A CASE REPORT ON TRAUMATIC TYMPANIC MEMBRANE PERFORATION (TTMP) AND IT’S MANAGEMENT THROUGH AYURVEDA.

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ABSTRACT

Traumatic Tympanic membrane Perforation (TTMP) is an Agantuja Vrana or Agantuja Karna Roga. The traumatic perforation can be caused by a physical blow to the ear (such as a collision or slap), blast, barotrauma (pneumatization of the mastoid cells) or insertion of sharp objects (such as cotton swabs, bobby pins and sticks). Moreover, some previous studies have shown that the injury occurs more often in the left ear than the right. The patient always suffers reversible high-frequency deafness, occasionally complicated with tinnitus and vertigo. Most TTMPs (about 80%) can heal spontaneously within 3 months post injury. However, large perforations usually fail to close, and appropriate treatment should be performed to reduce the incidence of permanent impairment.

In Agantuja-Vrana, shamana and Sodhana chikitsa were adopted according to Ayurved. In Ayurvedic literature, there is no direct reference of TTMP. Therefore, it is a challenge for us to treat the condition with the treatment modalities of Ayurveda. However, result of the case study shows the real potency of Ayurveda. The local as well as systemic Medication in the form of Kushtadi Taila Karna Pichu and Shadanga Guggulu respectively, shows their Rapid rate of recovery in terms of Closure of the Perforation within 5 Days. Here the Lekhana, Vrana Ropana, Vrana Sodhana, Rasayana, Krimighna, Soolahara and Sweda Janana Property of the drugs present in Kushtadi Taila Karna Pichu and Shadanga Guggulu Come in to act and perform the rapid Healing mechanism.

Key words: Traumatic Tympanic Membrane Perforation, Kushtadi Taila, Karna Pichu, Shadanga Guggulu.
INTRODUCTION
Acharya of Brihatrayee, Laghutrayee and many Scholars of Ayurved clearly mentioned Nidana of KarnaRoga. Mithyayoga of Shashtra is one of the causes of KarnaRoga [1]. Physical blow to the ear (such as a collision or slap), blast, barotrauma (pneumatization of the mastoid cells) or insertion of sharp objects (such as cotton swabs, bobby pins and sticks) [2-4]. Among these, collision is more often the cause in males, while perforation induced by insertion of a cotton swab is approximately twice as common in females [3]. Moreover, some previous studies have shown that the injury occurs more often in the left ear than the right [3, 5, 6]. Mithyayoga of Shashtra is the trauma causing injury to the wall of external auditory canal or perforation to the tympanic membrane. We can correlate this condition to the TTMP as Agantuja Vrana. TTMP patients always suffer reversible high-frequency deafness, occasionally complicated with tinnitus and vertigo [3, 7, 8]. Most TTMPs (about 80%) can heal spontaneously within 3 months post injury [4, 5, 9-12]. However, large perforations usually fail to close, and appropriate treatment should be performed to reduce the incidence of permanent impairment [10, 12-15].

Ayurved is the natural healer. Since thousands of years, Ayurved is adopted as the remedy of many acute and chronic diseases. Scholars of Ayurved have been mentioned many Bheshaja (medicines) in the form of Vati, Choorna, Kwatha, Swarasa, Bhasma, Taila, Ghrita, Leha etc. and many Chikitsa Upakrama (therapy) in the form of Panchakarma (Snehana, Swedana, Yamana, Virechana, Nashya, Rakta Mokshyana and Basti Karma). The topical treatment, that is local application of drugs or Sthanika Chikitsa in the form of Avyanga, Swedana, Lepa, Netra Tarpana, Karna Poorana, Ksharakarma, Agnikarma, Raktamokhna and Sansamana Chikitsa is mentioned in different classical literatures. KarnaPichu is a modified form of Karnaporana, which provides a long duration of skin contact time with controlled release of the Drugs. The Kushtadi Taila [16, 17] was used in this Agantuja Vrana (TTMP) as KarnaPichu and the Shadanga Guggulu Kwatha [18] mentioned in Chakradatta, was used in the form of tablet as Sansamana Chikitsa to reduce the Sotha and Soola in TTMP and this study just after 5th day of
treatment shows marked improvement in the perforation of tympanic membrane.

**MATERIALS AND METHOD**

**Case report**

A 26 years old male patient complaining reduced hearing and mild pain in left ear since 7 days with H/O hit on left cheek and mechanical trauma to left ear (non-MLC) visited the OPD of SJGAMC & H, Koppal vide Registration No. 89215/ Dt. 1.11.2019. No history of bleeding or discharge from the ear.

**Examination of the Patient**

Otoscopic Examination of the left ear shows a 2mm*4mm oval shaped central Perforation with 3-4 hemorrhagic lesions with irregular edges. In Rinne’s test, it was found that BC > AC in left ear, representing conductive deafness, whereas the right ear was normal. Webber’s test also reveals conductive deafness of the Left ear. After careful examination of the patient and his history, the patient was diagnosed as Traumatic Tympanic Membrane Perforation (TTMP).

**Procedures administered to the patient**

Patient was administered with Kushtadi Taila as Karna Pichu twice daily for 7 days and Tab. Shadanga Guggulu 500mg 1tab twice daily for 15 days. Follow Up was made on Day 15.

**RESULTS**

- On day three, the dimension of perforation was reduced from 2mm*4mm to 1mm*1.5mm. And there is very little pain in the Ear which probably due to the cotton Pichu inserted in the EAC
- On Day five, the Perforation was closed.
- On day seven, the perforation was totally closed and there was no pain. Patient’s hearing was restored.
- On Day fifteen Tympanic, membrane was clear and no mark of perforation was found.
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DISCUSSION
The Tympanic membrane has three distinct layers \[19\], the Outer epithelial layer, which is the continuation of the skin of EAC, the Middle most fibrous layer, which has radial, circular and parabolic fibrous layer and the inner most mucosal layer, which continues as the mucosal layer of middle ear cleft.

However, in 1851 Toynbee demonstrated that the Pars Tensa of TM has five layers \[20\]:-

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

Histopathological study of a newly formed perforation shows proliferation of squamous epithelium within 12 hours at the edge of the perforation and granulation formation within 18hrs, while the inner mucosa of the tympanic membrane takes several days to regenerate \[21\]. In chronic tympanic membrane perforation, squamous epithelium is found adjacent to the middle ear mucosa and creates a perforation edge with no raw surface. This is a contributing factor for a perforation to persist and was observed by Dunlop and Schuknecht in 1947\[22\].

The squamous epithelial layer of the perforated edge of tympanic membrane ceases closure of the TTMP.

Usually most of the TTMP heals spontaneously within 3 month of injury \[4, 5\]. Large perforations usually fail to close and need specific measures to get rid of the impairment \[10, 12\]. There are few non-surgical methods to induce closure of the perforation. Those are irritant oils \[23\], fibrin glue \[23\], fat plug \[24\], carbon Dioxide Laser trimming of the Margins before applying paper patch \[25\] etc. Studies have shown that moisture balance is important during wound healing and a moist environment facilitate cellular growth and collagen proliferation with in a healthy non cellular matrix, There by hastening the healing of both acute and chronic wounds and promoting the growth of new tissue\[26, 27\]. Indeed the moist tympanic membrane perforation has been shown to heal rapidly than the dried tympani membrane perforations \[27, 28\]. In acidic medium the healing mechanism of tympanic membrane perforation is rapid than in Alkaline medium \[29\].

We have used the Kushtadi taila and Tab. Shadanga Guggulu. The Kushtadi taila and Tab. Shadanga Guggulu. The Kushtadi taila and Tab. Shadanga Guggulu.
Taila contains Tila (Sesamum Indicum), Goat urine, Kushta (Saussurea lappa), Hingu (Ferula Narthex), Vacha (Acorus Calamus), Devadaru (Cedrus deodara), Satahva (Anethum sowua), Sunthi (Zinger officinale) and Saindhava (Rock Salt). The Shadanga Guggulu is mentioned in Chakradatta Shadanga Guggulu Kwatha. It is mentioned in Netraroga adhikara as a Soolahara, Pakahara and Sothahara. It has Amalaki (Emblica officinalis), Haritaki (Terminaliya chebula), Bibhitaki (Terminalia bellerica), leaf of Patola (Trichosanthes dioica), bark of Nimba (Azadirachta indica), Vasa (Adhatoda vasika) and Sudha Guggulu (Commiphora mukul). The property of the drug components are as follows.

Kushtadi Taila [16, 17] :-

<table>
<thead>
<tr>
<th>NAME</th>
<th>LATIN NAME</th>
<th>PROPERTY</th>
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<tbody>
<tr>
<td>Tila Taila</td>
<td>Sesamum indicum [30]</td>
<td>Vrana Ropaka-Sodhaka, sandhaniya, vedana sthapaka</td>
</tr>
<tr>
<td>Kushta</td>
<td>Saussurea lappa [31]</td>
<td>Vedana sthapaka , Rasayana, jantughna</td>
</tr>
<tr>
<td>Hingu</td>
<td>Ferula Narthex [32]</td>
<td>vedana sthapaka , jantughna</td>
</tr>
<tr>
<td>Vacha</td>
<td>Acorus Calamus [33]</td>
<td>Sweda janana, vedana Hara, Sothahara</td>
</tr>
<tr>
<td>Devadaru</td>
<td>Cedrus deodara [34]</td>
<td>Sweda janana, Lekhana, Sothahara, vedana hara, krimighna</td>
</tr>
<tr>
<td>Satahva</td>
<td>Anethum sowua [35]</td>
<td>Karna soola hara</td>
</tr>
<tr>
<td>Sunthi</td>
<td>Zinger officinale [36]</td>
<td>Sothahara, vedana sthapaka, srotasodhaka</td>
</tr>
<tr>
<td>Saindhava</td>
<td>Rock salt [37]</td>
<td>Tridosahara, Wound healing activity [38]</td>
</tr>
<tr>
<td>Aja Mutra</td>
<td>-----------</td>
<td>Karn soola hara, sofa hara</td>
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Shadanga Guggulu [18] :-

<table>
<thead>
<tr>
<th>NAME</th>
<th>LATIN NAME</th>
<th>PROPERTY</th>
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<tbody>
<tr>
<td>Ghee</td>
<td>Ghee [37]</td>
<td>Rasayana</td>
</tr>
<tr>
<td>Guggulu</td>
<td>Commiphora mukul [41]</td>
<td>Lekhana-Rasayana-Ropaka-Vedana Sthapaka</td>
</tr>
<tr>
<td>Amalaki</td>
<td>Emblica officinalis [42]</td>
<td>Rasayana- Indriya</td>
</tr>
</tbody>
</table>
Haritaki | Terminaliya chebula | Vrana Ropaka-Sodhaka-Rasayana-Indriya
Bibhitaki | Terminaliya bellerica | Vrana Ropaka-Sodhaka
Vasa | Adhatoda vasika | Vedana Sthapaka-Sothahara-KhyayaNasaka
Nimba | Azadirachta indica | Vrana Ropaka-Sodhaka, Khyaya Hara
Patola | Trichosanthes dioica | Vedana Sthapaka, Vrana Ropaka-Sodhaka

*Kushtadi Taila* is indicated in *Puti-Karna*. *Puti Karna* can be co related with CSOM. In CSOM, there is a permanent perforation in the tympanic membrane. The ingredient of *Kushtadi taila* has the property of *Sandhaniya (Tila Taila)* Vrana Ropaka and Sodhaka (Tila, Sunthi), Sothahara (Vacha, Devadaru, and Sunthi), Vedana Sthapaka (Kushta, Devadaru, Vacha, Sathva, and Sunthi), Sweda janana (Vacha, Devadaru), Krimighna / Jantughna (Hingu, Devadaru), Rasayana (Kushta, Saindhava) and Vrana Ropana karma i.e. wound healing activity \(^{[38]}\).

The Human cell membrane is Lipophilic as it is biphospholipid \(^{[48]}\). The lipids or the lipid soluble drugs can enters through the biphospholipid layer through the Passive diffusion \(^{[48]}\). In addition, the water-soluble particle through the Para cellular space or the aqueous pores present in the cell membrane \(^{[49]}\). Therefore, the lipid soluble part and the aqueous soluble parts of the *Kushtadi taila* can easily enters in to the cell through the cell membrane, to the cytoplasm and hence to the tissue of external auditory canal (EAC).

In the context of netra-Kriyakalpa, it has been told that, the drugs of the Kriyakalpa absorbs through the Vartma (skin of the lid), Sandhi (through the junctional area of eye) Sirakosha (orbital surface), *sira* (blood vessels) \(^{[50]}\). *Astanga Sangraha* and *Hridaya Kara* stated that the drugs are absorbed through the capillaries (*Srotas*) of *Kasha Sandhi* that is through the hair follicle, through the *Ghrana* that is through the nasal mucosa, through the *Ashya* that is through the oral mucosa \(^{[51, 52]}\). That mode of action of the Kriyakalpa suggests that the drugs are absorbed through the skin in contact, through the blood capillaries, through the hair follicles and through the mucosal membrane. Thus, the drugs of *Karna pichu* are absorbed by the skin, hair follicles and through the capillaries beneath the skin.
There it reaches the cell organelles. It provides nutrition and stimulates the cell organelles. Therefore, it restores the function of tissues by rejuvenating them. We are using the medicated oil in form of Pichu (a cotton roll soaked in Medicated oil), so there is more contact time of the oil, which provides better absorption of the drug in EAC and in Tympanic Membrane.

Shadanga Guggulu is indicated in Sofo and Paka mentioned in netra roga. The ingredients of Shadanga Guggulu suggests Vrana Ropaka-Sodhaka (Guggulu, Haritaki, Bibhitaki, Nimba and patola), Vedana Sthropaka (vasa, patola), Rasayana (Guggulu, Haritaki, Bibhitaki, Ghee and Amalaki), Indriya (Haritaki, Amalaki), Lekhana (Guggulu) and Sothahara (Vasa). The healing of the perforated tympanic membrane depends on the following factors:-

- Size of the TM [4, 5, 9, 10, 12, 15]
- PH of the medium[29]
- Dryness of the medium[26, 27]
- Presence of inward grown squamous epithelium [20]
- Fibroblastic proliferation and granulation [20]
- Circulation to the perforated edges [20]

In the above Case, the size of TM is small so it favors the rapid generation of the Tissues. The Kushtadi taila provides Acidic medium, which accelerate the healing mechanism. The Sweda janana property and the Snigdha Sara Guna of Tila and Guggulu respectively make the Tympanic membrane moisturized. Lekhana property of the drugs prevents the squamous epithelial layers to cover the edge of the perforation. The Khyaya Hara property along with Rasayana provides nutrition, strength and ultimately accelerates the rejuvenation of the Dhatu's i.e. epithelial, fibrous and mucosal layers of the TM. That means it favors the fibroelastic proliferation and granulation of the tissues in the perforated edges. Vrana Sodhaka-Ropaka-Sandhaniya property stimulates the process of healing and favors the flow of blood through the vessels of the TM. Indriya Property of the drugs provides nutrition and strength to the Srotronadi, which improves Hearing. Sothahara property reduces Sofa Caused by the Trauma and Vedana Sthropaka Property reduced pain.

**SUMMARY**

Thousands years ago the Acharyas knew the administration of drugs in various
routes as Oushadha Sevana, Vasti, Abhyanga, Lepa, Shirodhara, Pratisarana, Tarpana, Anjana, Aschyatono, Bidalaka, Karnapoorana, Kabala, Gandusha, Nashya, Dhoomapana etc. They knew the drug entry through the Sirakosha (hair root), sira (blood vessels), which is mentioned in the context of Netra Kriyakalpa. It shows the level development in Ancient Ayurveda. The KarnaPichu is a modified form of Karnapoorana, which provides more contact time causing slow absorption of drug for a long period. Thus favoring the condition, which is required for the rapid healing procedures in Perforation of Tympanic membrane. The traumatic edge of the perforation heals rapidly as it does not have the ingrown mucosal layer. The rejuvenation of the Dhatu and the cell organelles by the local application of the Pichu promotes the Fibroblastic proliferation and granulation at the edge of the perforation. The irritant, Kushtadi Taila and the Shadanga Guggulu promotes the circulation, reduces Sofa and prevents Paka. Hence, the Environment all around the TTMP, promotes the rapid healing.

CONCLUSION
Agantuja Vrana are caused by injury or trauma. The Vata, Pitta, Kapha Separately or by combination are involved in different stages of Agantuja Vrana. Traumatic Tympanic membrane Perforation (TTMP) is an Agantuja Karna Vrana. Considering the Nidana, Dosha-Dhatu-Adhisthana and Chronicity of the disease, the Chikitsa Sutra (treatment protocol) are developed or modified. Now a days People of the modern era need rapid recovery and the medical sciences, which provides a rapid rate of recovery, wins the race of treatment. Considering all the chikitsa sutra the above treatment modalities were adopted. Those treatment modalities prevented complication and secondary infection. It prevents the delay of healing and plays the role of a rapid healer. Thus, the treatment validates the potency of Ayurved. Therefore, the combination of Kushtadi-Taila KarnaPichu along with Shadanga Guggulu can be taken to treat tympanic membrane perforations.

REFERENCE
A CASE REPORT ON TRAUMATIC TYMPANIC MEMBRANE PERFORATION (TTMP) AND IT’S MANAGEMENT THROUGH AYURVEDA


17. Tripathi Indradeva, Chakradatta with Vaidayaprabha Hindi Commentary, Published by Chaukhambha Sanskrit Sansthan, Varanasi, Reprint 1997, KarnaRoga Chikitsa Shloka No.52, P.342.


A CASE REPORT ON TRAUMATIC TYMPANIC MEMBRANE PERFORATION (TTMP) AND IT's MANAGEMENT THROUGH AYURVEDA


30. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.121.


32. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.350

33. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.28

34. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.76

35. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.403

36. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.332


41. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.55

42. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.759

43. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.754

44. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.239

45. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.242

46. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.149

47. Sharma P.V. Dravyaguna Vijnana- published by Chaukhambha Bharati Academy; Varanasi; Reprint 2017, P.697.

48. Tripathy K D, Essentials of Medical
A CASE REPORT ON TRAUMATIC TYMPANIC MEMBRANE PERFORATION (TTMP) AND IT's MANAGEMENT THROUGH AYURVEDA


52. Tripathy Brahmananda, Astanga Hridaya with Nirmala Hindi commentary Chaukhamba Sanskrit Pratishthan; Varanasi; 2017, Su.23/7, P. 264.

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