



Review Article

Ancient view of cataract in relevance to modern science

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ABSTRACT

Cataracts are the leading cause of curable blindness, till date there is no medicine claimed to have the capacity to dissolve the cataractous lens. The researches either to delay the onset or to prevent the progress of cataracts deserve great attention as the goal of WHO is to achieve 0.3% reduction of prevalence rate of blindness by the year 2020, and cataract takes 62.6% of total cause of blindness as per national survey conducted 2001-2002 by WHO & NPCB. Ayurveda promises the cure of the initial stage of the pathology of any type of visual failure through internal & external medications and by eye care. The very scientific approach of Ayurveda in explaining the diseases of drishti, its classification, prognosis and treatments can contribute a great deal in this regard.

1. Introduction

There existed a lot of fantasies regarding lens, its position, structure, and also about cataract during 16 & 17th centuries. The position of lens was thought to be in the centre of globe (1514-64), cataract as a corrupt and inspissated humour in between the iris and cornea. It is around the 18th century that a clear cut idea about lens and cataract was made. But years before, ancient Hindu acharya *Susruta* identified the structure lens and explained signs and symptoms of cataract as a lesion affecting the lens. It is surprising that how scientifically he mentioned the indication, contraindication and complications of cataract surgery along with its management.

According to *Susruta* normal vision depends on healthy *Drishti*. When vitiated *Doshas* localise in different *patalas* of *drishti* it may result in various visual abnormalities and finally loss of vision[1]. He specify the importance of *drishti*, explained a lot of measures to maintain healthy *drishti* so as to keep clear & good vision.

All Pathologies related to vision are categorised under the title of *Drishtigata roga vijnaneeya*. *Susruta* describes 12 varieties of diseases pertained to the *Drishti*[2]. Among these 6 are *linganashas* of Various *Doshic* Origin (*vataja*, *pittaja*, *kaphaja*, *raktaja*, *samsargaja*, *sannipataja*) and 6 other diseases include *Gambheerika* (total loss of vision with distorted shape and with pain due to *vata*, *Hraswajadya* (Microphthalmous along with disturbed vision), *pitta vidagdha* (Yellow coloured vision), *sleshmavidagdha* (Night blindness Curable), *Nakulandha* (incurable night blindness), *Dhoomara* (A condition of blurred vision without other significant reason)[3]. It may be because of the instability of the condition of *Timira* that *Susruta* didn't

consider *timira* while counting the diseases of *Drishti* and it is not wise to call the initial pathological states as *Linganasha*, as *Susruta* himself gives signs and symptoms of *Timira* in detail and indicate total loss of vision during the stage of *Linganasha* and according to him it is possible to cure the initial stage by medicines as the *doshas* are not deeply situated.

Vagbhata gives more detailed information about *Drishtigataroga*. According to him there are 27 eye diseases affecting *drishti*. Among this, majority are *Timira*, *Kacha* & *Linganasha* of 6 different variety-*vataja*, *pittaja*, *Kaphaja*, *samsargaja* & *sannipataja* together with *oupasargika linganasha* it makes 19 out of 27[3] and eight other disease include *Gambheerika*, *Hraswa*, *Doshandhya*, *Nakulandhya* (night blindness of *sadhya* and *yapya* types) *pittavidagdha* (yellow coloured vision), *Ushnavidagdha* (Difficulty of vision due to over exposure to heat) *Amla vidagdha* (blurred vision due to over use of sour food items) *Dhoomara* (diminution of vision without specific reason *Amblyopia*).

Among the various diseases of *Drishti*, indication of surgical intervention in *Kaphaja Linganasa*, and the possibility of retaining of vision in *Kaphaja Linganasa* compared to the other categories, the signs and symptoms of *sujata* (Mature) & *Asamjata* (immature) *Kaphaja Linganasa*[4], clearly indicate the site of lesion in *Kaphaja linganasa* is Lens. Lens is one among the units of *drishti*, which is capable of producing *timira*, *kacha* and *linganasa* limited to this particular structure[5]. It is not possible to get all symptoms related to the initial pathology of cataract under single title, it may mimic mixed symptoms of

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vata, pitta, kapha *timira* but finally when it becomes mature the signs and symptoms equate with the kaphajalinganasa lakshana.

The general concepts of samprapti of *drishti* make the better understanding of the pathogenesis related to cataract. Cataract is the common cause of blindness and usually commence as an age related problem in 50-60 yrs of age. The status of *doshas* in the body in old age being *vata*, it will be predominant in the body. *Pittakshaya* is very evident from the features like *jataragnimandya* leading to *dhatwagnimandya* - which results in *malasanchaya*[6]. The structure lens is not an exception. The metabolic activity of the lens reduced significantly i.e. the synthesis of protein, glutathione-which is having great role in oxidation reduction mechanism shows reduction in their action during advancement of age, which is the initial pathological change of lens in old age. Most of the soluble proteins changed to insoluble (*malasanchaya*) with increase in amount of lipid which can be identified macroscopically in later stages of cataract, the elasticity of the capsule reduced and the permeability increased[7]. The *gati* (passage) of *pranavayu* (the component the 'humour vata' which is responsible for perception of sense) is obstructed from coming in contact with the *indriyarth* (the object of vision) resulting loss of vision in the later stage of the disease[8]. Now the status of all *doshas* in old age lens is clear, all *doshas* having role in the pathogenesis of cataract. There is slight variation in *samprapti* of different types of cataract e.g. in nuclear cataract the role pitta is minimal that it may not exhibit *pittatimira* lakshana (as the main pathology starts as sclerosis or hardening of the nucleus and gradually involve other part of lens), while in cortical cataract *pittatimira* lakshanas are well developed as it is initiated by difference in ionic transfer, imbibitions of water and stagnation of water molecule in between the lens fibres leading to swelling of the lens[9]. So that it necessitate adopting *pittatimira* chikitsa. In case of post subcapsular and posterior polar cataract we should try to elicit the *anubanda doshas* (possibly in the body, as the eye may not show any other symptoms), because according to acharya the pattern of opacity is not uniform and only doshanubandaja *linganasaa* exhibit such appearance. To explain these Acharya introduced terminologies like Avarthaki, Sarkkara, chinnamsuka etc 6 upadravas or (complications) of K. *Linganasa*.

Lens one among the units of *drishti* (in my opinion) is a unique structure, having the 4 *patalas* inside (as cataracts cause total loss of vision, and at the same time the other units of *drishti* expected to be normal) likewise the other units also. The *patalas* related with the aetiopathogenesis of *timira* are nothing else the constituents of lens here, the major content of lens is water around 63% the rest 36% is proteins 1% other solids[10]. The water is the medium of transportation here which carry out the function of *rasa* and *raktha* here, the way in which avascular lens obtains its nutritive substance and gets rid of its waste products differ from corresponding process in a vascular tissue the metabolites must travel to and from the capillaries through the aqueous or vitreous humours[11]. The adequacy and integrity of the ocular blood supply was proved by many experiments in which cataract developed following the

obstruction of arteries or veins entering and leaving the eye. So there is no doubt that there is representation of these two dhatus in its microform in the lens e.g. the carbohydrates, which is the main source of energy inside the lens. Variation in its concentration leads to difference in osmolarity resulting imbibitions of water i.e. *Prathama* and *dwiteeya patalasrita timira*, this condition is reversible e.g: In diabetes the additional glucose in the lens is converted to sugar alcohol-named sorbitol by aldose reductase and it is this change that make the difference in concentration gradient and resulted imbibitions of water and swelling of the lens which is reversible. The lens is formed of complex system of lens fibres, which are proteins, there are various kinds of proteins inside the lens, the crystallins or water soluble protein is the critical protein on which the transparency of lens is depend, MIP -membrane intrinsic protein is another important protein which maintain the structure of lens maintaining the normal architecture of the lens or according to Acharya "Dharana" the function of *Asthidhatu* and "lepana" the role of *mamsa* dhatu can be attributed towards this proteins as once these are degraded it can't be retained so that the condition is irreversible etc. The lipid content has been demonstrated between the lens fibres suggesting that it may function as lubricating cement substance. Lubrication is the function of *medodhatu*.

2. Signs & Symptoms

Acharya *Susruta* & *Vagbhata* explain the *Samanya* & *visesha* lakshanas (general & specific signs and symptoms) of *Timira* and *Linganasa* in detail. *Susruta* has no differentiation like *Kacha*. According to him *Kacha* & *Linganasa* are same while *Vagbhata* gives details of 6 different types of *Kacha*. But both of them are of the view that localisation of vitiated *doshas* at the level of third *patala* cause staining of the *drishti* and is having much significance in evaluating the involved *doshas* and because of this *Susruta* termed it as *Ragatimira*, and to him *Aragi timira*[4] (a condition before this state) can be cured. But he used the word *Kacha* as a synonym of *Linganasa*.

Acharya mention the signs and symptoms of visual failure in general and also he describe it according to doshic state in three different categories i.e. *timira*, *kacha*, *Linganasa*. Among this *Avyakthameeksheroopam*, *vyakthamapyanimittathaha* (transient nature of blurriness), *dooram nekshathe* (difficulty of distant vision) *sookshmam nekshathe* (difficulty to see small objects) *mandalani eva pasyathi* (circular spots) *Dwidhaikam drishtimadhyashte* (diplopia) *Bahudha bahudhe sthith*e (polyopia) of general symptoms match with the lakshanas of cataract in addition to this the specific lakshanas of kapha *timira* are *snigdham swetaham cha pasyathi-leucopsia* (white coloured vision) and slimy appearance of the objects and acharya give examples of jasmine flower, conch, moon etc to indicate the whiteness, but there is no reference of such white coloured vision in cataract[5]. These symptoms were produced when dosas localised in the 1st and 2nd *patala* of lens or due to partial involvement of the structure lens.

When dosas migrate towards the third patala or further areas of lens it may cause the development of *kacha*. The general features of *Kacha* (the intermediate stage of *timira* and *Linganasa*) given by Acharya include progressive deterioration of vision. According to him at this stage the patient is not able to appreciate the lower part of his visual field but he can see the upper field that also is as if covered by a cloth (indicating the severity of blurriness in *Kacha*) and patient also develops colour change at the level of *drishti* depending on the involved dosha the colour may be varied, Susruthacharya also having the same view he used the term Ragi *timira* to indicate the occurrence of colour in *kacha*[6], and both of them are same in the opinion that *kacha* can't be cured totally through treatment and the treatment recommended at this stage is to arrest the further progress of the condition.

The specific lakshanas of kaphaja *kacha* include whitish discolouration of *drishti*, as we can appreciate *drishti* from the level of papillary aperture the *drishti* with naked eye here it refers to the change in colour at the level of pupillary aperture and the patient can't appreciate the brightness, though they are illuminated well eg: the sun, moon, etc appears to be faded[8].

Finally when all *patalas* or total lens fibres involved in the pathology it may leads to the formation of Kaphaja *Linganasa*. Independent of the dosas involved in the pathology of *timira* at the stage of *Linganasa* there is total loss of vision in and it is said to be incurable except Kaphaja. *Linganasa* for which surgery is mentioned. Acharya explains the signs and symptoms of mature and hyper mature cataract as Kaphaja *Linganasa* lakshana. It may be due to the fact that during that period cataract surgeries are very rare and because of this hyper maturity is very common.

As per Acharya's description when the kapha sited in moordha vitiated and get localised in eye, the condition get worsened and leads to the development of *linganasa* at that time a movement can be appreciated inside the eye at the level of *drishti* which according to him is just like the movement of a drop of water on a lotus leaf, and the *drishti* becomes constricted in presence of bright illumination and dilated in shade. The movement inside the eye which can be compared to the movement of nucleus in morgagnian cataract or dislocated lens at the level of *drishti*, He also noticed the variation in the size of pupillary aperture.

3. Conclusion

Thus here we see the vast methodologies and description of *timira* in our ayurveda texts that are still now relevant in terms

of modern era but now with the advancement of diagnostic procedures and technologies, we are able to understand the diseases in a much better way and hence the treatment too. Ayurveda has its basic theories and fundamentals .the salient features regarding *timira* has been discussed widely here. The principals of ayurveda are eternal; the modern techniques help us in throwing more light on these facts.

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