Kundu-hara (anti-pruritic) and Shonita-sthapana (haemostatic and blood enhancer) properties. They help in the thorough healing of Agantuja Vrana. The healing effect resulted from the synergistic impact of various substances working together.

So, all these properties enhance the health of tympanic membrane and lining of EAC chiefly at cellular level and reduce keratinization, therefore, maintaining healthy cell cycle. They reduce symptoms such as itching, traumatic derangement of lining and unctuousness, restoring them to normal texture for both ear canal and tympanic membrane.

Rapid healing is seen in patients with small perforation and early treatment. Here in this case, the patient presented after 1 month of trauma and the size of perforation was big. So, the regeneration of the tissue was somehow slower than expected. But the medications were prompt, thus leading to complete healing in 2 months.

The Rasayana (rejuvenating), Brimhana (nourishment) and Balya (strengthening) properties of Drayvas imparted nourishment and strength and eventually, promoted the rejuvenation of all three layers of the membrane, and therefore, it encouraged the fibroblastic response and granulation in the perforated edges which is essential for repairing of wound. Vrana-ropaka (wound healing), Vrana-shodhaka (wound purification), Sandhinya (healing) and Bhagna-sandhankara (fibrous healing) property stimulated the process of healing and repairing, thus lead to increased vascularity of the tympanic membrane. Shotha-hara (anti-inflammatory) property reduced Shotha (inflammation) caused by the trauma, and Shoolahara (analgesic) property lowered the pain.

The Krmi-hara (anti-microbial) property prevented and cured the potential infection which may have complicated the disease. The Kundu-hara (anti-pruritic) property treated the itching sensation which the patient came with. The Shonita-sthapana (haemostatic and blood enhancer) and Rakta-stambhaka (haemostatic) properties stopped bleeding points created due to traumatic rupture. The Deepana property improved the digestion, thus eased the uptake of other Drayvas. It also improved metabolism even at molecular level resulting in complete healing of the perforation and subsided the associated symptoms.

**CONCLUSION**

This case is based on the management of patient on an OPD basis who was diagnosed with traumatic perforation and was kept on the line of treatment of Agantuja Vrana. Internal medications which were easy to administer and easily available, were prescribed. The Vrana-ropaka, Shotha-hara (anti-inflammatory) and Rasayana (rejuvenating) properties were found to be very useful in the management of traumatic perforation. No other intervention was introduced during the course of treatment. The current study provides a way for more clinical trials on a larger scale to evaluate the effect of Sarivadi Vati, Mahayograj Guggul, Lakshadi Guggul, Gandha Taila and combination of Vatari, Ashwagandha and Mulethi.
Churna on traumatic perforation. This will provide a smoother way to treat the condition without any instrumental intervention and topical therapy.

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Cite this article as:

https://doi.org/10.47070/ijapr.v12i5.3218

Source of support: Nil, Conflict of interest: None Declared

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