TARPANA-EVIDENCE BASED AYURVEDIC APPROACH FOR EYE MALADIES

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ABSTRACT
Ayurveda advocates topical ophthalmic procedures called Kriya Kalpas as major therapeutic procedures for the management of eye diseases. Tarpana one among these ocular procedures wherein the topical application of clarified butter (ghrita) and other dosage forms of clarified butter processed with medicinal plants (ghritakalpas) are employed which are lipid soluble. Lipid soluble substances possess better permeability and cross ocular tissues irrespective of their molecular size, hence therapeutic concentrations could be achieved. Ghritakalpas (dosage forms with clarified butter as base), the drug is present as small particles kept suspended in an lipid medium by a dispersing agent, particles do not leave the eye as quick as solutions that increase the tissue contact time. Tarpana is indicated in diverse ophthalmic conditions such as surface lesions, diseases of adnexa, intraocular and neuro-ophthalmic diseases. Owing to these merits, prime importance stands attributed to tarpana over the other topical ocular therapies.

KEYWORDS: Tarpana, Kriyakalpas, Ayurveda, Ocular therapeutics.

INTRODUCTION
Eye maladies and Ayurvedic remedies are known to all, but their impact is yet felt and recognized by both medical fraternity and public in general. From historical point of view it is evident that Ayurvedic drugs and procedure based therapies are exceedingly used in alleviating wide range of ocular conditions, as Atharvaveda furnishes many references to the use of different natural products as topical ophthalmic dosage forms and Pharmacological action of eye ointments are also attributed to different metals and minerals. In Iteraya Branmana, another ancient text mention about ophthalmic use of Anjanas (collaryia) is found.
Description of Analgesic ophthalmic drugs is found in Indian mythology text-Garuda purana. Vinaya pitika and Bhulla vagga, two books on budhic tradition describe much information concerning ophthalmic indication of different metals minerals. Texts of Ayurvedic Samhita period and medieval period such as Sushruta Samhita, Videha tantra, Nimitantra, Kankayana tantra, Astanga hridaya, Bhava prakash, Yoga ratnakara etc. have highlighted the importance of various ophthalmic drugs and procedures. The happiest part of history of medicine is the origin of Indian ophthalmology (2000 B.C.). Susruta, the Father of Indian Ophthalmology and author of Susruta Samhita contributed many chapters on clinical ophthalmology, ocular surgery, principles of ocular pharmacology, and therapeutics in Uttara-Tantra of his text. Despite of recent progression in ophthalmic medicine, still there are several refractory eye diseases that require special attention to develop un-explored fields of medical knowledge. Ayurveda offers comprehensive safe and effective approaches to manage these conditions.\(^1\) Lamentably, several traditional indigenous ophthalmic practices have been largely eroded for want of tangible evidence on safety and efficacy; call for scientific research and validation for their attributes and principles.

The Ayurvedic therapeutic measures vogue in the treatment of eye diseases comprise many topical treatments along with systemic ones. The reason might be non-crossing of the blood aqueous, blood vitreous and blood retinal barriers of the drugs administered systemically. The topical measures are called as ‘Kriyakalpas’. The term Kriyakalpa is comprises of two words Kriya and Kalpa. Kriya means the therapeutic procedures which cures the disease without causing any adverse effects. Kalpa indicates the specific dosage form prescribed in select therapeutic procedures. These are specifically designed according to the stage and severity of the disease. The such five kriyakalpas include tarpana (retention of medicated ghee), putapaka (retention of extracts of medicinal plants), seka, aschyotana(eye drops) and anjana(ointments). Pindi and bidalaka (external application above the eye lids and adnexa) are the two more procedures added to ocular therapeutics in later period.\(^2\)

The mechanism of action of these ancient ocular therapies (kriyakalpas) could be well understood with the basic principles of ocular pharmacology \textit{viz.} routes of administration (instillation into the conjunctival sac etc.), compliance (giving detail explanation to patients regarding drugs/therapy), disposal (time and path of excretion of the drug), absorption (time and rate of absorption), drug vehicles and bioavailability (aqueous or lipid medias), duration and quantum of bioavailability of the drug.\(^2\)
TARAPANA: A DISTINCTIVE APPROACH

Amongst all kriyakalpas, tarpana is attributed with most promising and potential benefits in various disorders of adnexa of the eye, surface lesions and visual disorders; such as jihyata (squinting), tamyata (visual disturbances), rookshata (dryness), adhimantha (glaucoma) etc. and usually contra indicated in inflammatory conditions of the eye. The core procedure comprise retaining the medicated clarified butter(ghrita) over the eye for a stipulated period. Local application of sesame oil (tila taila) around the eye orbit followed by mild sudation is given as preparatory procedure (purvakarma). Concentric boundary is made around each orbit with paste of power of Phasleous mungo (masha choorna). About 20-25 ml of lukewarm medicated clarified butter (ghrita) is filled and allowed to retain within the boundary approximately for 20 minutes according the type of ocular condition.(table-1) After prescribed period, ghrita will be removed with cotton pads followed by removal of the boundary.[2], [18], [19]

Table-1 Drug Retention period in Tarpana in different eye diseases

<table>
<thead>
<tr>
<th>SNo.</th>
<th>Ocular conditions</th>
<th>Drug Retention period as cited in Ayurvedic texts</th>
<th>Approximate equivalent Time (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vata Rogas (neuro- ophthalmic conditions, pain and dryness causing lesions)</td>
<td>1000 matra kalas</td>
<td>17</td>
</tr>
<tr>
<td>2.</td>
<td>Pitta Rogas (inflammatory and vascular lesions of eye)</td>
<td>800 matra kalas</td>
<td>14</td>
</tr>
<tr>
<td>3.</td>
<td>Sandhigata Rogas(lesions of adnexa of the eye)</td>
<td>300 matra kalas</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>Shukala gata Rogas (surface lesions–conjunctiva and sclera)</td>
<td>500 matra kalas</td>
<td>7</td>
</tr>
<tr>
<td>5.</td>
<td>Krishna gata Rogas (corneal lesions)</td>
<td>700 matra kalas</td>
<td>12</td>
</tr>
<tr>
<td>6.</td>
<td>Drishtigata Rogas (visual disorders)</td>
<td>800 matra kalas</td>
<td>14</td>
</tr>
</tbody>
</table>

A contemporary pharmacological understanding of pharmaco- dynamics and kinetics of Tarpana procedure could be understood to certain extent with the following interpretations (Table -2).
• **Compliance**: The dose (25 ml) and duration (20 minutes) are fixed for each to avoid non-compliance.

• **Disposal**: The drug is retained for a prescribed period and the average time prescribed is 20 minutes.

• **Absorption**: Absorption is more because the most of drugs used are lipid soluble. Penetration of fat soluble substances is high irrespective of molecular size.

• **Drug vehicle and bio-availability**: Ghee (clarified cow butter) preparation used in tarpana is in the form of suspension containing different particle of the drug and the particles do not leave the eye and quick as solution.

• **Tissue contact time and bio-availability** is more hence therapeutic concentration can be achieved.

**Table-2. Tarpana-contemporary Pharmacological perceptive**

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Drug vehicle/dosage form</th>
<th>Disposal</th>
<th>Bio-availability and tissue contact time</th>
<th>Drug Absorption and Therapeutic concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple supernatant layer of clarified butter (ghritamanda) or clarified butter processed with different medicinal plants</td>
<td>in the form of suspension in clarified butter</td>
<td>very less compensated by retaining the drug</td>
<td>Adequate</td>
<td>Better absorption Adequate therapeutic concentration</td>
</tr>
</tbody>
</table>

**EVIDENCE BASE**

Certain clinical studies revealed the efficacy Ayurvedic approaches where tarpana procedure embodied as one of the interventions in managing surface lesions as well as neuro-ophthalmic conditions of the eye.

1. **Chronic Simple Glaucoma**: Studies conducted on therapeutic efficacy of tarpana with *Mahatriphala ghrita* — A compound ghee formulation (Bhaisajya Ratnavali, Netrarogadhikara 173-175, Ayurvedic Formulary of India Part-I, page No.78) along with oral administration and decoction of *Punarnava (Boerheevia diffusa)* in the cases of chronic simple glaucoma revealed notable reduction in intra-ocular pressure, marked improvement in visual acuity besides arrest of further spread of visual field defects.\[^3\][^4][^5]

2. **Diabetic Retinopathy**: Tarpana with Patoladighrta was scheduled for 5 days repeated at an interval of 15 days for three months along with oral for the same period. A follow of study was conducted for 6 months and Visual acuity, Fundoscopy were followed at
an interval of 1 month. No further visual deterioration was observed clinically. Tarpana procedure was repeated with Patoladighrita at an interval of one month along with during the follow up study. The subjects of diabetic retinopathy showed remarkable improvement in visual acuity. There was no further visual loss, no further focal hemorrhages and no neo-vascularisation was observed.[6]

3. **Retinitis Pigmentosa:** Observational studies on degenerative disorders viz. Age Related Macular Degeneration and Retinitis pigmentosa revealed that Ayurvedic preparations Patoladighrita (for Tarpana) –5days, Jeevantyadi ghrīta (for Nasyakarma)-7days and internal use of Combination of Triphala Churna(250gm), Yasada bhasma (5gm), Praval Bhasma (5gm), and Guduchi satwa (10gm)--- 5gm BD for four months, have shown improvement in visual acuity besides arresting further progress of these conditions. Single and compound ophthalmic drugs such as Guduchi (Tinospora cordifolia) Yasada Bhasma (Zinc oxide), Amalki (Emblica officinalis), Praval (Calcium carbonate) etc. possessing Rasayana effects and anti-oxidant activity and ophthalmic properties like drugs effective in improving visual acuity, colour vision etc. have shown improvement in visual acuity in age related Neuro-ophthalmic conditions where modern medicine offers no cure. All these observational studies reveal that these are clinically safe and bio-chemical safety profiles like liver and kidney parameters also remain unaltered.[7]

4. **Dry Eye Syndrome:** In a study (n=20) of dry eye syndrome ghrīta prepared with Haridra (Curcuma longa Linn.) and Daruharidra (Berberis aristata D.C.) was taken up to establish the clinical and therapeutic efficacy. Out of 20 patients under taken for study, in 5 patients (25%) complete relief of signs and symptoms was observed at the end of fourth month and no recurrence was observed in 2 months follow up study. In 6 patients (30%) complete relief of signs and symptoms was observed at the end of fourth month and recurrence in some of the features was observed during follow up study and in 11(55%) patients, no relief of some of the features was observed at the end of fourth month. Irrespective of the response obtained at the end of fourth month, complete relief of dryness of the eye was found in 17 patients (85%), mild blepharitis in 14 patients (70%), scratchy or sandy felling in the eyes in 17 patients (85%) photophobia in 16 patients (80%), difficulty in opening the eyes in 13 patients (65%) and complete relief of mild redness was observed in 16 patients (25%).[8],[9]
5. Abnormal Involuntary Movements of Eye: The study interventions encompass *Patoladighrita* (for tarpana), *Ksheerabalataila* (for nasyakarma and internal use), *Ekangavirarasa* and *Asvagandhachoorna* (for internal use). Treatment and dosage schedule comprise, *tarpana* with *Patoladighrita* was scheduled for 5 days. After an interval of 5 days, *nasyakarma* conducted for 7 days with *Ksheerabalataila* followed by internal administration of *Ksheerabalataila* (101) 5 ml once in a day with milk; and *Ekangavirarasa* 125 mg twice in a day and *Asvagandhachoorna* 5 gm twice in a day with milk for one month and follow up study was conducted for six months. The study revealed complete disappearance of abnormal involuntary movements of the left eyelid was noticed after one month. Follow up observations did not reveal any recurrence.\(^{10}\)

6. Pain management in ocular conditions: Deep searches into Ayurvedic text of ancient and medieval period reveal more than ten plants having pharmacological action that alleviate ocular pain. The plants described with analgesic action on ocular system in classical Ayurvedic literatures.\(^{1,15}\)

The following are few illustrations

**61:** *Tarpana* and internal administration of ghee(clarified butter) containing Haridra (*Curcuma longa*) and Daru Haridra (*Berberis aristata.*) in Dry eye Syndrome has resulted in significant relief of symptoms viz. dryness, pain, photo phobia, scratchy feeling, redness.\(^8\)

**6.2:** Clinical observations on topical use - *tarpana* with ghee processed with Manjistha (*Rubia cordifolia*) in inflammatory/non inflammatory ocular conditions (conjunctivitis, scleritis, acute dacrocystitis, keratitis, dry eye etc, revealed it’s significant pain relieving effect.\(^{11}\)

7. Myopia: In a clinical study of 60 cases of Myopia, topical administration (*Aschyotana*) with decoction of root bark of *Daruharidra* (*Berberis aristata* DC.) for 5 days followed by tarpana with *Patoladighrita* {A compound poly herbal formulation with clarified butter base(ghee)} was administered for five days. *Saptamrta lauha* was given internally for 3 months. The study revealed improvement in visual acuity and symptomatic relief (eyestrain, discomfort and headache) in some cases.\(^{12}\)

**CONCLUSION AND WAY FORWARD**

In spite of great technological advances in the field of ophthalmic medicine and surgery, conservative therapy still continues to be mainstay for reversible ailments. Researchers are relentlessly in quest to identify plants metals and minerals with medicinal properties. Often
they are successful, proverbially, in turning over a new leaf. Enormous number of indigenous drugs and procedures mentioned in codified Ayurvedic texts and literatures for managing disorders of vision require further validation on safety and efficacy and generation of scientific evidence.

The response obtained in certain studies on tarpana procedure may be explained with pharmacological actions viz. caksusya (improves visual acuity) netrya/ netrahita(conducive to visual system) timira hara (effective in managing disorders affecting vision) , netramayaghni, asesaksi rogahara (effective in managing various disorders of eye,), caksusya (improves vision) etc. ascribed to ingredients of formulations based on textual citations.[13][14]

Basic studies on mechanism of action of tarpana with parameters and principles of ocular pharmacology and other kriyakalpas are essential to endorse the concepts.[16], [17] The caksusya-rasayana approach of Ayurveda certainly provide safe and clinically effective ophthalmic drugs having diversified effects may be judiciously used to tackle intractable problems of the eye and planned clinical studies are vital to mainstream these practices.

REFERENCES