Clinical Appraisal on Therapeutic Efficacy of Tankana and Sphatika Bhasma with Madhu Pratisarana in Tundikeri

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ABSTRACT

The clinical study was carried out to find out the efficacy of Tankana & Sphatika bhasma with Madhu pratisarana in Tundikeri (Chronic Tonsillitis). The study was an Open Labelled Randomized Comparative study with a pre- and post-test design at the outpatient level of S.V.M. Ayurvedic Medical College & R.P.K Ayurvedic Hospital, Ilkal, Karnataka, India. In accordance to inclusion and exclusion criteria 30 patients were treated with Tankana bhasma (Purified borax powder) along with Madhu (honey) pratisarana and Sphatika bhasma (purified potash alum) along with Madhu pratisarana on alternative days for 13 days to Group A and Group B respectively. Each group comprised with 15 patients. After assessment of all data, the result conforms that both the drug Tankana bhasma with Madhu pratisarana and Sphatika bhasma with Madhu pratisarana on Tundikeri have significant result. However, in overall assessment, the efficacy of Tankana bhasma pratisarana is more significant than Sphatika bhasma pratisarana in the management of Tundikeri.

Keywords: Tundikeri, Tonsillitis, Tankana, Borax, Sphatika, Alum, Madhu, Pratisarana

1. INTRODUCTION

‘Tundikeri’: The term of Ayurveda gives a general meaning of disease which occurs in oral cavity (Mukhagata roga) defined as swelling at root of Hanu sandhi (temporomandibular joint) that resembling (Fig.1) Vana karpasa Phala (cotton fruit).[1-2] Ayurveda classified this disease under Kantagata (disease of throat ) and Talagata roga (disease of palate) also,[3-5] Tundikeri of Ayurveda has been correlated with Tonsillitis of modern science. [5-7] Tonsillitis is an infection of tonsils. The surface and deep bacterial flora of chronic inflamed tonsils consist of an abundance of probable pathogenic aerobic and anaerobic bacteria, primarily of streptococcal origin.[8-12] From all visits to paediatrician, it is found that 7% children are affected with this disease.[13] Ayurveda advocates that it is caused by the vitiation and imbalance of doshas i.e., Vata, Pitta, and Kapha. Mainly derangement of Kapha and Rakta (blood) is preceded by impaired digestive capacity (Mandagni/Vishamagni) and obstruction of channels (Srotavrodha) namely Annavaha srotas (gastrointestinal tract) and Pranavaha srotas (respiratory tract) which is manifested as difficulty in swallowing, mouth breathing, choking spells at night, etc.[14,15]

Ayurveda provides enough references regarding the treatment of Tundikeri based on doshik predominance, signs and symptoms. Among these one of the promising therapy is application of Kshara (alkal) in the form of Pratisarana (Application of different form of drugs inside the mouth with the help of a finger tip).[16] This therapy has many advantages over conventional surgery and is aimed at pacifying inflammation and subsidence of symptoms. Pratisarana kshara is a prevalent treatment modality in Ayurveda which has been advocated in disorders like Arbuda and Adhimansa besides that many other unhealthy or undesirable growths of body tissues.

Out of various minerals described in Ayurveda, Tankana (Borax/Sodium tetraborate decahydrate) and Sphatika (Alum/Potash alum) are important minerals which are used for Rasa Samskara as well as therapeutic use in purified form. Tankana is also named as Kshararaaja means it is corrosive in nature but not a strong corrosive.[17] Tankana

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bhāsma (Purified Tankana/Sodium Borate) is known as a best bleaching agent & anti-septic which helps in the removal of media for growth of pathogens. Sphatika is also an alkaline Material. Ksharīya in nature and possesses kashaya, katu, ama and madhura rasa.\textsuperscript{18} Sphatika bhāsma (Purified Alum) is also a bleaching agent & anti-septic which sustains the growth of pathogens by eroding the layer formed by the infection. Considering these thoughts a comparative study was carried out to trace the efficacy of Tankana and Sphatika kshara (in form of bhasma) Pratisarana with Madhu (honey).

2. MATERIAL AND METHODS

Design
Open Labelled Randomized Comparative study

Participants: In accordance with the Inclusion criteria, patients associated with chronic tonsillitis (Tundikeri) i.e. Kathina sotha (enlargement of tonsil), Ragatwa (hyperemia), Galoparodha (dysphagia), Mukha daurgandhya (halitosis) were selected and registered in OPD-IPD of Department of Shalakya Tantra, S.V.M. Ayurvedic Medical College & R.P.K Ayurvedic Hospital, Ilkal between April 2018 to Jun 2018.

Exclusion criteria were Tonsillitis associated with complications such as peritonsillar abscess, tonsilar cyst, tonsillolith or any other systemic disorders and patients who had taken systemic steroids or antibiotics in past 4 weeks.

Study Drug
Tankana bhāsma, Sphatika bhāsma and Madhu

Preparation of Tankana bhāsma and Sphatika bhāsma.\textsuperscript{19,21} The raw material of both the drugs were taken in a clean and dry Khalva yantra separately and powdered well to prepare powder. This powder was taken in a Sarava (earthen pot) & heated in Madhyamagni (moderate heat) until all the water content is completely evaporated. Finally Tankana was obtained as a white coloured puffy light substance and Sphatika was obtained as an off-white coloured light substance. This white substance then made as fine powder like the character of bhāsma by khalva yantra.

Intervention
Out of 36 patients, 30 patients were participated till end of the study design. A suitable sampling technique was adopted with 15 patients each in study Group A & Group B. Patients of Group A treated with Tankana bhāsma along with Madhu pratisarana on alternative days for 13 days. Patients of Group B treated with Sphatika bhāsma along with Madhu pratisarana on alternative days for 13 days (total 7 time application). From 14th day to 21st day patients were undertaken for follow-up without medicines in both the Groups.

Trial Method
Tankana bhāsma with Madhu and Sphatika bhāsma with Madhu were mixed in equal quantity respectively. Pratisarana was carried out le applied in dose which sufficiently covers the whole surface of tonsil. The duration of Pratisarana was 2 minutes per sitting i.e approximate 100 Vakmatra (time duration after Pronunciation of one alphabetic letter).\textsuperscript{22}

Assessment Criteria
Subjective parameters were assessed according to severity of signs and symptoms. Assessment was done on the basis of grading and scoring of clinical features on 1st day (before treatment), 14th day (after treatment) & 21st day (after follow-up) on four point grade scale. Kathina Shohta: Tonsils in tonsillar fossa, Tonsils visible beyond the anterior pillar, Tonsils extended \% of way to midline, completely obstructing; Kissing Tonsils. Ruk (Pain) - No pain, Occasional, During food intake, Recurrent/Several times per day, throughout the day. Raaga (Redness of Tonsils) - Nil, Mild discoloration, Moderate discoloration, Severe discoloration, Severe discoloration with throat ulceration. Galoparodha (dysphagia) - No difficulty. Difficulty in taking solid food only. Difficulty in taking solid & liquid food, Difficulty in swallowing saliva itself. Mukha dourgandhya (Halitosis) - No Halitosis, Halitosis present only when opening the mouth completely, Halitosis present during yawning, Halitosis present even during talking. Objective criteria were assessed according to Pictorial presentation and Size of Tonsils (By applying 4% xylocaine to measure the tonsil by tonsillar forceps before and after treatment)

3. DATA ANALYSIS

The observations of characters were presented in tabulated form & statistically analyzed individually & inference drawn. For each independent sample, unpaired t-test and Mann-Whitney U test (for between-subjects designs) and paired samples t-test and the Wilcoxon test (for within-subjects designs) were done.

4. OBSERVATION AND RESULT

Out of 36 registered patients, 30 patients were completed the study. In accordance to socio demographic profile, participants were approximately equal percentage of male and female in gender basis, 76.7% Hindu & 23.3% Muslim on religion basis. Socio economic status divulged that 30% lower classes, 20% Lower middle classes, 43% Middle classes and 5% higher classes. In dietic regimen equal % of vegetarian and mixed vegetarian participants were traced. Prakriti shows participants having majority in Vata kapha prakriti (73.3%) & others Pitta prakriti (26.7%)

Trail drug effected on the score of Sotha, Ruk, Raagatwa, Galoparodha and Mukha dourgandhya was 38.9%, 84.2%, 63%, 60% and 84% respectively improvement in Group A and 14.3%, 65.5%, 39.5%, 33.3% and 53.6% respectively improvement in Group B. Within both the groups (Wilcoxon signed ranks test) statistical significance (p < 0.05) on signs and symptoms of chronic tonsillitis was found. (Table 1)

5. DISCUSSION

With the chief complain of sore throat, difficulty in swallowing, refuse to intake of food, pain in throat and fever etc patients are diagnosed as the disease Tundikeri. Investigation conforms the inflammation of the tonsils is caused by a microbial organism. The symptoms are usually mild and often related to the common cold. Acute tonsillitis often affects school-going children, but also affects adults. Haemolytic streptococcus is the most commonly infecting organism. Other causes of infections may be staphylococci, pneumococci or H.influenzae. These bacteria may primarily infect the tonsil or may be secondary to a viral infection.

The statistical analysis (Mann-Whitney ‘U’ test) on subjective criteria showed that p-value on all parameters are less than 0.05 but mean rank for Group A in all clinical features is greater than Group B, which imply that there is significant difference between Group A and Group B. (Table 2)

Observations on objective criteria reveal that, the effect of drugs in both groups is significant as p value < 0.05. But In Group A, only 7.5% patient shows reduction in size of tonsils while in Group B is 3.4%. This observation was statistically analyzed by using paired t-test as data are quantitative &
sample size is less than 30. Inter group comparison by using Un-paired t-test, shows that $p < 0.05$ and mean difference for Group A is greater than Group B. Therefore the drug prescribed in Group A is more effective than drug prescribed in Group B.

Tankana is corrosive as well as Mridu (soft) in nature having the properties like Katu rasa, Ushna virya, Ruksha & Tikshna guna. Kshaara has been used as Prakriti vighatana treatment for all types of krimi chikitsa as krimi cannot exist in kshariya state.[23,24]

Tankana carries properties like Kapha-visleshaka and Vatahara due to Katu rasa, Ushna virya & Tikshna guna. Katu rasa & Tikshna guna helps the drug to penetrate the deeper parts of Tundikeri which removes the vitiated Kapha dosha and mucoid debris, so that symptoms like Mukha daurgandhya (halitosis) is reduced. Pain is reduced in Tundikeri due to pacification of Vata dosha due to Srotabarodha (blockage of channels). Because of Vitiated kapha under goes Vishlesana due to Kshariya swabhava of Tankana, this further helps to open the obstructed cannals of the tonsil. Katu rasa along with Ruksha, Tikshna guna acts as Lekhana and Margya vishdhana, which helps in reduction of Ragata and Sotha.

The results of in-Vitro antimicrobial study of Tankana reveals that Tankan was effective against bacterial strains E. coli, P. aeruginosa, S. aureus, S. pyogenes and fungal strains C. albicans, A. niger and A. Clavatus.[23] Tankana churna possesses anti inflammatory action also.[24]

Sphatika or Potassium aluminium Sulphate (Alum) exhibited broad spectrum antibacterial potency against test bacteria but much more on the Gram negative than gram positive using in-vitro susceptibility tests but in-vitro-study demonstrates that alum can be used as a novel and emerging antimicrobial agent in food system to combat some spoilage bacteria and food borne pathogens.[27]

Madhu is the chief drug in Samana chikitsa having the nature of Yogavahi (catalyst) also. The Yogavahi character of Madhu helps to increase the pharmacodynamic action of drugs without changing its original properties. It acts as antimicrobial & anti healing action due to its Kashaya rasa, Rukshya guna & character like Visanwayat (krimighna).[18]

The anti-microbial properties of honey is derived from the osmotic effect of high sugar content & low moisture content along with its acidic properties of gluconic acid. The healing properties of honey are due to the fact that it offers anti-bacterial activity, maintains a moist wound condition and its high viscosity helps to provide a protective barrier to prevent infection. Its immune modulator property is relevant to wound repair too. The antimicrobial action of honey is due to the enzymatic production of Hydrogen peroxide.[29]

Madhu is applied locally with purified Tankan for various ailments of mouth including Mukhapaka where swelling, burning etc. are present.[30] Madhu with purified Sphatika powder- 2-3 gunja (1 gunja = 125mg) is indicated in whooping cough.[31] Kashaya rasa & Rukshya guna of Madhu helps to absorb Kapha (voshana ) that leads to reduction of Shotha.[21] So, Madhu may also helps for the reduction of the clinical feature Shotha in Tundikeri.

It is reported that honey reduced the activities of cyclooxygenase-1, cyclooxygenase-2, thus honey showing anti-inflammatory effect also.[32] The local application of Tankana bhasma with Madhu pratisarana and Sphatika bhasma with Madhu pratisarana are Vyadhikara by nature. As the drug was directly applied at the site of disease, therefore the remedy was fast acting in reducing the signs and symptoms. No side effects were observed during the study period.

On overview of both the drugs (Tankana and Sphatika) the chemical formula of both the drugs are different but belongs to same family i.e. “Borax Family”. Both have equal properties. But the chemical formula indicates they are different due to their water content. Tankana (Borax compound) contains 10 water molecules, on the other side Sphatika (Potash alum compound) contains 24 water molecules. Along with, there is a clear difference in Rasa & Guna between both drugs. Tankana has Katu rasa & Tikshna guna, where as Sphatika has Kashaya, Katu, Amla-Madhura rasa & Guru-Snigdha guna. Both drugs are kshariya in nature but the kshariya character is less in Sphatika due to presence of more water molecules which responsible for variation in Guna and Rasa than Tankana. So that kshariya property of Tankana has acts more effectively than Sphatika.

6. CONCLUSION

Tundikeri is a clinical condition which is very common in child as well as in growing age (adolescent) with no significant relation to sex, religion & geographical distribution. Its signs and symptoms correlates with Tonsillitis in contemporary medicines. Poor oral hygiene, improper food habit like more intake of kapha ja abhara vihara & exposure to cold are the chief predisposing factors of the disease Tundikeri. Children as well as growing age adults with Kapha-Vata predominance Shareerika prakriti are more prone to develop tonsillitis. Both the drug Tankana bhasma with Madhu pratisarana and Sphatika bhasma with Madhu pratisarana on Tundikeri have significant results. However, there is significant effect of Tankana bhasma Pratisarana than Sphatika bhasma Pratisarana in Tundikeri as from the Ayurvedic perspective, it controls the imbalance of doshas and thus effectively reduces the signs and symptoms of chronic tonsillitis.

Fig.1: Tundikeri (Chronic Tonsillitis) that resembling Vana Karpasa Phala (cotton fruit).
Table 1: Effect of prescribed drugs on signs and symptoms of chronic tonsillitis (BT & AT) - test statistics within the groups (Wilcoxon signed ranks test).

<table>
<thead>
<tr>
<th>Sign &amp; Symptoms</th>
<th>Group</th>
<th>Wilcoxon Signed Rank W</th>
<th>P-Value</th>
<th>% Effect</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shotta (Inflammation)</td>
<td>A</td>
<td>-3.742a</td>
<td>0.000</td>
<td>38.9</td>
<td>Significant</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-2.000a</td>
<td>0.046</td>
<td>14.3</td>
<td>Significant</td>
</tr>
<tr>
<td>Ruk (Pain)</td>
<td>A</td>
<td>-3.502a</td>
<td>0.000</td>
<td>84.2</td>
<td>Significant</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-3.578a</td>
<td>0.000</td>
<td>65.5</td>
<td>Significant</td>
</tr>
<tr>
<td>Raaga (Redness)</td>
<td>A</td>
<td>-3.453a</td>
<td>0.001</td>
<td>63.0</td>
<td>Significant</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-3.873a</td>
<td>0.000</td>
<td>39.5</td>
<td>Significant</td>
</tr>
<tr>
<td>Galoparodha (Dysphagia)</td>
<td>A</td>
<td>-3.464a</td>
<td>0.001</td>
<td>60.0</td>
<td>Significant</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-2.449a</td>
<td>0.014</td>
<td>33.3</td>
<td>Significant</td>
</tr>
<tr>
<td>Mukha daurangdhyva</td>
<td>A</td>
<td>-3.051a</td>
<td>0.002</td>
<td>84.6</td>
<td>Significant</td>
</tr>
<tr>
<td>(Halitosis)</td>
<td>B</td>
<td>-3.000a</td>
<td>0.003</td>
<td>56.3</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 2: Statistical analysis & comparison of all features (Subjective Criteria) in both groups

<table>
<thead>
<tr>
<th>Sign &amp; Symptoms</th>
<th>Group</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Mann Whitney U</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shotta (Inflammation)</td>
<td>A</td>
<td>15</td>
<td>20.50</td>
<td>307.50</td>
<td>37.50</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>15</td>
<td>10.50</td>
<td>157.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruk (Pain)</td>
<td>A</td>
<td>15</td>
<td>20.53</td>
<td>308.00</td>
<td>37.00</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>15</td>
<td>10.47</td>
<td>157.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raaga (Redness)</td>
<td>A</td>
<td>15</td>
<td>20.50</td>
<td>307.50</td>
<td>37.50</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>15</td>
<td>10.50</td>
<td>157.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galoparodha (Dysphagia)</td>
<td>A</td>
<td>15</td>
<td>10.50</td>
<td>277.50</td>
<td>67.50</td>
<td>0.028</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>15</td>
<td>12.50</td>
<td>187.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mukha daurangdhyva</td>
<td>A</td>
<td>15</td>
<td>16.30</td>
<td>244.50</td>
<td>100.50</td>
<td>0.562</td>
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<tr>
<td>(Halitosis)</td>
<td>B</td>
<td>15</td>
<td>14.70</td>
<td>220.50</td>
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Conflict of Interest: None

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