Ayurvedic management of Keratoconus - A Case Report

Anuj Kumar Singh¹, Veena Shekar²

¹Post Graduate Scholar, Department of PG Studies in Shalakya Tantra, Sri Kalabryaveshwara Swamy Ayurvedic Medical College Hospital and Research Centre Bengaluru, Karnataka, India.
²Professor, Department of PG Studies in Shalakya Tantra, Sri Kalabryaveshwara Swamy Ayurvedic Medical College Hospital and Research Centre Bengaluru, Karnataka, India.

ABSTRACT

This study reports a case of 37 years old female who had presented with the complaints of blurred vision in left eye for distant objects and also frequent headache and photophobia on exposure to bright light with heaviness in both of the eyes. The subject approached us with the reports of already performed corneal topography where corneal ectasia could be appreciated in both the eyes. The subject was already diagnosed as Keratoconus at previous hospital where she had consulted before. Ayurvedic treatment was initiated with Basti, Nasya, local ocular therapeutics which included Pindi, Bidalaka, Netra Prakshalana and Tarpana. The subject reported reduction in symptoms within 3 months of the treatment. It was observed that there was no progression of the disease from the findings of corneal topography which was repeated after the treatment within 3 months of initial visit.

Key words: Keratoconus, Basti, Nasya, Pindi, Bidalaka, Netra Prakshalana, Tarpana

INTRODUCTION

Keratoconus (KCN) is a progressive non-inflammatory bilateral corneal ectatic disorder. It manifests with characteristic cone-like steepening of the cornea associated with irregular stromal thinning, resulting in a cone-like protrusion and significant loss of vision. Approximately 50% of normal fellow eyes will progress to KC within 16 years. However, it can also occur secondarily following trauma, in which case it is unilateral, or in patients with vernal keratoconjunctivitis or Down syndrome due to repeated rubbing of the eye. Prevalence of keratoconus being 2300 per 100,000 in central India.

It is diagnosed by clinical examination and corneal topographic techniques. The basic pathological features seen in keratoconus are increased activity of proteases leading to increased breakdown of the collagen cross-linking leading to progressive thinning of cornea. The majority of the studies agree that in KC the stromal collagen content is decreased. Gradually progressive diminution of vision because of myopic astigmatism is the most common symptom. Protrusion of the lower lid margin (Munson’s sign), steepening of the cornea, Fleischer’s ring, Vogt’s striae, scissoring of retinroscope reflex, distortion of the mires of the Placido’s disk, irregular astigmatism on keratometry and oil droplet reflex shown by distant ophthalmoscopy are the signs observed. If the progression of Keratoconus is not treated, it might lead to complication like corneal hydrops, corneal perforation and scarring. The various management options include spectacles, contact lenses, corneal collagen cross-linking (CXL) with riboflavin, intacs, penetrating keratoplasty, and deep
anterior lamellar keratoplasty.[8] Keratoconus can be compared with Vataga Prartha Patalgata Timira, a Drishtigata Netra Roga (diseases of vision) in Ayurveda characterised by blurred and distorted vision.[10] The classical management of Timira includes Snehapana, Raktamokshana, Virechana, Nasya, Anjana, Shirobasti, Basti, Tarpana, Lepa and Seka.[11] Here in, we report a case of keratoconus which was effectively managed with Ayurvedic treatment. Informed consent was taken from the patient for publication of the case and clinical details.

CASE REPORT

A female patient aged 37 years approached Shalakya Tantra OPD of Sri Kalabyraveshwara Swamy Ayurvedic Medical College Hospital with the complaints of blurred vision in left eye for distant objects and also frequent headache and photophobia on exposure to bright light with heaviness in both of the eyes since 3 years. She had attended a general family health checkup in Florida 3 years before initial visit where she was referred to Ophthalmologist for her ocular complaints. The ophthalmologist had diagnosed it as Keratoconus of left eye and had advised surgery, the details of which were not known to her at the time of taking history. Patient had denied surgery as she did not want to undergo the same. Later, after returning back to India she did not approach anywhere as she had conceived and also due to restrictions imposed during the covid pandemic. After a gap of almost a year she consulted an eye specialist in a hospital in Bengaluru where corneal topography was performed which was suggestive of Keratoconus of both eyes. She was suggested to wear contact lenses, but, did not agree as she was comfortable wearing glasses. After a few days, she developed heaviness of both eyes and headache after wearing glasses and hence approached Shalakya Tantra OPD of our hospital for further management. Her past medical and family histories were insignificant. Her unaided visual acuity in left eye was 6/12 whereas it was found to be 6/6 (p) in right eye. Both the eyes revealed Munson’s sign on down gaze which was more obvious in left eye. Though not erythematous, few papillae could be observed on palpebral conjunctiva of both the eyes. Both the corneas were clear and showed ectasia which was steeper on left side. Pupils were round and reactive to light. Direct ophthalmoscopy showed ‘oil droplet’ reflex in both the eyes.

Retinoscopy examination revealed scissoring reflex in both the eyes. Fundoscopic findings were unremarkable. IOP was found to be 12 mm of Hg and 19 mm of Hg in right and left eye respectively. Right eye was diagnosed to have stage 1 and left eye with stage 2 Keratoconus based on modified Krumeich classification. The aim of treatment was to prevent further progression of thinning and ectasia of cornea.
After Treatment
The treatment protocol followed was as follows-

<table>
<thead>
<tr>
<th>Mode of Treatment</th>
<th>Treatment</th>
<th>Dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shodhana</strong> (purificatory procedure)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Avipattikara Churna</td>
<td>1 tsp in morning and evening with warm water before food</td>
<td>7 days</td>
</tr>
<tr>
<td></td>
<td>Basti (medicated enema)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Sthiradi Niruha Basti (6 days)</td>
<td></td>
<td>16 days</td>
</tr>
<tr>
<td></td>
<td>o Anuvasana Basti (10 days)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Jivantyadi Ghrita</td>
<td>40 ml</td>
<td>7 days</td>
</tr>
<tr>
<td></td>
<td>b) Yashtimadhu Taila</td>
<td>40 ml</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nasya with Shadbunda Taila</td>
<td>8 drops in each nostril</td>
<td></td>
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<tr>
<td><strong>Kriyakalpa</strong> (Topical ocular therapeutics)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Netraprakshalana (eyewash) with Triphala (Combination of Emblica officinalis, Terminalia bellerica and Terminalia chebula) Kashaya</td>
<td>Once a day</td>
<td>3 months</td>
</tr>
<tr>
<td></td>
<td>Bidalaka (medicated paste applied over eyelids devoid of eyelashes) with Triphala + Yashtimadhu (Glycyrrhiza glabra) + Lodhra (Symplacos racemosa) Churna</td>
<td></td>
<td>14 days</td>
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<td></td>
<td>Pindi (medicated paste enclosed in a fabric applied over eyelids) with Shigru (Moringa oleifera) and Amalaki (Emblica officinalis)</td>
<td></td>
<td>14 days</td>
</tr>
<tr>
<td></td>
<td>Tarpana (Retention of medicated ghee)</td>
<td></td>
<td>7 days</td>
</tr>
</tbody>
</table>

Initially patient was treated with Basti (Sthiradi Niruha Basti) for 16 days (Kala Basti) after Pachana-Deepana with Avipattikara Churna for 7 days, simultaneously she was advised to undergo Netraprakshalana, Pindi and Bidalaka during the course of which she felt reduced discomfort and heaviness of the eyes and photophobia. She also felt reduced frequency and intensity of headache. After Basti, 1 month of gap was given for next course of treatment i.e., Nasya during the period of which she was advised to continue Netraprakshalana and internal medications. After a gap of 7 days, after completion of Nasya, Tarpana was administered following which patient felt lightness of eyes and reduced blurred vision. The total duration of the treatment was restricted to 3 months. The patient was asked to come for follow up one month after the treatment. At follow up, her unaided visual acuity remained same i.e., 6/6 p in either eye and BCVA was 6/6 in right eye and 6/6 p in left eye. CT repeated after 1 month of the treatment remained stable with a slight reduction in K max or maximum corneal curvature in left eye which was reduced by 0.6 D. There was also a very slight increase in thickness of cornea by 0.009 μm in right eye and 0.014 μm in left eye at apex and thinnest corneal thickness (thinnest local) increased by 0.011 μm in right eye and 0.017 μm in left eye. Astigmatism was reduced by 0.5 D in left eye.

### Overall Observation

<table>
<thead>
<tr>
<th>Corneal Topography Findings</th>
<th>Before Treatment</th>
<th>After Treatment</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>OD</td>
<td>OS</td>
</tr>
<tr>
<td>Kmax</td>
<td>47.9 D</td>
<td>55 D</td>
</tr>
<tr>
<td>Kmean</td>
<td>44.3 D</td>
<td>47.7 D</td>
</tr>
</tbody>
</table>
**DISCUSSION**

Keratoconus is frequently associated with repeated eye rubbing which was observed in this case also, which may be due to allergic eye disease as papillae were evident on examination of anterior segment. Repeated eye rubbing leads to progressive thinning of the central cornea. The most advanced methods for management of keratoconus includes collagen cross linking (CXL), which is a technique of strengthening the corneal tissue by using riboflavin and ultraviolet - A light to halt the progression of progressive keratoconus. In CXL, riboflavin act as a photosensitizing agent, and UVA improves the formation of intra and interfibrillar covalent bonds by oxidative photosensitization.[12]

The symptoms of KC are similar to those observed in Timira of first Patala caused by vitiated Vata which gives rise to hazy and distorted vision. In this study, Basti was selected as it does Shodhana and is also Vatavaha and nourishing in nature. Sthiradi Niruha Basti was chosen as the chief line of treatment as it is said to provide strength to eyes (Chakshurbalamb). Basti is said to remove all the vitiated Doshas from head to toe by the virtue of its Veerya.[14] It is reported that inferior and middle rectal vein which drain the lower part of the rectum, drain directly into inferior vena cava therefore, directly into the systemic circulation. The rectum is extensively drained by lymphatic system which may contribute to the systemic absorption of highly lipophillic drugs. Most of the therapies and internal medication adopted here include Amalaki and Triphala as chief ingredients which contain vitamin C and it is reported that vitamin C plays a key role in collagen synthesis[15] and strengthens the cornea by decreasing the distance between collagen fibrils by enhancing crosslinking in vitro[16]. It is also reported that increased levels of oxidative stress markers and the decreased antioxidant capacity and antioxidant defences in keratoconus corneas indicate that oxidative stress may be involved in the development of this pathology.[17] Phenolic acids, flavonoids and tannins present in Triphala possess antioxidant activity and also drugs like Moringa oleifera, Symplocos racemosa and Glycyrrhiza glabra possess antioxidant activity. The leaves of M. oleifera are rich in minerals like calcium, potassium, zinc, magnesium, iron and copper, beta-carotene, vitamin B such as folic acid, pyridoxine and nicotinic acid and vitamin C.[18] Amalaki [19] and Shigru are also enriched with riboflavin which is required for collagen cross linking.[20] In Pindi and Bidalaka drugs are delivered transdermally as eye lid has thinner stratum corneum and bioavailability of the drug is enhanced as the contact time is increased.[21] Nasya was performed with Shadbindu Taila for a period of seven days as it is said to provide strength to ocular tissues and improve vision.[22] Tarpana was advised in this case as it is said to be the best procedure to nourish the eye. Being amphiphatic, the active principles of Ghrita readily penetrate the cornea. In KC, it is said that the primary insult is an epithelial abnormality, resulting in the release of proteolytic enzymes that degrades stromal collagen and weaken the cornea.[23] Vitamin A present in Ghrita helps to maintain the integrity of corneal epithelium and hence epithelial abnormality can be prevented. Aschyotana with Drishtiprada Varti[24] was adopted as it is indicated in Timira and has Tridosha Shamaka, Ropana and Snehana properties. The compound drug...
pacifies vitiated *Doshas*, clears *Sanga* (obstruction of channels) and restores nutritional supply to *Dhatu*s of *Drishti Patala*. The drug contains vitamin C and minerals like Cu, Fe and Zn required for collagen synthesis. Cu, Fe, Zn, and Se are the co-factors of enzymes involved in collagen synthesis, cross-linking, or antioxidant activity. Therefore, the drug has a strengthening effect on the cornea.[25] Thus, it can be understood that the drugs used here for the management of Keratoconus were effective in breaking the pathogenesis of the disease thereby restricting the progression of the disease.

**CONCLUSION**

Keratoconus is a progressive disease and its progression should be restricted to prevent complications arising out of it. The results were encouraging as there was improvement in visual acuity with reduction in symptoms and there was no progression of the disease which was confirmed by topographic profile repeated after treatment, which remained stable and also showed slight improvement in corneal thickness and curvature. Thus, it can be concluded that drugs employed in treatment could promote the integrity of epithelium, increase collagen synthesis, help in collagen cross linking and remodelling of collagen fibres thereby strengthening the cornea. Hence this simple and non-invasive treatment protocol can be adopted in future in the successful management of KC.

**REFERENCES**

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