

SAMPRAPTI VIVECHANA OF CENTRAL RETINAL ARTERY OCCLUSION

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ABSTRACT

Central Retinal Artery Occlusion (CRAO) is one among the major causes of painless loss of vision. It needs acute and intense treatment, otherwise the damage will be irreversible. Review of such a case in Ayurvedic treatise may not yield any specific answer and may usually end up in diagnosing it as *Animitta Linganasha*. So, it is a real challenge both to evaluate and to plan an effective management. This review is based on clinical presentation, pathogenesis, and prognosis of CRAO and aims to evaluate the involved *Samprapti* (pathogenesis), *Sadhyasadhya* (prognosis) and thus plan an effective treatment.

Keywords: Central Retinal Artery Occlusion (CRAO), Timira, *Linganasha*, *Tejojalashrita patala*, *Ayurveda*, *Shalaky*

INTRODUCTION

Central Retinal Artery Occlusion is one of the major causes of sudden painless visual loss. It may be unilateral or bilateral. Ischemia following arterial occlusion causes retinal hypoxia and persistence of this state more than 90min can initiate death of retinal photoreceptors, causing visual loss.¹ Such a loss is almost always irreversible unless the management is acute and intense. In most of the instances as there is no noticeable causes for visual loss it usually falls into the category of *Animitta Linganasha* (visual loss without cause). Though such a case falls into the category of *asadhya vyadhi*, attempts are to be made to retain the vision. Moreover critical derivation on such a condition can save time and an acute care within *Ayurvedic* purview may be geared up. This can only be made on understanding its *samprapti* (pathogenesis) in authoritative way. As a specific pathology is not explained in *Ayurveda*, modern pathology can be analyzed under *Ayurvedic* concepts using diagnostic advancements as footsteps and an

attempt is made to understand underlining pathology.

Blood supply of Retina

Retina is extremely metabolically active neural tissue with highest Oxygen consumption in comparison with any other body tissue. In humans, retina has dual blood supply. Inner 2/3rd is supplied by Central retinal artery, outer 1/3rd by choroidal circulation. Considerably choroidal circulation has high flow rate (150mm/sec) with low Oxygen exchange in contrary to retinal circulation with low flow rate (25mm/sec) and high Oxygen exchange.¹

Central Retinal Artery

Central retinal artery arises from ophthalmic artery in optic canal about 1cm behind the Eye. It pierces infero-medial aspect of Optic nerve, passes forward in the centre. Then it enters the papilla through constriction at lamina cribrosa. This constriction is the potential site for partial or complete occlusion.³ Then it branches dichotomously superior and inferior, each further subdivided into nasal and temporal branches. These major four

branches are functional end arteries as they supply a sector of retina and no overlap or anastomosis.²

Central Retinal Artery Occlusion

It is the occlusion to the arterial flow at its anatomical constriction at lamina cribrosa. This occurs because of an embolus obstructing the flow and by super added spasm.³This can occur with or without general arterial disorders like atherosclerosis, hypertension, Burgers disease, and diabetic mellitus. Hence immediately there will be no flow to further arias of arterial supply. This leads to sudden and complete ischemia, tissue death and complete visual loss. In some cases it may produce premonitory obscurations, as the embolus dislodges forward, branch retinal artery occlusion may set in affecting a sectoral loss.³

Fundal findings

On fundal examination there will be extensive cloudy retina, resulting from edema that corresponding to area of ischemia. Larger arteries become thinner, thinner becomes invisible. Fovea looks like a cherry red spot reflecting underlining normal choroidal circulation.^{4,5}

Fundal Fluorescence Angiogram (FFA)

Key observation in case of CRAO is prolonged arm to retina circulation, more than 1min.⁴This will be shown in delayed arterial filling indicating the obstruction in arterial flow. Masking of Choroidal florescence by retinal edema may be seen but venous phase will be normal.⁵

Timira samprapti

While explaining the *timira samprapti*, Acharya Laghu Vagbhata has followed the anatomical description of *patala*⁶ (~coats of Eye). He says, in Eye, *doshas* initially invade outer *Tejo-jalashrita patala* and move inwards involving *pishithashrita*, *medashrita* and finally the *asthyasritha patala*. This view of *timira*

samprapti may not be acceptable as it is not supported by any other *Ayurvedic* treatise. A contrary view is stated by Acharya Nimi, Sushruta, Vriddha Vagbhata and commentators of various *samhithas*, who opined the movement of vitiated *doshas* through upward channels and its localization from *abhyantara* to *bahya akshi patalas*.⁷In other words, anatomically *Tejo-jalashritha* is the first *patala*, while inverse is true with *timira samprapti*. Hence, *Asthyashrita patala* will be the initial occupancy of vitiated *doshas*, while *Tejo-jalashrita (Rasa- Raktashritha)* will be the last.⁸ Prognosis of any eye diseases is based on the number as well as the order of *patala* involved; involvement of deeper *patala* makes it difficult to cure. *Rasadhatu (Tejo-jalashritha patala)* being the deepest occupancy in *timira samprapti*, thus prove its *kruchra sadyatha*.

Linga nasha⁹

Linganasha is a condition where loss of visual function is due to *doshaja* or *bahya karanas*; or a condition which is later to or an advanced stage of *timira*. According to Acharya Dalhana, *Chaturtha Patala* is *Tejo-jalashrita Patala* and *Linganasha* is a resultant of *chaturtha patala gatha timira karaka dosha*.

DISCUSSION

Analysis of the above condition requires detailed knowledge of involved *srotas* (channel), *srotodusti prakara* (types of impairment in channels), *dosha*, *dhatu* and *Agni*. *Srotas* are channels which carries *parinamamaapadyamana* (in process of transfer into other state) *dhatu*s all over the body¹⁰ and their disturbance may disturb *margastha* (in the channel) *dhatu*s, *sthanastha* (presently occupied) *dhatu*s and nearby structures leading to impaired physiological functions. This disturbance can be sequential and produce disease symptoms.¹¹Such an impaired functioning

of *Srotas* is known as *Srotodushti* which is of four types.¹¹ *Acharya Indu* commenting on above reference explains *sanga*, one among the four, in detail.¹² He opines *sanga* as *apravrutti* (complete obstruction of flow), *kinchit pravrutti* (minimal flow) or *stoka-stoka pravrutti* (flow in small bouts) of *srotas*. Hence, the complete obstruction to the arterial flow or narrowed streamline or prolonged arterial phase in FFA of CRAO signifies *sanga* in the *srotas*.

Retinal cell death in CRAO is due to prolonged ischemia. Ischemia causes reduced nutritional influx and hypoxia to retinal cells leading to cell death. It is very essential to understand the role of *dhatu*s especially *Rasa* and *Rakta* in this context as these *dhatu*s does *preenana* (nutrition) and *jeevana* (life supportive) of *shareera dhatu* through *tiryaggata dhamani* (transverse channels).¹³ Continuous inflow of *rasa* and *rakta* does *tarpana* of all *dhatu*, supports their physiological functions and thus does *dhatu dharana* (to sustain). Hence, retinal cell death due to impaired *dhatu dharana karma* (loss of *poshana* and *jeevana karma*) resulting from ischemia in CRAO can be established.

Invasion of vitiated *dosha* into *Rasa dhatu*, leads to *rasapradoshaja* (impaired functioning of *rasa*) *vyadhi*.¹⁴ The pathological changes taking place in CRAO, like obstruction to the arterial flow, narrowing of further arterial course, retinal paleness, loss of retinal cell functions and resultant visual loss, can be now rethought off. On keen observation of *rasapradoshaja vyadhis*, symptoms like *srotorodha* (obstruction in channel), *pandutha* (paleness), *sada* (sinking in or narrowing of vessels), *Agninasha* (impaired function of *Agni*) and *tama*¹⁵ (deprived or loss of eye sight) are seen. The *lakshanas* of *Rakta kshaya* such as *sira shaitilya* (nar-

rowing of vessels) and *varna hani* (defective hue) may be secondary to *srotorodha*. Hence, fundal changes in CRAO and *lakshanas* seen in *rasa pradoshaja* along with the features of *rakta kshaya* seem to be similar. Hence we can presume the role of *rasapradoshaja* and resultant *rakta kshaya* in pathogenesis of CRAO.

While discussing the manifestation of ocular diseases the terms *Agninasha* and *tama* mentioned in the context of *rasapradoshaja vyadhi* are usually overlooked.

Eye is a seat of *Agni*, known as *Alochaka pitta*.¹⁶ It helps in transcription of visual perseverance by converting the perceived image into *rupa jnana*. Any interference for its existence can deplete *rupa jnanotpatti*. Thus, the phrase *Agninasha* in *rasapradoshaja vyadhi* can be rightly taken into visual deterioration or *timira* of CRAO.

The word '*tama*' has not been elaborated either by the author or by the commentators. Hence, by observing the meaning, in this instance it can be considered as visual loss or *linganasha*.

After considering the involvement of *dhatu* (*Rasa*), and *sroto dusti prakara* (*sanga*) in pathogenesis of CRAO, it is relevant to discuss *doshas* involved. Aggravated *doshas*, obstructed in their movement, are the sole reason in the manifestation of any disease. The *lakshanas* (signs) exhibited in the manifested disease represents the *gunas* (quality) of the vitiated *dosha* and thus lead us to the *dosha* involved.¹⁷ Hence, analysis of *dosha* has been carried out by critically evaluating the involved *gunas* in the clinical signs of CRAO like *srotorodha*, *pandutha* (*kapha prakopa laxana*), *sada* and *linganasha* (*vata prakopa laxana*). When *Kapha* aggravates in the body it will hinder (*rodha*) the *chala guna* and *gati* (movement) of *Vata* and also counter the *ushna* and

tikshna gunas of Agni (*Alochaka Pitta*) and hence deplete their function. Thus, *Kapha* is *avarodhaka* to functions of both *Pitta* and *Vata*; and this is true with features like visual deterioration and reduced blood flow to further areas of arterial course which are seen in CRAO.

It can also be established that *Vata dosha* has a key role in manifestation of most of the signs seen in CRAO. When CRAO sets in, contraction or super added spasm of blood vessels (*sira sankocha*) are seen immediate next to the site of obstruction along with thinning of vessels (*sada*) in their further course. Thus these *lakshanas* are resultant of *Vata prakopa*²⁰ caused by *Kapha avarodha* as a result provoked *Vata* loses its normal functions like *abhi-vodhana karma* (to carry / grasp knowledge) and leads to *linganasha*.

Further, exploring into specific type of *Vata* involved here, it can be understood from the context of *Rasa samvahanana* (circulation) that an evident role is played by *Vyana Vata* in carrying the essential nutrients to the tissues.¹⁸ Hence, *avarodha* due to *Kapha* in *Rasavaha srotas* can lead to *gati hani (sanga)* of *vyana*¹⁹ in turn reduction in *Rasa gati* to further areas of circulation, hampering *Rasa tarpana*.

Prognosis of any disease is understood based on the primary seat (*dhatu*) of the disease, *dosha* involved and current status of the *dhatu*. In this context, prognosis of *timira* may be reviewed by observing the involved *dhatu* (*Rasa* and *Rakta*) and its presenting symptom (*linganasha*). By the review mentioned above it is clear that *Tejo-jalashritha patala* is the representation of *Rasa Rakta dhatu* in Eye and in the *timira samprapti* it will be the end abode of occupancy causing *linganasha* accounting for its poor prognosis. Hence

established involvement of *Rasa Rakta* in CRAO, make the disease difficult to cure.

CONCLUSION

By above discussion, we can arrive at *samprapti* of CRAO in *Ayurvedic* perspective. CRAO is a disease of *Rasa pradosha*. Thus, the *srotas* involved is *Rasavaha*, with *srotodusti prakara* as *Sanga*. It is a *tridoshatmaka vyadhi* wherein *Kapha* obstructs the flow of *Vata*, as a result *Vata* gets *prakupita*. The initial symptoms observed are *panduta* and *timira* (blurred vision) which can be attributed to *Kapha pradhana avastha*, where there still exists a chance of reverting the pathology and better prognosis. As the time progresses, *Vata* take an upper hand and visual loss (*linganasga*) sets in, which may not be reversible making the prognosis poor. The involvement of *Pitta (Agni)* can be summarized as loss of physiological function of *rupa jnana*, due to possible *Kapha avarodha*. Thus, in protocol of managing CRAO treatment mentioned as per *Kaphavritha Vata* with due consideration to *Pitta* may be adopted.

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