



Review Article

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TIMIRA WITH SPECIAL REFERENCE TO SENILE CATARACT: A REVIEW

Pratima Paudel ^{1*}, Praveen Kumar B ², Shamsa Fiaz ³

¹ PG Scholar, Department of Shalaky Tantra, National Institute of Ayurveda, Jaipur, Rajasthan, India

² Assistant Professor, Department of Ayurveda Samhita and Siddhanta, National Institute of Ayurveda, Jaipur, Rajasthan, India

³ Professor & HOD, Department of Shalaky Tantra, National Institute of Ayurveda, Jaipur, Rajasthan, India

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*Corresponding author

E-mail: paudelpartima52@gmail.com

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ABSTRACT

Senile cataract, the age-related opacification of the normally transparent crystalline lens, is the most common cause of blindness in an elderly population. Timira is a disease affecting dristi, explained in Ayurveda classics as a progressive condition that results in the colouration of dristi and loss of vision in later stages. Very little is said in Ayurveda about the pathophysiology of Timira. The only proven treatment for cataracts is surgery. Though much research has been and is being done to find an alternative to surgery in the conventional system of medicine, no satisfactory option has been found to date. To plan an effective treatment, knowing about the condition and its pathophysiology is necessary. This paper reviews classical Ayurveda texts and their commentaries to understand senile cataracts and Timira better. Progressive stages of cataracts are correlated to different stages of Timira-Kacha-Linganasha based on their signs and the resultant colour of the lens. In addition, by applying the concept of guna and the specific functions of dosha on the pathophysiology of different types of cataracts, an attempt is made to better understand the stages of cataracts and help plan the management.

Keywords: Kacha, Linganasha, Lens, Dosha

INTRODUCTION

Cataract refers to any opacification in crystalline lens either during the time of formation of lens fibers (congenital/developmental) or later (acquired).¹ The cataract after the age of 50 years is called a senile cataract or age-related cataract.² It is a disease commonly occurring in all geographical areas, races, and genders. As per data published in 2020, cataract is the most significant contributor to global blindness in adults above 50.³ The incidence is distinctly higher in developing tropical countries like India, where an estimated 20 lakh new cataract cases are added to the burden every year.⁴ Age-related cataractous changes in the crystalline lens are inevitable, and the annual burden of the visually inefficient population has been increasing.

Rupagrahana vikriti lakshana (visual disturbances) is pathognomonic to all dristigata roga (including Timira).⁵ 'Timira' refers to the group of six dristigata roga among 12, as explained by Acharya Sushruta. Based on the causative dosha, it is named Vataja, Pittaja, Kaphaja, Raktaja, Sannipataja and Parimlayi Timira. Timira involving the third Patala of dristi causes the development of raga in dristi and is also named Kacha, while that involving the fourth Patala is called Linganasha. There is no direct reference to diseases like age-related cataracts in Ayurveda. Acharya Vagbhata mentions that dristi declined in the seventh decade with an average life expectancy of 100 years.⁶ According to Sharangdhara, among the ten factors hampered one in every decade of life, dristi is reduced or impaired by the sixth decade.⁷ This might be due to multiple age-related and degenerative causes like, presbyopia, cataracts, age-related macular degeneration, etc. There is no separate mention of the condition, such as senile cataracts. But based on its clinical signs and symptoms, it resembles to fit into a progressive condition among dristigata roga-Timira.

The only management option for cataracts to date in conventional systems of medicine is different types of surgical extraction of lens matter. Any alternative to this can greatly help the healthcare system and national economy. Further, it will be safer and more acceptable to the population than surgical extraction. But, when it comes to management, it is imperative to have a good understanding of pathological changes occurring in the condition, as reversal of the pathology means bringing back normalcy or health. Therefore, to find an alternative to surgical extraction of lens matter through Ayurveda, the first step is to understand the etiopathogenesis of cataracts in terms of Allopathic science and Ayurveda. The present study attempts to fill the void in Ayurvedic understanding of senile cataracts through a baseline evaluation interpreted through logical reasoning.

A detailed study of classical Ayurveda texts and their commentaries was conducted to understand the concepts of Timira correctly, and then clinical interpretations were made. Various textbooks and journals of contemporary science were studied for the basic understanding of cataracts, especially senile cataracts. Then, a possible correlation between the etiopathogenesis of senile cataracts and its stages from the Ayurveda perspective was made, and the analysis of guna and dosha was conducted.

Dristi, Lens and Cataract

The anatomical explanation of dristi given by Sushruta reveals it has a shape resembling masuradala matra (red lentil).⁸ Surprisingly, the term 'lens' was derived from the word 'lentil'. Dristi is said to have vivarakriti (perfectly transparent- allowing the light rays to pass but not having holes). This explanation of dristi points towards the crystalline lens.

For good vision, the lens is supposed to be clear, the possible refractive error is corrected, media from the cornea to the vitreous is clear, and no pathology affects the retina and visual pathway. Various factors are known to be responsible for the transparency of crystalline lenses, and once the transparency is lost, it is called a cataract. If this loss of transparency occurs by the age of or above 45 years, it is referred to as senile cataract. Based on the proportion of the lens fibres opacified, senile cataracts are divided into different stages: immature, mature and hyper-mature senile cataracts. (Table 1)

Timira and Stages of Senile Cataract

Timira is considered 'Paramadaruna'¹⁰ because if untreated or mismanaged, it will lead to vision loss. The site of Timira is the four Patala that do not include the two Vartma-Patala. Normally, these four Patala are responsible for 'rupagrahana' (perception of vision). If these Patala are affected by kupita-dosha, it results in 'rupagrahana-vikriti' (abnormal perception of vision), which is pathognomonic of all the drishtigata-roga. The presence and absence of features related to the involvement of Patala in Timira/Kacha/Linganasha and other drishtigata roga, respectively, differentiates them.

Timira begins with minimal disturbance in vision, similar to the early stage of cataract when it involves the first Patala of dristi. Symptoms are slowly more pronounced with the appearance of floaters, polyopia or diplopia, reduced colour sensitivity, etc., when Timira involves the second and third Patala of dristi. Once the third Patala is involved, there is the colouration of the dristi (probably lens). This stage corresponds to the immature stage of cataracts. Cataracts' mature and hyper-mature stages can correlate well to natirudha and atirudha avastha of Linganaasha, respectively. Irrespective of dosha, based on ashraja prabhava, the symptoms of Timira in different Patala manifest¹¹ and irrespective of Patala, based on dosha, the patient perceives the objects.¹² Identification of dosha is made based on the colour of objects perceived and dristimandala colouration.

Timira-Kacha-Linganasha is the different stages of the same disease based on the involvement of Patala. There is an absence of colouration of dristi when the dosha are still in the first and second Patala because there is an absence of Rakta in these Patala. The appearance of raga (colour) on reaching the third Patala is due to the presence of Rakta and dosha being balavattara.¹³ So, this stage is called Kacha or Ragi Timira.

The word 'Timira' is derived from the root word 'tima', which means 'ardribhava' (to be wet or moist) and the word cataract is derived from the Latin 'cataracta', which means 'waterfall'. Patalagata dosha can be correlated to different stages of cataracts. Prathama Patalagata Timira can be correlated to early cataractous change like lamellar separation, second Patalagata Timira to further progression- stage of incipient cataract, third Patalagata Timira to immature stage and fourth Patalagata Timira/Linganasha to mature and hyper-mature cataract. (Table 2)

Based on the pathogenesis involved and the site of the beginning of opacification, senile cataract is classified into nuclear, cortical and posterior sub-capsular.

In the pathophysiology of nuclear sclerosis type of cataract, there is stiffening and hardening of the lens nucleus, which can be attributed to kathina guna, and this is a result of dehydration, which can be attributed to ruksha guna. Here, it seems to be an

impairment of the function of Samana Vata as it is responsible for fluid regulation (ambuvaha-sroto-avalambana)¹⁴ and Vyana Vata impairment resulting in stiffening of cytoplasm and restricted accommodation (dhatu tarpana and gati). The reduced and oxidised glutathione exchange rate from the cortex and nucleus is diminished, leading to impaired repair of oxidative damage. This can be attributed to ruksha and sheeta guna (stambha) and the deficient function of Prana Vata (annapravesha not happening well) and Samana Vata (annam grihnati-pachati-vivechayati-munchati- cellular nourishment not well maintained). Thus, the pathophysiology of nuclear cataracts reveals the causative dosha is Vata (Samana-Vyana-Prana), and as roukshya is common, the best upakrama will be deepana with snehana; initially with tikta rasa (Patoladi ghrita) followed by snehana (with madhura rasa e.g. Jeevantiyadi ghrita). Moreover, the yellowish-brownish colour of the opacifying lens in nuclear cataracts corresponds with the aruna varna of Vataja Kacha (Pitta and Kapha can be in anubandha form). The opacity is at the centre, so monocular diplopia is common (when a dosha is in the centre of dristi, a single object appears double).¹⁵ The figure below summarises the pathological changes in nuclear cataracts and the possible guna and dosha responsible. (Figure 1)

In the case of cortical cataracts, there is a collection of fluid between the cortical lens fibres owing to their separation, and when it continues, it results in early opacities with a clear area between them. The guna responsible for the production of kleda are, sneha, pichhila and drava; for the formation of opacity, sandra guna, and these guna are all present in Kapha (ambukarma is also by Kapha). Prakupita Kapha disturbs the flow of Vata at that site. Then Vyana Vata (srotoshodhana- taking fluid out of cells), Udana Vata (srotopurana- taking fluid into the cell), and Samana Vata (ambu avalambana- fluid regulation and balance) come into the picture due to their action being disturbed. Therefore, the dosha responsible for cortical cataracts seems to be Kapha. In addition, the whitish spokes seen in cortical cataracts resemble the pandura colour of dristi in Kaphaja Kacha, and the vacuoles formed are similar to that said in Kaphaja Kacha as water collected in lotus leaf.¹⁷ Thus, cortical cataracts can be well correlated to Kaphaja Timira-Kacha-Linganasha, and the management should be Kaphahara, deepana with katu rasa with Chakshusya prabhava (when anubandhya Kapha is given treatment, the anubandha Vata normalises itself). Lekhana Anjana, Shodhana Nasya, etc., can also be used in addition to oral Kaphahara dravya. This has been summarised in Table 3.

There is posterior migration of the epithelial cells of the lens from the equator to the visual axis on the inner surface of the posterior capsule, followed by enlargement. Guru and snigdha guna are responsible for the fall and migration, and guru and drava guna are accountable for the enlargement and swelling of cells. Dosha analysis varies according to the cause and resultant colour of the lens in posterior subcapsular cataracts as a complication to other ocular or systemic illnesses or drug-induced cataracts. But the one due to purely senile changes and having the above-explained pathophysiology can be attributed to Kapha (gourava, sandra-granular deposits), again resulting in functional impairment of Samana Vata (ambu avalambana- improper fluid regulation and thus swelling). Besides, the pandu varna of Kaphaja Kacha also corresponds with whitish-yellow opacification of the lens in posterior subcapsular cataracts. Therefore, for senile posterior subcapsular cataract, the management needs to be of Kaphahara line; deepana with tikta rasa dravya of Chakshusya prabhava, and Lekhana Anjana, Shodhana Nasya, etc. This is summarised in Table 4.

Table 1: Factors for loss of transparency of lens and Ayurveda perspective

Factors for Lens transparency ⁹	Guna and Functions involved	Dosha
Avascularity of the lens	Vishada (Ajeevana)	Vata (Prana-Udana-Vyana)
Characteristics of lens fibre: -Tightly-packed nature of lens cells, -Narrow lens fibre membranes, -Loss of organelles	Sandra (Bandhakarakara) - Laghu (Anupalepa-laghava) -Vishada (kledachushana)	Vata (Samana-Akasha)-Kapha
Role of lens proteins - control transport of water and glycerol	Sneha (bala-mardavakara) - Pichila (balya-sandhana)	Kapha
Lens capsule - Semipermeable Character	Sukshma (vivarana)	Vata (Samana-Akasha)
Pump mechanism of lens fibre that regulates the electrolyte and water balance in the lens, maintaining relative dehydration	Laghu (Asadakrit) - Pichila (kledakara) - Vishada (kledachushana)	Vata (Samana-Udana-Vyana), Pitta (agni)
Auto-oxidation and a high concentration of reduced glutathione in the lens maintain the lens proteins in a reduced state and ensure the integrity of the cell membrane pump	Laghu (Asadakrit) - Snigdha (balakara) - Ushna (pacana)	Vata (Udana-Samana), Pitta (Agni)

Table 2: Patalagata Timira and possible Ayurveda correlation

Patalagata Timira	Cataract Stage	Features
Prathama Patalagata	Lamellar separation, early cataract	Only mild visual symptoms
Dvitiya Patalagata	Incipient stage, progression from early	early detectable opacities- Aragi Timira (Alpa Raga) and other symptoms like floaters
Tritiya Patalagata (Kacha)	Immature Senile Cataract	Greyish-white pupillary glow (Ragi Timira) and other symptoms
Chaturtha Patalagata (Linganasha)	Mature Senile Cataract	Minimal vision with perception of light and perception of rays (Na-Ati-Rudha)
	Hyper-mature Senile Cataract	Total blindness (Ati-Rudha/ Pragadha Timira)

Table 3: Maturation of Cortical cataract and Ayurveda perspective

Stages of Cortical Senile Cataract	Pathogenesis ¹⁸	Guna and Function involved	Sthani Dosha and Function involved
Stage of lamellar separation	Demarcation of cortical fibres owing to their separation by fluid.	Sneha (kledakrit) - Pichila (kledakara) - Drava (prakledana)	Kapha (Ambukarma) Vyana (srotoshodhana), Udana (srotopurana), Samana (ambu-avalambana)
Stage of incipient cataract	Early detectable opacities with clear areas between them.	Sneha (kledakrit) - Pichila (kledakara) - Drava (prakledana) - Sandra (prasadana) - Vishada (kledachushana)	Kapha Vyana (srotoshodhana), Udana (srotopurana), Samana (ambu-avalambana)
Immature Senile Cataract (ISC)	Opacification progresses further; greyish white but clear cortex is still present, so iris shadow is visible	Sneha (kledakrit) - Pichila (kledakara) - Drava (prakledana), Sandra (prasadana) - Vishada (kledachushana)	Kapha Vyana (srotoshodhana), Udana (srotopurana), Samana (ambu-avalambana)
Mature Senile Cataract (MSC)	Opacification becomes complete, and the Lens becomes pearly white	Sneha (kledakrit) - Pichila (kledakara), Guru (upalepa)	Kapha Vyana (srotoshodhana), Udana (srotopurana), Samana (ambu-avalambana)
Hyper-mature Senile Cataract (HMSC) – Morgagnian	The whole cortex liquefies, and the lens is converted into a bag of milky fluid.	Drava (prakledana) - Tikshna (sraavana)	Kapha Udana (srotopurana), Samana (ambu-avalambana), Pitta (paka)
Hyper-mature Senile Cataract (HMSC) – Sclerotic	The cortex becomes disintegrated, and the lens shrinks due to water leakage.	Ruksha (shoshana)	Vyana (srotoshodhana)

Table 4: Pathophysiology of Posterior Sub Capsular cataract and possible Guna and Dosha altered

Maturation of Posterior Subcapsular Cataract – Features ¹⁹	Guna involved	Sthani Dosha and Function involved
Posterior migration of the lens epithelial cells from the lens equator to the visual axis on the inner surface of the posterior capsule.	Guru, Snigdha	Kapha (Gourava), Samana (samam nayati)
Aberrant enlargement of the migrated cells- the swollen cells called Wedl (bladder) cells	Guru (Upadeha-enlargement), Drava	Kapha (Gourava, Snigdhatva), Samana (ambu avalambana)

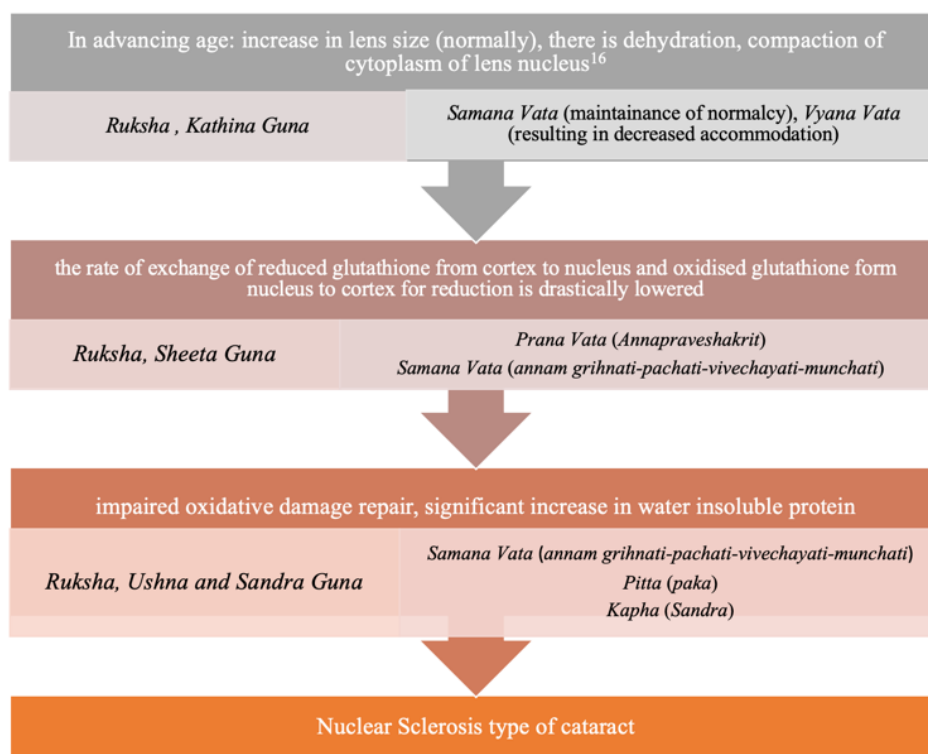


Figure 1: Pathophysiology of Nuclear Sclerosis type of cataract and possible Guna and Dosha altered

CONCLUSION

‘Timira’, term indicates ‘Andhakara’ or blindness, which represents visual impairment at the beginning to complete blindness at the advanced stage of the disease. Therefore, it is considered paramadaruna. Senile cataract is the largest contributor to global blindness in the people of age group >50 years. Though blindness is preventable, with surgery being the only treatment option available, due to increased life expectancy, environmental factors, dietary factors and barriers to uptake of surgical facilities, the burden is rising every year. Besides, the prevalence of cataracts in the pre-senile age group increases yearly. Therefore, universal demand is an alternative to surgery to prevent or reverse the cataractous change.

The samprapti of Timira and its progressive stages are briefly described in available Ayurveda texts. Therefore, decoding the pathophysiology given in conventional systems through basic principles of Ayurveda is necessary to plan an effective treatment. Based on the pathophysiology and signs of different types of senile cataracts as mentioned above, nuclear sclerosis type of cataract resembles Vataja Timira-Kacha-Linganasha; cortical cataracts and posterior subcapsular cataracts resemble Kaphaja Timira-Kacha-Linganasha. Posterior subcapsular cataracts following any ocular or systemic inflammations, drug-induced, irradiation, traumatic cataracts can be correlated to Pittaja, Parimlayi or Sannipataja Timira-Kacha-Linganasha based on their symptoms and colouration of the lens. Based on the dosha predominance and guna involved, the drugs having the opposite guna are to be used, which normalises the functioning of dosha, thus bringing back the lens fibres into a normal state of transparency. The main line of management, even in Ayurveda classics for Ragi Timira, is shastra karma (surgery), especially for the Kaphaja variety (others are yappa- manageable), but for those with alpa raga, who cannot go for surgery, the Timira (aragi) line of management is to be adopted.

Therefore, for the early stages of senile cataract, though with significant visual disturbances, Ayurveda management based on the above principles can help give a good visual prognosis, reversing the pathophysiology and at least delaying the maturation and need for surgery. In addition, since the senile cataract is due to age-related changes occurring in the lens, using Chakshusya and Rasayana formulations before its onset may prevent its onset and slow the maturation, too.

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