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Ayurvedic management of Corneal Ectasia - A Conceptual Study

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ABSTRACT

Corneal ectasia is a disorder that results in thinning of the central, paracentral, or peripheral cornea that leads to progressive myopia and irregular astigmatism. Keratoconus, Pellucid marginal corneal degeneration (PMCD), Terrien's marginal degeneration (TMD), Keratoglobus, Posterior keratoconus are the conditions/types of corneal ectasia. In *Ayurveda* there is no direct reference of corneal ectasia, based on signs and symptoms it can be correlated with *Vataja Timira*. *Timira* is the *Drustigata Roga* which further leads to *Linganasha* if not treated initially. Based on symptoms and *Dosha-Dushya* involvement *Brhumhana* and *Vatahara* line of treatment should be followed in the form of *Virechana*, *Nasya*, *Tarpana*, *Putapaka* and *Pindi*. These treatment modalities are more beneficial in corneal ectasia.

Key words: Corneal ectasia, Vataja timira, Vatahara, Bruhmana.

INTRODUCTION

Corneal ectasia are group of uncommon, Non-inflammatory disorder characterized by bilateral progressive thinning of the central, paracentral or peripheral cornea and apical protrusion. The prevalence rate is 54.5 per 1 lakh and both men and women are affected equally. Corneal ectasia includes keratoconus, Pellucid marginal corneal degeneration

(PMCD), Terrins marginal degeneration (TMD), Keratoglobus, Posterior keratoconus. Corneal ectasia are the complication of corrective surgeries like PRK (Photorefractive keratectomy) and LASIK (Laser-Assisted in situ keratomileusis).^[1] Among the corneal ectasia keratoconus is common.

Keratocous is a progressive non inflammatory bilateral ectatic condition of cornea in which cornea assumes a conical shape secondary to stromal thinning and protrusion.^[2]

Pathophysiology

It is not clear. Various theories proposes that corneal thinning and ectasia of cornea is the result of an interlamellar and interfibrillar slippage of collagen within the stroma due to a loss of cohesion between collagen fibrils and the non-collagenous matrix.^[3]

Symptoms^[4]

It usually starts in their late teens or early twenties.

- Progressive myopia and irregular astigmatism.

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- Blurred vision, distortion, glare
- Frequent changes in refraction
- Other includes^[5]
 - Increased light sensitivity
 - Difficulty driving at night
 - A halo around light and ghosting (especially at night)
 - Eye strain
 - Headache and general eye pain
 - Eye irritation
 - Excessive eye rubbing

Signs^[6]

- Distorted window reflex
- Placido's disc examination shows irregular circles
- Direct ophthalmoscopy: oil droplet reflex
- Retinoscopy: irregular scissoring reflex
- Slit – Lamp biomicroscopy : Vogt striae, Fleicher ring
- Progressive corneal thinning
- Munson sign
- Corneal topography shows irregular astigmatism
- Acute hydrops

Grading (Keratometry)^[6]

- Mild : <48D
- Moderate : 48-54 D
- Severe : >54 D

Morphological classification^[6]

1. Nipple cone : Small size (<5mm) and steep curvature
2. Oval cone : Larger (5-6mm) and Ellipsoid in nature
3. Globus cone : Very large (>6mm) and globe like

PMCD is a variant of keratoconus.^[7] It is a bilateral rare progressive peripheral corneal thinning disorder, typically involving the inferior cornea. Symptoms

includes blurring of vision due to increasing astigmatism. Signs include crescentic 1-2mm band of inferior corneal thinning extending from 4-8 o' clock, 1mm away from the limbus, Butterfly pattern seen in corneal topography.^[8]

TMD is an uncommon idiopathic thinning of the peripheral cornea (circumferential cornea). It usually starts with deposition of refractile yellowish- white dots in peripheral anterior stroma followed by the appearance of narrow gutter parallel to the limbus with progressive thinning.^[9]

Keratoglobus an extremely rare congenial Hereditary condition in which entire cornea is abnormally thin. Characterized by thinning and hemispherical protrusion of entire cornea. Symptoms include, it may be associated with congenital amaurosis and blue sclera. Signs includes cornea develops globular, thinning is generalized, acute hydrops occurs less commonly, cornea id prone to rupture on relative mild trauma. Topography shows generalized steepening.^[10]

Keratoconus posterior is a rare, congenial, unilateral condition. There is slight cone like bulging of posterior surface of the cornea. Non progressive thinning of the inner surface of the cornea, while curvature of anterior surface remains normal.^[11]

Treatment of corneal ectasia includes spectacles or contact lenses, rigid contact lenses, Intracorneal ring segment (intacs) implantation are useful in early cases, corneal cross linking with riboflavin (CXL or C3R) may slow down the progression of disease, Keratoplasty may be required in later stages.^[12]

Corneal ectasia is not described in Ayurveda as a separate entity. Based on signs and symptoms it can be correlated with *Vataja Timira (Prathama Patalagata or Dvitiya Patalagata)*. The *Laxanas* of *Vataja Timira* are *Roopani Bhramanti* (objects look unstable), *Avila* and *Aruna* (visualize dirty and slightly reddish objects), *Vyavidda* (distorted vision),^[13] *Prasannam* (sometimes vision is clear), *Jaala*, *Kesha*, *Mashaka*, *Rashmi* (visualize webs, hairs, mosquitoes and rays of light).^[14] *Samanya Chikitsa* of *Timira* is *Snehapana*, *Visravana*, *Virechana*, *Nasya*, *Anjana*, *Murhabasti*, *Basti*, *Tarpana*, *Lepa*, *Seka*.^[15] *Chikitsa* for *Vataja Timira* is

Virechana with *Eranda Taila* mixed with *Ksheera*, *Nasya* with *Sthiradigana Sidda Taila*, *Madhuradigana Sidda Taila* and *Anutaila*, *Sahadi Taila*, *Jaladhavadi Grita*, *Jeevantiyadi Taila*. *Tarpana*, *Putapaka*, *Anjana*.^[16] If *Timira* is not treated in time it leads to *Linganasha*, it is better to intervene at the earliest to arrest the further progression of disease. Here considering the concept of *Vata Vriddhi* in *Timira* the treatment should be *Vatahara* and *Bruhmana*.^[17] *Shodhana* in the form of *Virechana* and *Nasya* followed by *Tarpana*, *Putapaka* and *Pindi* are helpful in this condition.

DISCUSSION

In Ayurveda, *Vata* is responsible for formation of normal body parts. The concept of vitiation of *Vata* can be understood in different views. Cornea (*Krishna Mandala*) can be considered as *Vayu Mahabhoota* predominant. There are so many reasons for taking cornea as *Vayu* predominant like cornea is transparent, it gets its nourishment directly from *Vayu* and it is in constant contact with air. As the cornea is *Vayu Mahabhoota* predominant, the *Sthanika Dosha* will be *Vata*. Moreover, it is stated by *Sushruta* as *Vatat Krishnam*, which means the *Krishna Mandala* is derived from *Vayu Mahabhoota*.^[18] The function of *Vata* in cornea includes transmission of light rays and their convergence. *Vata* is said to be responsible for *Pravartan* (stimulation, activation) of *Indriyas*. So, any defect in *Vayu* leads to *Krishngata Roga*. In *Garbhavasta*, *Vayu* is vitiated due to *Douhrudivamaanana* leads to *Vikrutaksha* (deformed eye).^[19] While describing the *Sadyasadyata* of *Kshataja Shukra*, mentioned as *Dvitvagashrita* that is *Dvipatalashrita*. We can consider outer part of cornea as *Tvak*. So, corneal ectasia can be considered as *Tvakgata Vata*.^[20] In contemporary science also there is no exact cause for corneal ectasia. Here thinning of cornea is mainly due to the vitiation of *Vata* which leads to progressive myopia and astigmatism. Based on the symptoms of corneal ectasia, this can be correlated to *Vataja Timira*. Considering the *Dosha* involvement, the treatment should be *Vatahara* and *Bruhmana*. In this disease *Shodhana* with *Virechana* and *Nasya* followed by *Sthanika Chikitsa* like *Tarpana*, *Putapaka*, *Pindi* works good.

Mode of action

Virechana^[21]

Administration of *Virechana Dravya* through oral route spreads throughout the body at cellular level and enters into micro and macro channels with its specific quality, dragging the *Doshas* from *Shakha* to *Kosta* and eliminates them through anal route by virtue of *Dravya* property. This *Virechana Karma* helps in *Samprati Vighatana* of *Vataja Timira*.

Nasya

Drugs in the form of *Nasya* has probable mode of entry in circulation, hence role in the improving vision is as follows. By general blood circulation, after absorption through mucous membrane, Direct pooling into venous sinuses of brain via, inferior ophthalmic veins and Absorption directly into the cerebrospinal fluid. As this medicine is absorbed in ophthalmic vessels it has its nourishing role in extra ocular muscles and eye proper. Along with this antioxidant property have role in maintaining tissue built.^[22]

Bruhmana Nasya in the form of *Taila* or *Grita*, these *Sneha Dravya* possesses *Sukshma Guna*, so that it is easier to absorb through *Shleshmika Kala* of nose. These medicines are highly lipid soluble and are capable of accelerating the *Vata Dosha* by their antagonistic properties. The lipid soluble drugs have delayed action and the duration of action is long. So, *Bruhmana Nasya Dravyas* acts slowly for longer duration. Lipid provides energy to the nervous tissue.

Tarpana and Putapaka

Tarpana and *Putapaka (Snehana)* exerting direct pressure over the cornea, there may be changes in the refractive index of the cornea and *Grita* has the quality of transpassing into the minute channels of the eye, it enters deeper layer of the *Dhatus*. Medicine used in *Tarpana* is *Grita*. So, the lipophilic action of the *Grita* facilitates the transformation of the drug to the target organ and the corneal epithelium is permeable to lipid soluble substances. *Grita* has high levels of antioxidants which can reduce corneal ectasia by allowing more tissue contact time and bioavailability of the drug from the corneal surface.^[23]

Putapaka is advised after *Tarpana* to promote strength to eye as it become fatigued due to *Tarpana*.^[24] *Putapaka* is of three types: *Snehana*, *Lekhana*, *Ropana*. Among these *Snehana* type of *Putapaka* is useful as it is composed of *Sneha*, *Mamsa*, *Vasa*, *Majja*, *Meda* and *Madhura Dravyas*.^[25] This act as a *Bruhmana* and improves the vision.

Tarpana and *Putapaka* is indicated in *Timira* the commonly used *Ghrita Yogas* are *Jeevantiyadi Grita*, *Triphala Grita*, *Mahatriphala Grita*, *Shatavaryadi Grita*. *Jeevantiyadi Grita* has high levels of antioxidants, which reduce the oxidative stress cornea ectasia. It helps in bringing down the corneal protrusion by *Dosha Shamana* and mechanical pressure. In contemporary science C3R and INTACS is advice to strength the stroma tensile and flatten the central cornea, but there is no assurance of cure as their methods are not without complication.

Pindi

In *Pindi* medicine is absorbed through the skin of lids and due to heat of *Pindi* local temperature is increased resulting in vasodilatation. By practice the *Pindi* can advise to overnight, that will help to flatten the corneal curvature by its mechanical pressure and strengthen the cornea by medicine effect. *Pindi* is indicated in *Shota* and *Kandu* the specific drugs like *Sunti* (*Zingiber officinale*) and *Nimbadala* (*Azadirachta indica*) should be pasted in hot water with little of *Saindhava* will help in all the inflammatory conditions of eye.

In contemporary science contact lenses are advised to correct the myopia and astigmatism, aspheric lenses with high eccentric value helps to flatten the cornea quicker compare to other lenses the main effect of the contact lenses is to provide a best vision to corneal ectasia patient, the same effect get by *Pindi* procedure.^[26]

CONCLUSION

Based on signs and symptoms of corneal ecatsia it can be correlated with *Vataja Timira*. The aim of treatment is to slowdown the progression of the disease, to strengthen the interlamellar and interfibrillar collagen fibers of stroma and to improve the vision. As corneal

ectasia is treated in contemporary medicine with correction and prescription of glasses and operative procedures like INTACS, C3R which are not affordable to common people and success rate is unknown and even not free from complications. Hence, Ayurveda has a wide scope of research in this regard to come up with new researches with better results.

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