

PROJECT REPORTS

EVOLUTION OF AYURVEDIC OPHTHALMOLOGY IN ANCIENT AND MEDIEVAL INDIA: A CRITICAL STUDY*

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The text *Suśrutasamhitā* depicts substantial progress made by ancient Indians in the study and practice of ophthalmology. Science of ophthalmology and ophthalmic surgery was more advanced in India at that time than in many other parts of the world. When transmitted to distant lands like China and Arab it became a foundation for the systematic study of ophthalmology in these regions. India's long ophthalmic tradition began with the legendary Nimi. It flourished with Suśruta and Nāgārjuna who lived sometime between second to fourth century AD and then through Vāgbhaṭa of the sixth century AD. The tradition was unbroken up to medieval period as is evident in the seventh to sixteenth century works like *Mādhavanidāna* by Mādhava, *Kalyāṇakāraka* by Ugradityacārya, *Śārṅgधारasaṃhitā* by Śārṅgdhara and *Bhāvaprakāśa* by Bhāvamiśra to name a few. Each century till the eighteenth saw either a new work or a fresh commentary of an earlier work. Naturally, one expects later compilers or commentators to add newer information or contemporary wisdom to the successive works as they came out, resulting into gradual growth of the field. Yet a casual glance at later Āyurvedic works does not indicate any striking advancement of this medical field. Did Āyurvedic ophthalmology develop at all after the landmark progress in *Suśrutasamhitā* or was ophthalmology at a standstill or on decline at this time? These issues were addressed in this project.

The study was undertaken under the following chapters:

- I. Introduction
- II. Literature survey

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- III. Methodology
- IV. Study of ancient non-medical literature in Sanskrit: reference to Ophthalmology in (a) *Atharvaveda*, *Āraṇyakās* and *Upaniṣads*, (b) Ancient Indian philosophical literature, (c) Buddhist literature and (d) Popular literature
- V. Study of ancient medical literature in Sanskrit
- VI. Table of eye diseases in successive Āyurvedic works
- VII. Analysis of Major Finding [(a) Eye anatomy and disease classification by Suśruta b. Etiology of eye diseases, (c) Nosology or classification of eye diseases, (d) Constitution and working of the eye, (e) Diagnosis and prognosis (f) Cataract and other surgeries, and (g) Case studies of certain eye diseases.
- VIII. Ophthalmology in other world civilizations
- IX. Concluding remarks
- X. Bibliography

Development in any field of medicine is indicated by even a tiny increase in the understanding and treatment of diseases. As successive Āyurvedic works and their commentaries appeared, one would expect that with increased observation and experience there would be greater understanding of disease categories, of individual diseases, and also of the entire discipline. It could be in the form of an increase in total number of known diseases or realization of subcategories of a particular disease. It also could be in the form of realization of wrong or irrational statements by earlier authors, or ambiguities and contradictions in them and so on. A study of non-medical works reveals ideas related to ophthalmology among the general public. Sanskrit works both medical and non-medical were studied for the purpose.

A Study of Non-medical Works

A study of standard Sanskrit works other than medical, reveal commonly known ideas related to eye, eye diseases and their treatment, vision and visual path etc. The 7th to 10th century philosophers contributed substantially to these ideas. The Buddhists considered eye ball as the seat of visual perception because all eye diseases could be cured by treating the eye ball alone. They deduced that visual perception takes place when the organ of sight, the eye, helped by external matter which is light (*āloka*), and a desire to apprehend the object and also the past deeds (previous knowledge of the object), contacts the object. The *Nyāya-vaiśeṣika* philosophers did not agree with the view that the eye ball is the organ of visual perception but it is produced by the ultimate particles of *tejasa*, and the

eye balls are only the means through which the rays centered in the *tejasa* particles come in contact with the object. Hence the *Nyāya-vaiśeṣikas* concluded that the visual organ does not come in contact with the object when cognition takes place. This was an intuitive and logically derived conjecture that we know now is nearer the truth. The philosophers also argued if two eye balls ought to be taken as separate seats of perception, whether there is simultaneous perception of objects placed at unequal distance from the viewer, whether the double-moon cognition as perceived by an eye with cataract was a real entity or an illusion due to defect of senses.

Buddhist philosophy used medical terminology as a metaphor in explaining its various doctrines. Also analogy of Buddha removing the screen of ignorance using a probe of wisdom to the surgeon who removes cataract is often found in Buddhist literature. Even a symbolic cataract operation was imitated at the time of initiation of monks. Thus it is apparent that ophthalmic surgeries were very much a part of ancient Indian medicine at the time of writing of these Buddhist works. A metaphor of ‘eye of knowledge’ is frequently found in Sanskrit literature. There are innumerable references to eye as one of the five sense organs in Sanskrit historical classics e.g. *Mahābhārata*. The five primary elements were considered to be responsible for the five sense perceptions, *pṛthvī* or earth for smell, *agni* or fire for eyes or visual perception, *vāyu* or wind for touch, *kha-ākāśa* or empty space for sound and *āpa* or water for taste.

A Study of Medical Works

The *Suśrutasamhitā* is the earliest work to deal extensively with ophthalmology and ophthalmic surgery. He introduced various topics related to eye. As to the structure of the eye, he divided the eye into five parts and called them five wheels or *maṇḍalas*. They are *pakśma*, *vartama*, *śukla*, *kṛṣṇa* and *dr̥ṣṭi* (eyelashes, eyelids, conjunctiva, cornea and pupil respectively). Again, an eye was supposed to be made of five parts viz. muscles, blood, black and white parts and empty channels. In addition, they were related to five principal elements viz. *Bhu*-earth, *Agni*-fire, *Jala*-water, *Vāyu*-wind, and *Ākāśa*-eather respectively. Suśruta classified eye diseases in number of ways based on anatomy of the eye, etiology and lastly on the treatment. Classification of diseases in other ancient cultures used to be chiefly based on symptoms only. In that light Suśruta’s approach was very innovative.

Suśruta discussed seventy-six eye diseases following the classification based on anatomy of the eye. He suggested three kinds of treatments: General, Local, and Surgical.

Prominent among surgical treatments discussed by Suśruta are those of entropion, pterygium and cataract. Suśruta elaborately described the surgical removal of cataract that was not found in earlier works. Besides, specifications of the surgical needle, suitable place and day of the surgery, posture of the patient, pre-operational treatment such as oiling and purgation etc are discussed.

A systematic study of ophthalmic contents of successive Āyurvedic works and their commentaries as against the contents of *Suśrutasaṃhitā* uncovered following facts.

The *Suśrutasaṃhitā* classified the eye diseases in various categories viz. *Saṅdhi*, *Vartama*, *Śukla*, *Kṛṣṇa* and *Sarvagata* and took them up for further discussion in successive chapters. *Aṣṭāṅgahṛdayasaṃhitā* did not include separate chapters for *Saṅdhi*, *Śukla* and *Kṛṣṇagata* diseases but wrote a chapter named *Saṅdhisitāsitārogavijñāna*. Apparently Vāgbhaṭa thought it was not possible to separate them on that basis since most of the diseases under this category spread all over the white, black part and also go to the corners. Madhava although discussed 76 eye diseases just like Suśruta but did not partition them into different sections. *Śāraṅgdharasaṃhitā* initially divided eye diseases into sections that are based on Suśruta's order but changed it in the end. It separated *Kāca*, *Timira* and *Liṅganāśa* from *Dr̥ṣṭi* diseases, also separated *Abhiṣyandas* and *Adhimanthas* from *Sarvagata* diseases.

Among the post-Suśruta works dealing with ophthalmology *Aṣṭāṅgahṛdayasaṃhitā* by Vāgbhaṭa, is of foremost importance because of its substantial ophthalmic content. Vāgbhaṭa was a 6th century figure and he is acknowledged also as author of an earlier work *Aṣṭāṅgasamgraha*. At this juncture it was particularly aimed at providing a shorter text that could be used for quick reference. In this text description of a disease and its symptoms are immediately followed by treatment unlike in *Suśrutasaṃhitā* where the diagnostic and therapeutic chapters are separate. Thus Vāgbhaṭa only discusses the essentials of the contents of *Uttaratantra* of Suśruta in its ophthalmic section and narration of cataract surgery is a short version too. Although a shorter work, *Aṣṭāṅgahṛdayasaṃhitā* does depict some progress of the discipline in terms of listing of more diseases, and at times more symptoms of a disease that was useful in the diagnosis as well as prognosis.

Several prominent medical works and their commentaries came in up the following centuries e.g. *Mādhavanidāna* (6/7th century AD), *Kalyāṇakāraka* (9th century AD), *Śāraṅgधारasaṃhitā* (13th century AD), *Bhāvaprakāśa* (16th century AD), etc. They too included ophthalmology as a small condensed section.

Successive works tend to change earlier categorization, exclude some and add some other diseases. They sometimes change the name of the disease if the earlier one is found inappropriate or insufficient to express the symptoms/cause and commentators usually explain the title. (e.g. *Śirājapiḍaka* are explained by Dalhana as ‘They are not coming out of actual *sirās*, but is covered by *sirās*’, *Balāsagrathita* is explained by Adhamalla in *Śāraṅgधारasaṃhitā* as “On the white part of the eye there is something that resembles a drop of water, is like bronze in luster and soft then it is called *Balāsa*.’ The name *balāsa* is here because due to *padaikadeśavṛttivāt* it is *balāsagrathita*. Here Adhamalla proves himself to be a good grammarian too.

Later authors/commentators either wrote more symptoms or less for a disease. This was either to give more accurate description or in the latter case to write condensed version. An overall need for appropriate terminology, precision in writing was underlined by them. There were debates with respect to basic concepts like *Tridoṣa* theory, causes, classification, primary and secondary diseases, correct location of a disease and curability.

The case of a disease called *parimlāyī* demonstrates how later works moved towards correct ophthalmic ideas. The symptoms of the disease *parimlāyī* perplexed the ancient medical men. They were in the habit of calling all those displaying redness as due to *raktadoṣa*. Later scholars pointed out that actual blood in its physical sense was playing a role here. It was wrong to call the disease *raktaja* because it was not the *doṣa* in blood caused it. Present day Āyurvedists recognize the disease *parimlāyī* as Eale’s disease caused by tuberculosis or a protein reaction. There is blood exudation in the vitreous humour. It is also called *Perivasculitis Retinitis*. When the blood flow dries up then the patient regains vision to some extent. This fact is stated by Suśruta in following words, “In *parimlāyin* there appears a circle caused by *rakta*, thick like glass, and lustrous like fire, and yellow blue. Sometimes by decrease of *doṣa* vision reappears automatically.” Suśruta attributed it to *doṣakṣaya*. Interestingly, Suśruta hinted at the cause of *parimlāyī* being *raktateja* and Dalhana explained that in that case *rakta* is not one of the *doṣas* but actual excess blood and when blood

reduces due to *doṣakṣaya* (or *karmakṣyaya* as Mādhava calls it) then the vision improves.

One comes across many cases of this kind in the study of successive Āyurvedic works and their commentaries.

Conclusion

It is worthwhile to study the Sanskrit Āyurvedic works and their commentaries to evaluate the growth, however minute, of ophthalmology in traditional Indian medicine. The theoretical ophthalmology definitely showed progress in the overall understanding of eye diseases and their treatment, as depicted in increase in (a) Total number of diseases, (b) Wider etiologies of diseases, (c) More subcategories of a particular disease, (d) Greater understanding of certain diseases like *parimlāyī* or Eale's disease, *Adhimanthas* glaucoma, *Kaphaja Liṅganāśa*, cataract etc., (e) Greater understanding of the various parameters, that affect the progress of the disease which helped in predicting prognosis and choosing a suitable treatment.

Select Bibliographies

1. Chaudhury, R.C. - *Netra cikitsā vijñāna*, Chaukhambha Orientalia, Varanasi, Delhi, 1993.
2. Commentary of *Mādhavanidāna* by Vācaspati viz. *Ātaṅkadarpaṇavyākhyā*
3. Garde, G.K. (Edited and Trans) *Aṣṭāṅgahr̥daya or Sārtha Vāgbhaṭa*, Published by Gajanan Book Depot, Pune, 1983.
4. Harisastri Paradkar (Ed) - *Sarvāṅgasuṅdara* commentary of *Aṣṭāṅgahr̥daya* by Arunadatta, and *Āyurvedarasāyaṇaṭikā* by Hemadri
5. Srikantha Murthy, K.R., *Bhāvaprakāśa of Bhāvamiśra* (Text, English Translation, Notes, Appendices and Index), Chowkhambha Krishnadas Academy, Varanasi, Vol. 1 (including Nigaṅṭu Portion), 2008.
6. Kaviraj Ambikadatta Sastri (Tr) - *Suśrtasaṃhitā* - written by *Mahaṛṣi Suśrta*, Chaukhambha Sanskrit Samsthana, Varanasi, 1953.
7. Parashurama Sastri (Ed) - *Śārṅgdharasaṃhitā* and its commentary by Adhamalla viz. *Dīpikā*, by Kasirama viz. *Guḍhārthadīpikā*, Chowkhambha Orientalia, Varanasi, 2005.
8. Sharma Priyavrata - 'Nimi' in *History of Indian Medicine*.
9. Tarte and Krisnasastri Deodhar (Ed)- *Aṣṭāṅgasamgraha* by Vāgbhaṭa, Ganapati Krisnaji Press, Mumbai, Shake 1810
10. Vaidya Jadavji Trijumji Acarya (Ed) - *Mādhavanidānam* of Madhavakara – *Madhukośavyakhyāsahitam* (Vijayaraksita [AD1100] and Srikanthadatta racitam), Published by TukaramJadavji, Nirnayasagar press, Bombay, 1901.