Review on Ayurvedic Anatomical Concept of Eye i.e. Netra Sharir
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Abstract:
Ayurveda is ancient science of health. It deals with treatment of diseases with medicines as well as Surgical procedures. Ashtang Ayurveda has Kaya (Medicine), Shalya (Surgery), Shalakya (E. N. T. and Ophthalmology) etc. eight branches of Ayurveda. Shalakya (E. N. T. and Ophthalmology) branch has described various Urdhva Jatrugat Vikar and their management with surgery and medicine. Eye i.e. Netra has its own importance in Panch Dnyaneneindriyas. The description of anatomy of eye can be traced in Vedic literature. The divine Vaidya Ashwinidwaya used to perform eye surgeries with thorough knowledge of anatomy. Vedas are mankind’s source of knowledge. Ayurved is derived from one of the Vedic Samhita called Atharv-ved. One of the eight branches of the Ayurveda is shalakyatantra which deals with diseases of urdhvajatrugataragas and treatment including surgical one. Father of surgery Sushrutacharya has described eye anatomy in detail in Sushrut Samhita.

Keywords: Netra sharir, Shalya Karma, Ayurveda, Sushrut Samhita.

Introduction:
The description of anatomy of eye can be traced in Vedic literature. The divine Vaidya Ashwinidwaya used to perform eye surgeries with thorough knowledge of anatomy. Vedas are mankind’s source of knowledge. Ayurved is derived from one of the Vedic Samhita called Atharv-ved. One of the eight branches of the Ayurveda is shalakyatantra which deals with diseases of urdhvajatrugataragas and treatment including surgical one. Father of surgery Sushrutacharya has described eye anatomy in detail in Sushrut Samhita.

Aims and Objects:
To evaluate the importance of Netra sharir in shalya Karma as described in Ayurveda.
Material and Methods:

Literature reviewed from Ancient Ayurvedic classical text.

Literature Review:

Synonyms:

Netra, Nayana, Chakshu, akshi, Netragolak, Nayanabudbud, Drishti, etc.

Etymological Derivations:

Akshi, Chakshu, Drishti, Netra, Nayana, lochana are different synonyms used for organ of site in Ayurved Samhitas but it is surprising to note that Acharya Shushruta has not used the word Chakshu in Uttartantra, whereas Charakacharya used it frequently.

Akshi: The word Akshi is derived from root word Asu having meaning a source of reaching or seeing or eye.

Chakshu: Charaka defines Chakshu as that sensual faculty situated in both eye ball which is responsible for vision. (Cha. Su. 8/8) Chakrapani a commentator of Charak Samhita comments that Chkshrendriya is one situated in two eyeballs located in Shira. This indriya develops from Agni Mahabhuta. Acharya Shushruts defines Chasku as Buddhindriya originated from Rup Tanmatra performing the visual perception through dominance of Tej Mahabhuta. (Su. SU. 1/6) Acharya Dalhana has repeatedly commented Chakshu as Chakshurendriya

Drishti:

The word Drishti is derived from the root ‘Drus’ having meaning to see, when it is sufficed by ‘kit karane’ meaning source or a tool with which on can see.

Nayana:

This word is derived from root ‘ni’ having meaning to drive or to take away, which when sufficed by ‘karaneLyut’ it becomes Nayana. Nayana is defined as that source drives towards subject of Drishti.

Lochana:

The etymological derivation of lochana is from root ‘Loch’ having meaning to see, which when sufficed by ‘KaraneLyut’ it becomes Lochana meaning a source with which one can see. Acharya Shushruta and Acharya Vaghbhata have used this word in anatomical sense as synonym of Netra.

Thus from above discussion it is clear that synonyms related to organ of sight i.e. Akshi, Nayana, Netra and lochana are used an anatomical sense while Chakshu is its functional phenomenon whereas drishti is having amphistomous meaning. Netra is widely used word for organ of sight.

NETRA SHARIRA:

Description of Netra is available in all Samhita especially Sushruta and Vagbhata.

Shape:

Two terms are available to the Eye viz. Nayana and Netra in Uttara tantra 1st chapter, as narrated by Acharya Sushrutha. Both are suggestive as shape. The former means the Eye is like a bubble floating over water i.e. round in shape and soft in consistancy, which suggests the external appearance of the eye in the orbit. The later means the Eyeball almost round in shape and resembles the cow’s teat.
Dimensions:

Acharya Sushrutha has used Anguli Pramana the unit of measure, in context to the measurement of Eye, it is equal to swangusthadara, which has been given supported and clearly mentioned by the commentator Dalhana that the dimension of this one anguli is equal to the central part of the thumb of an individual.

Circumference:

It is stated that, the thickness or antero-posterior diameter of an eyeball is two anguli, and the circumference i.e. horizontal and vertical diameter two and a half angulas. The distance between two Eyes is two angulas.

Measurement of cornea and pupil:

The black part of the eye (krishnamandala / cornea) is said to be one third of its whole extent, while Drishti occupies only one seventh of krishna mandala i.e. iris.

In reference to the description of Eye, Acharya Sushruta has mentioned the following important structures as:

1. **AkshiBandhana**:

   The Siras, Kandaras, Meda, Kalakasthi and Shleshma are the responsible factors for the proper alignment of the eye. Especially Shleshma, along with siras takes part in the bandhana karma of the eyeballs. Here, Dalhana opines that Sira in the reference includes both the Sira and dhamani and kandara is meant for Snayu and peshi.

2. **Peshi and Snayu**:

   The Peshis in the eyes are Mandala in shape and are two in number, whereas, the Snayus are of pruthu type and 30 in number.

3. **Marma**:

   Marmas are vital points of the body, trauma to which may result in various complications. Two Marmas mainly Apanga and Avarta are related to Eye. Apangamarma is situated on outer side of the orbits below the lateral end of the eyebrows, ½ angulas in size and is a Sira Marma. AvartaMarma is situated above the lateral end of eyebrow, of same size and Sandhi type of Marma. Any injury to these sites may result in blindness and diminished vision.

4. **Sira and Dhamani**:

   According to Acharya Sushrutha, 38 Siras are found in the Eye which transports Vata (10), Pitta (10), Kapha (10) and Raktha (8). Whereas, Acharya Vagbhata states to be 65 Siras in the Eye, but details are not available. Among 4 Dhamani, 2 are...
meant for Roopavahana and rest two is for drainage of ashru to the Eye.

5. Asthi and Sandhi:
Arunadatta, in his commentary opines that Tarunasthi is present in Akshikosha (Lids).

Mandala Pataka and Sandhi
मंडलपत्तिकिस्मीक्रपटलाभिचलोने ।
यथोऽमविजानीयान्त्यपंचशष्ट्यचरणः ॥

Mandala
The term Mandala is used for the consecutive circular areas of the eye, which are as follows
1. Pakshma Mandala
2. Vartma Mandala
3. Shweta Mandala
4. Krishna Mandala
5. Drushti Mandala

The Mandala are arranged successively from outside to inside:

1. Pakshma Mandala – Paksha or cilia of the eyelids form the outermost Mandala of the eye i.e. eye lashes. These protect eye from dust and wind.

2. Vartma Mandala – The circle formed by the conjunction of upper and lower eyelids of eye ball is termed as Vartma Mandala. Two Nimeshinisiras, situated in eyelids perform the function of Nimesha and Unmesha (blinking). These vartmamandala is seat for 21 vartmagatavyadhis according to Shushrutaschrya.

3. Shweta Mandala – The whitish part, inner to eyelid and beyond the black circle is known as Shweta Mandala, when both the lids are open i.e. sclera. Sushruta has encountered 11 pathogenesis in shweta Mandala and 13 according to Vagbhata.

4. Krishna Mandala - The anterior most circle of the eye, blackish in colour, is the Krishna Mandala. Sushruta has mentioned the size of this Mandala as 1/3rd of the whole Eye. A term Taraka for one of the structures of the Eye is also used by Sushruta, which is having the same size. The Drushti Mandala is enclosed in this Mandala. Sushrutahas mentioned four clinical entities in this Mandala, whereas, they are five in view of Acharya Vagbhata. It can be correlated with cornea with iris.

5. Drushti Mandala - This is the last and innermost circular structure of the Eye. It is named as Drushti Mandala as the Drushti is enclosed in it. According to the statement of Dalhana, Videha opines that the diameter of Drushti Mandala is equal to 1/7th of the Krishna Mandala and Sushruta also agreed with this. Again it is said to be equal to 1/9th part of the Tarka. Sushruta in his Uttaratantra states that the Drushti, encircled by Drushti Mandala is equal to the cotyledon of Masura.

SANDHI
The junctional region between two Mandala, in relation to the Eye, is considered as Sandhi of the related Mandala, which are 6 in number viz.
1. Paksha Vartmagata Sandhi
2. Vartma Shuklagata Sandhi
3. Shukla Krishnagata Sandhi.
4. Krishna Drushtigata Sandhi  
5. Apanga Sandhi  
6. Kaneenika Sandhi

1. **PakshmaVartmagata Sandhi:**  
The juncture line of Pakshma and Vartma i.e. the lid margins, where cilia grow are termed as PakshmaVartmagata Sandhi. i.e. lid margin.

2. **VartmaShuklagata Sandhi:**  
The juntional regional of Vartma and Shukla mandala is known as VartmaShuklagata Sandhi. i.e. fornices.

3. **Shukla krishnagata Sandhi:** The circular joining line in between Shukla and Krishna Mandala is Shukla Krishnagata Sandhi. i.e. limbus.

4. **Krishna Drushtigata Sandhi:** This Sandhi is the juncture line in between the Krishna Mandala and Drushtimandala.

5. **Kaneenika Sandhi:** Junction of urdhva and adhovartma near Nasa i.e. inner canthus.

6. **Apaanga Sandhi:** Junction of urdhva and adhovartma laterally i.e. outer canthus. Three Sandhi namely VartmaShuklagata, Kaneenika and Apaanga are supported by Sandhi Bandhana.

The clinical entity VatahataVartma (Ptosis) occurs here, when it is vitiated by the provoked Vata.

**PATAL**  
The term Patala means a veil, which denotes a thin membrane, skin or a layer. Dalhana says, it is having the thickness of 1/5th Drushti. Six Patala or layers are stated to be present in the eye. The 4 Patala are in eye proper and 2 Patala are situated outside the eye i.e. UrdhwaVartmaPatala (Upper lid) and AdhoVartmaPatala(lower lid). The disease Adhimantha occurs in all the above structures, hence the name “Sarvakshiroga”.

1. **TejojalashritaPatala:** This is the outer most among the 4 patala. Dalhana denotes teja as “AlochakaTejaSanshrayaSiragataRa kta” i.e. the Alochaka Pitta, responsible for vision, present in the blood vessels and Jala as TwakgataRasadhathu. Acharya Indu has defined the word Ashraya as “Apyayitha” means thereby ‘to nourish’. Hence this Patala is supported or nourished by Rasa and RaktaDhathu of the body.

2. **MamsashritaPatala:** This is the second Patala, nourished and supported by MamnsaDhathu.

3. **MedoshritaPatala:** Medodhathu nourishes this 3rd Patal.

4. **AsthyashritaPatala:** Asthidhathu of the body supports the innermost or 4th Patalain general and by the Kalakasthi in particular.

**Discussion and conclusion:**  
The description of anatomy of eye i.e. Netra Sharir plays an important role in surgical as well as Medicinal procedures. Mandal, Sandhi and Patal concept is innovative concept of Ayurveda which made easy to classification of various diseases of eye. It also helpful to manage the medicinal as well
as surgical treatment of the diseases which occurred in eyes.

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