



The Concept of Neuro-ophthalmology in the Context of Ayurveda

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Abstract

The academic specialization of neuro-ophthalmology combines the sciences of neurology and ophthalmology and frequently deals with complicated systemic disorders that appear in the visual system. Initially completing a residency in either neurology or ophthalmology, neuro-ophthalmologists then pursue a fellowship in a related specialty. A thorough medical history and physical examination are required and neuro-ophthalmologists frequently spend a lot of time with their patients because diagnostic tests can be normal in individuals with substantial neuro-ophthalmic disease¹. Common pathology referred to a neuro-ophthalmologist includes afferent visual system disorders (e.g. optic neuritis, optic neuropathy, papilledema, brain tumors or strokes) and efferent visual system disorders (e.g. anisocoria, diplopia, ophthalmoplegia, ptosis, nystagmus, and blepharospas, seizures of the eye or eye muscles, and hemifacial spasm). The North American Neuro-Ophthalmological Society (NANOS)², which hosts an annual congress and disseminates the Journal of Neuro-Ophthalmology, is the biggest worldwide organization of neuro-ophthalmologists. Large university-based medical centers frequently employ neuro-ophthalmologists as faculty members. The neuro-ophthalmologist frequently serves as a liaison between the ophthalmology department and other departments at the medical Centre since patients frequently have co-existing disorders in other domains (rheumatology, endocrinology, cancer, cardiology, etc.)³. In Ayurveda concept of patala is very much required to understand the diseases of neuro ophthalmology. When vitiated dosha reaches at particular patala then particular symptom is seen. According to Susruta when vitiated doshas reaches in 1st, 2nd and 3rd patala it is known as Timir, vitiated doshas reaches in 3rd patala and ragata prapti occurs (pigmentation) it is known as Kacha. Vitiated doshas reaches in 4th patala it is known as Linganasha. According to Vagbhata, vitiated doshas reaches in 1st, 2nd patala it is known as Timir. vitiated doshas reaches in 2rd patala and ragata prapti occurs (pigmentation) it is known as Kacha vitiated doshas reaches in 4th patala it is known as Linganasha⁴. In this Review article we try to find out the co relation between different diseases in neuro ophthalmology and different Dristi gata roga.

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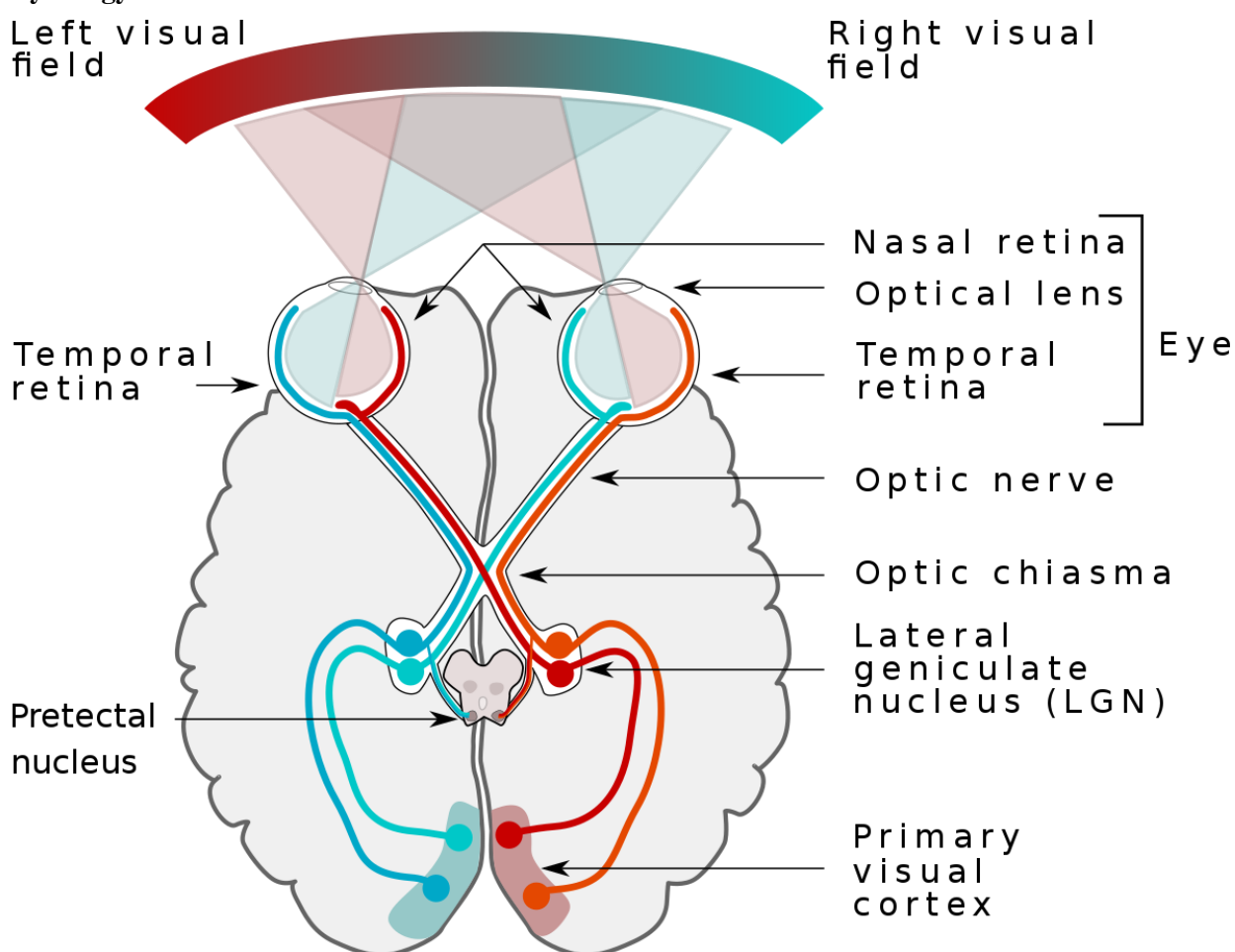
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1. Introduction

Diseases of the neurological system that impact vision, the ability to control eye movements, or pupillary reflexes are the focus of neuro-ophthalmology. Patients with complicated multi-system diseases and "zebras" are prevalent among the patients that neuro-ophthalmologists examine. The first four recipients of the coveted Straatsma American Academy of Ophthalmology teaching awards were neuro-ophthalmologists, who are frequently involved in teaching at their academic institution⁵. However, neuro-ophthalmologists may be educated to conduct procedures such as eye muscle surgery to treat adult strabismus, optic nerve fenestration for the treatment of idiopathic intracranial hypertension, and botulinum toxin injections for the treatment of blepharospasm or hemifacial spasm⁶. In Ayurveda we can co relate these disease in drishti gata roga. According to Susruta drishti gata roga is 12 in number and Vagbhata said drishti gata roga is 27 in number⁷. For understanding neuro ophthalmology and drishti gata roga we have to understand the physiology of vision according to modern and Ayurveda science.

Physiology of vision:



Starts from retina and goes up to the visual cortex⁸.

Retina-

Inner part- nasal

Outer part- Temporal

1. Optic nerve- Contains ipsilateral nasal fibers and the ipsilateral temporal fibers.

2. Optic chiasma- contains both side bilateral nasal nerve fibers.

3. Optic tract- contains contralateral nasal and ipsilateral temporal fibers.

4. Lateral geniculate body- contains contralateral nasal and ipsilateral temporal fibers.

5. Optic radiations- contains contralateral nasal and ipsilateral temporal fibers.

6. Visual occipital cortex- contains contralateral nasal and ipsilateral temporal fibers.

Concept of drishti and patalas⁹:

Vitiated dosha manifests a disease, only when it is confined to dhatus. In other words, the asrayasthana of the diseases is dhatus. This is applicable to the diseases of drishti also.

Dhatus have two aspects:

- a. Sookshma roopa
- b. Sthoola roopa.

Sthoola roopa is the visible aspect, but sookshma roopa is not visible. We have to assess it from the signs and symptoms.

Function of drishti i.e., vision, is purely subjective. So, when we consider the dhatus in drishti, its functional aspect or 'Sookshma roopa' deserve more attention. That means doshas vitiate the functional aspects of dhatus than its physical aspects. Thus, in the case of a drishti roga the vitiated doshas are confined to the sookshma aspect of dhatu and manifests purely subjective symptoms.

Dhatus (rasa, rakta, mamsa, meda, asthi, majja and sukra) are developed one after another in an evolutionary process. Rasa dhatu is developed from anna rasa. Then rakta dhatu is developed from rasa dhatu, and mamsa dhatu is developed from rakta dhatu and so on. In short one dhatu becomes the basement for development of the succeeding dhatu. So dhatus can be described as Patalas.

Rasa-> Rakta > Mamsa > Meda > Asthi > Majja > Sukra

These Patalas (dhatus) become asrayasthana of the diseases of drishti.

First Patala

1) First patala consists of rasa and rakta dhatus. These are the primary dhatus and they together perform nutrition in the eye. Both rasa and rakta dhatus are equally important in nutrition, Rasa gives nutrition to the transparent structures and rakta gives nutrition to the vascular structures. These two dhatus together are termed as first patala.

2) First patala being the initial dhatus, diseases confined to this patala, are mild, and can easily be treated.

3) Rasa rakta dhatus are circulating and not stable. So, the signs and symptoms are also not stable, they are reversible.

Second Patala

1) Next dhatu is mamsa, and the second patala is confined to this dhatu. When vitiated, doshas are confined to mamsa dhatu of the eye. It manifests certain characteristic signs and symptoms. These are described as the diseases of second patala.

2) Mamsa dhatu is derived from the rakta dhatu and so the diseases of rakta dhatu gradually spread to the mamsa dhatu also.

3) When doshas reach the mamsa dhatu, it becomes more serious. Mamsa dhatu is more stable compared to rasa and rakta dhatus. So, signs and symptoms of the 2nd patala are more prominent and stable than that of 1st patala.

Third patala

1) Next dhatu is medas, and so third patala is confined to meda dhatu. Meda is derived from mamsa. So, the diseases of mamsa dhatu, if left untreated, spread to meda dhatu.

2) Diseases confined to 2nd patala, gradually get confined to 3rd patal. In this stage, signs and symptoms are stable, and irreversible, and they become permanent

3) So, the diseases of third patala are not curable, they remain as Yapya.

Fourth patala

1) This patala is confined to asthi dhatu. Since this is derived from medas, the diseases of medas, in due course spread to asthi dhatu.

2) In this stage the symptoms are stable and prominent and vision is permanently lost. So medicinal treatment is impossible in this stage.

In the concept of eye disease, only four patalas deserve consideration.

First patala- Rasa and Rakta Dhatus

Second patala- Mamsa dhatu

Third patala- Meda dhatu

Fourth patala- Asthi Dhatu

Thus, each dosha is capable of producing four different types of diseases on the basis of the involved dhatu.

Vata- 1st, 2nd, 3rd, 4th Patala

Pitta- 1st, 2nd, 3rd, 4th Patala, Kapha- 1st, 2nd, 3rd, 4th Patala

If vitiation is transferred to sukra dhatu, it can be considered as the involvement of fifth patala. Since eye is already blind, the dushit remains in sukra dhatu. It can be considered as beeja vayava dushti. It is capable of transferring the disease to the offspring. This manifests as a congenital eye disease.

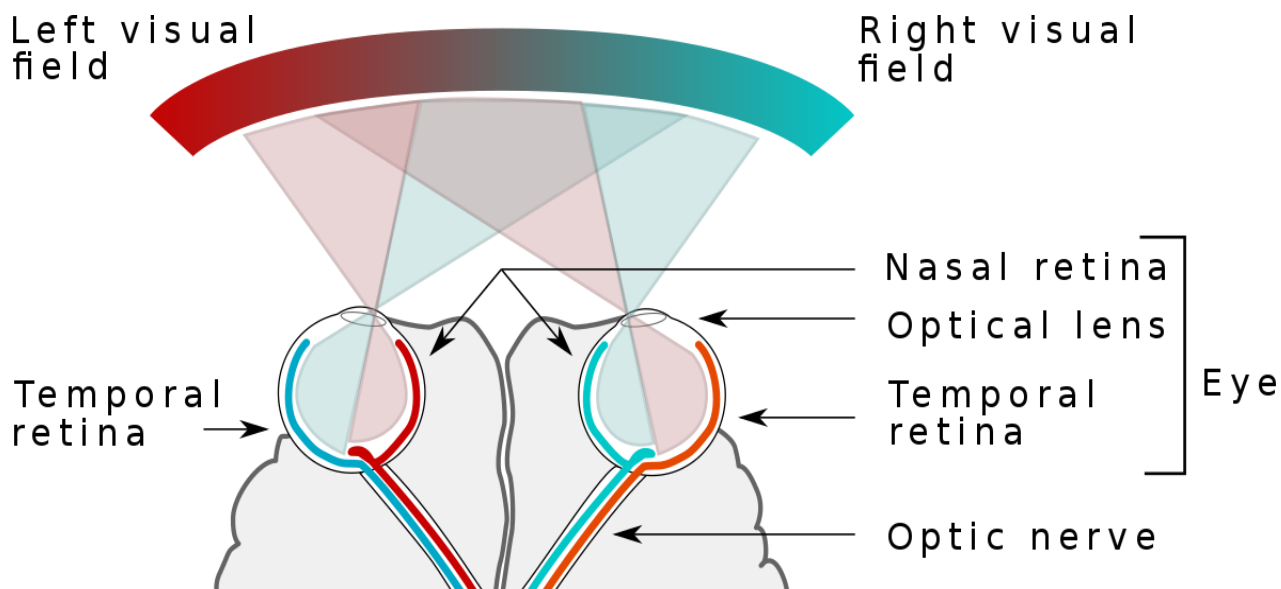
Structurally drishti includes mainly three different structures:

1) Drishtikacham (lens) 2. Drishtipatalam (retina) 3. Drishtinadee (optic nerve) and Drishtipadham (optic pathways).

On the basis of the involvement of these structures' diseases of drishti are classified into three:

1. Diseases of Drishtikacham
- 2) Diseases of Drishtipatalam
- 3) Diseases of Drishtinadee and Drishtipadham

Co-relation of visual pathway with visual field



The Outer part is Temporal Visual field and the inner part is nasal visual field.

Considering the left eye, if an object is visible:

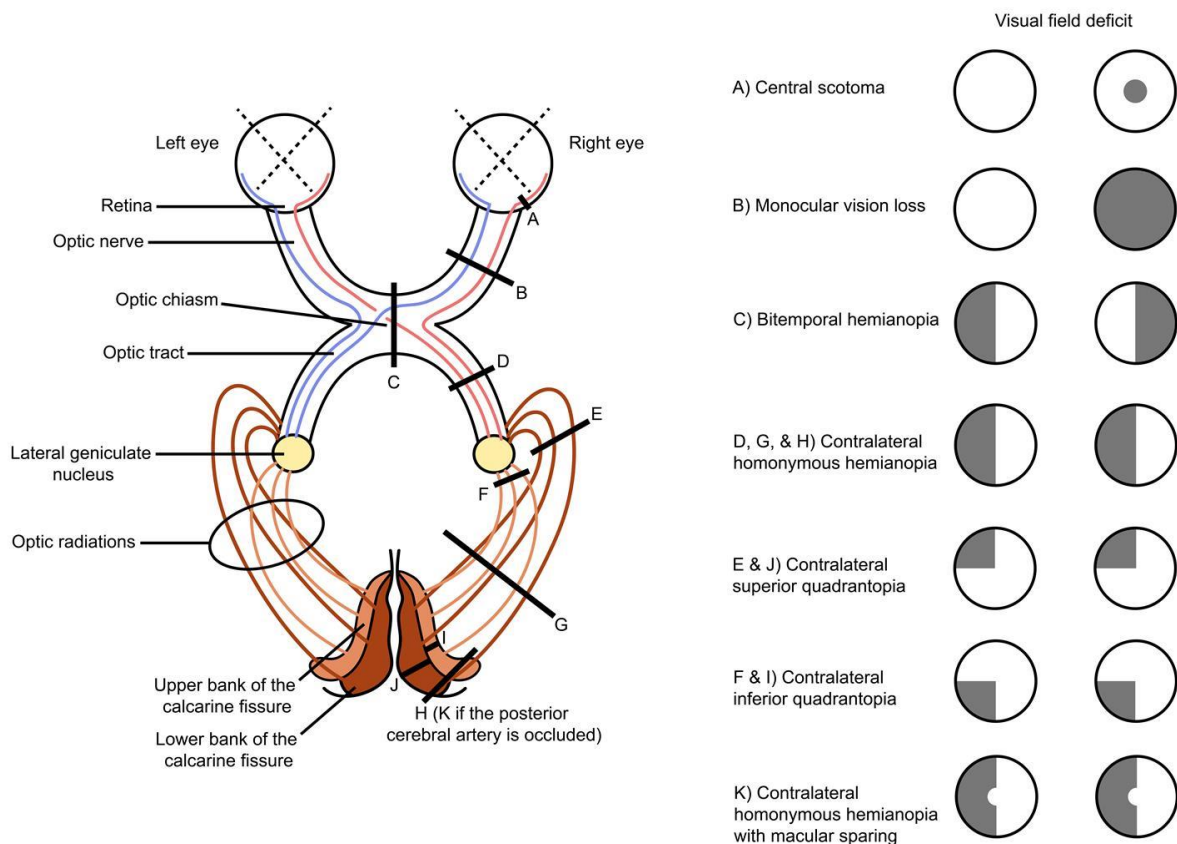
- 1) In the left temporal field then it casts an image on nasal part of the retina
- 2) In the left nasal field, it casts an image on the temporal part of the retina.
- 3) Visual Field coordinates are opposite to the retinal fibre coordinates because light travels in a straight line.

Examples:

- 1) Cancer destroys the temporal fibres in both hemispheres: nasal vision affected.
- 2) Pituitary adenoma compresses the optic chiasma: Temporal Vision affected.

Visual Pathway lesions

Visual Field Defects



Diseases of the Drishtikacham [10]

TIMIRA: It is a diseased condition in which the Drishtikacham is seriously involved. Timir is the Initial clinical manifestation where vitiated doshas are Confined to first and second patalas only (Vagbhat) and first, second and third patala (Susruta). This gives rise to a group of characteristic Signs and symptoms. This includes mainly visual disturbances.

Involvement of first patala

The symptoms are not stable. So, the disease is not serious in this stage.

Involvement of second patala: When 2 patala (mamsa dhatu) is involved, the disease becomes more serious. The prominent manifestations are:

- 1) Blurring- It is constant throughout the day
- 2) Scotomas- It is more or less positioned. It may be medial, lateral. The shape and size of the scotoma varies considerably according to the lesion. The patients complain of seeing the shape of hairs, flies, networks, flames etc.
- 3) Decreased visual acuity

Distant vision-highly decreased

Near vision - reduced

- 4) Unable to see small objects
- 5) Metamorphopsia: Near objects are seen in distance and the distant objects are seen near.
- 6) Micropsia - objects are seen smaller than original
- 7) Macropsia - objects are seen bigger than original.
- 8) Field defects- notable defects are seen in the visual field. Medial, lateral field may be affected.

- 9) Diplopia-In some cases there will be double vision. One object is seen as two.
10) Polyopia sometimes one object may be seen as many in number.

Involvement of third patala

Signs and symptoms

- 1) Generalised dimness of vision is the main symptom. Objects are seen just like covered by a thin cloth
- 2) Inferior visual field is almost lost but superior field persists
- 3) Colour discrimination
- 4) The objects are seen bluish yellowish, reddish, and whitish according to the predominant dosha (bluish or yellowish in pitta predominance reddish in vata and whitish in kapha predominance).

Involvement of fourth patala (Linganasa)

- 1) If the stage of kacha is left untreated, the vitiated doshas spread to the asthi dhatu also. This stage is known as linganasam.
- 2) The symptoms are prominent and permanent.
- 3) As a result, complete blindness is resulted.

According to symptom of these first, second, third and fourth patala gata roga, we can correlate.

Visual Field Defects

1. *Ipsilateral monocular visual loss*: This is due to a lesion in the optic nerve, causing complete visual field loss in the ipsilateral eye. **It can be correlated with 2nd patala gata drishti roga (vagbhat) and 3rd patala gata drishti roga (Sushruta).**
2. *Bitemporal hemianopia*: This can be due to a lesion of the optic chiasm or compression of the optic chiasm, as is seen in pituitary adenomas and craniopharyngiomas disturbing the medial portions of each optic nerve as they cross here. With one eye closed, the other eye loses vision in the temporal visual field. **It can be correlated with 2nd patala gata drishti roga (vagbhat) and 3rd patala gata drishti roga (Sushruta).**
3. *Unilateral anopia*: This is due to a lesion in the optic tract on the side of the anopia. **It can be correlated with 2nd patala gata drishti roga (vagbhat) and 3rd patala gata drishti roga (Sushruta).**
4. *Homonymous hemianopia*: This is due to a lesion in the optic radiations in the visual cortex on the contralateral side of the anopia. **It can be correlated with 2nd patala gata drishti roga (vagbhat) and 3rd patala gata drishti roga (Sushruta)**
5. *Homonymous hemianopia with macular sparing*: This is due to a posterior cerebral artery (PCA) stroke. The PCA supplies the occipital cortex, where visual processing for the contralateral side takes place. A PCA stroke will, therefore, lead to contralateral homonymous hemianopia. The reason the macula is spared is that the macula has a dual blood supply from both the middle cerebral artery (MCA) and the posterior cerebral artery. **It can be correlated with 2nd patala gata drishti roga (vagbhat) and 3rd patala gata drishti roga (Sushruta)**
6. *Lower quadrantanopia*: This can be due to a lesion in the parietal lobe or an MCA stroke in the contralateral side of the anopia. **It can be correlated with 3rd patala gata drishti roga.**
7. *Central scotoma*: This defect of central vision occurs in lesions of the macula, such as macular degeneration, cystoid macular edema, and inflammatory macular disease. **It can be correlated with 2nd patala gata drishti roga.**

Afferent visual system disorders	Symptom and sign according to modern science	Symptom according to Ayurveda science	Co-relation in Ayurveda
Optic Neuritis		Mandalani paschati	2 nd patala (Sushruta)
	Color Blindness	Yatha Varna cha rajyeta	3 rd patala (vagbhat)
	Unilateral loss of vision	Parshwasthite Na Pashyati	3 rd (Sushruta) and 2 nd patala (vagbhata)
Hereditary Optic	Bilateral painless loss of vision	Parshve Pashyen na	2 nd patala (vagbhata)

Neuropathy		parshvasthe	
		Parshwasthite Na Pashyati	3 rd patala (Susruta)
Toxic Optic Neuropathy	Centrocaecal scotoma> Central Scotoma	Mandalani paschati	2 nd patala (Susruta)
Papilledema	Elevation of optic disc Hyperaemia of optic disc	Drishti Sthulam Raktajam Mandalam	Parimlayi (s.u.7/25-29)
efferent visual system disorders	Symptom and sign according to modern science	Symptom according to Ayurveda science	Co-relation in Ayurveda
Diplopia	Seeing an object double.	Dvidhaikam drishti madhyasthe	2 nd patala (Vagbhat)
Ptosis	Dropping of upper eye lid	Nimilyate Vimukta Sandhi Nischeshta Hina	Vata hata vartma [11]
Blepharospasm	blinking or other eyelid movements, like twitching, that Patient can't control	Kruchron meelana, Ashru, Stambha	Kruchoronmeelana [12]

According to ayurveda vatahata vartma is asadhya, Parimlayi is yapy. Rogas in first and second patala is sadhya. Third patalagata is yapy. Fourth patalagata is asadhya except kaphaja lingana [13]. According to modern science it is also difficult to treat. But we can try to cure or stop the further progression of the diseases by giving treatment on the basis of dosha. According to vagbhat, we can use Snehapana, Raktamokshana, Viréhana, Nasya, Anjana, shiro basti, basti Kriya, tarpana, lepa, seka. According to Sushruta we can use Samshodhana, Raktamokshana, virechana, Samshamana Nasya, putapaka, Anjana, Dhooma, Tarpana. We can use Purana ghrita or triphala ghrita for pana, Raktamokshana should be done in prathama and dwitiya patalagata timira. For virechana-Ghrita prepared out of dashamoolayukta triphala kalka, triph panchamoola kwatha, dugdha and eranda taila. In Timira-Nasya, tarpana etc kriyakalpas should be done depending on predominant dosha as in Abhishyanda. Nirooha and Anuvassana basti as mentioned in Vataja peenasa roga. Pathya like Jeevanti, tanduliyaka, kshetra, vastuka, bala mulaka, pakshi mamsa, jangala mamsa, patola, karkotaka, karavella, vartaka, arani (agnimantha), shigru, sahachara along with ghee can be used. Special Measures for preventing these disease like daily, early morning sprinkle the eyes by filling the mouth with water. Rub the palms and place it over the eyes immediately after having meals [14]. By this ahara, vihar and ausadha we can control further progression neuro ophthalmological diseases.

4. Conclusion

The current hot issue in neuro ophthalmology is neurodegenerative disorders. If a patient receives Ayurvedic treatment as soon as possible for this illness, their chances of recovering the injured nerve fibre rise. The traditional Ayurvedic principles can stop additional nerve fiber damage, combined with Panchakarma therapy, local treatment, and palliative care provided by Ayurveda. In these situations, contemporary diagnostic tools like perimetry and OCT are helpful to demonstrate objective improvement. To prove the efficacy of Ayurvedic treatment with Panchakarma for neuro ophthalmic illnesses, future research must confirm the subjective and objective results shown in such a patient.

References:

1. <https://en.wikipedia.org/wiki/Neuro-ophthalmology>
2. <https://en.wikipedia.org/wiki/Neuro-ophthalmology>
3. <https://en.wikipedia.org/wiki/Neuro-ophthalmology>
4. A Text Book Of Shalakya Tantra, Prof. Suja k. Sreedhar, Chapter- 8, Chaukhambha orientalia, Varanasi, First edition, 2016,253-271
5. <https://en.wikipedia.org/wiki/Neuro-ophthalmology>
6. <https://en.wikipedia.org/wiki/Neuro-ophthalmology>
7. A Text Book Of Shalakya Tantra, Prof. Suja k. Sreedhar, Chapter- 8, Chaukhambha orientalia, Varanasi, First edition, 2016,253-271

8. Dr. Utsav Bansal, Ophthalmology, chapter -31, 5th edition, Marrow, 259-274
9. A text book of Ophthalmology in ayurveda, Dr. P K Santhakumari, Chapter-9, 2nd edition, 2009, 166-173
10. A text book of Ophthalmology in ayurveda, Dr. P K Santhakumari, Chapter-9, 2nd edition, 2009, 166-173
11. A Text Book Of Shalakyia Tantra, Prof. Suja k. Sreedhar, Chapter- 8, Chaukhambha orientalia, Varanasi, First edition, 2016, 253-271
12. A Text Book Of Shalakyia Tantra, Prof. Suja k. Sreedhar, Chapter- 8, Chaukhambha orientalia, Varanasi, First edition, 2016, 253-271
13. A Text Book Of Shalakyia Tantra, Prof. Suja k. Sreedhar, Chapter- 8, Chaukhambha orientalia, Varanasi, First edition, 2016, 253-271
14. A Text Book Of Shalakyia Tantra, Prof. Suja k. Sreedhar, Chapter- 8, Chaukhambha orientalia, Varanasi, First edition, 2016, 253-271