A REVIEW ON DEVELOPMENT OF THE MOOLASTHANA OF SROTAS WITH REFERENCE TO EMBRYOLOGY

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ABSTRACT
From the beginning of the mankind the science of Ayurveda has been flourishing into our lifestyle. The flows in knowledge of Ayurveda have risen to a higher level. Reproduction is one of the life processes which maintain the continuation of life further. To attain a healthy progeny, the internal body system must be in good state and healthy condition. Srotas Sharir is the integral part of human system and any disturbance at this level leads to Dosha-Dusya Sammurchna and eventually to the pathology (whether embryological). Embryological development of organs or body tissues may lead to malformations. Those organs which are Moolasthana for any Srotas will lead to various diseases of the respective Srotas. Thus this work has been put forward to get an evaluation of Moolasthana of Srotas with its development from both sciences. A comparative evaluation of the developmental process regarding the Moolasthana of Srotas is considered.

Keywords: Srotas, Moolasthana, Rakta, Mamsa, Dhatu, Vayu, Prana, Embryology

INTRODUCTION
Srotas is defined as channels or structure through which Sravana Karma (exudation) of Dhatus take place at a very slower movement. The word “Parinamamapdhapmanama” refers to the circulation of fluids from one site to the other.\(^1\) Acharya Sushruta describes that Srotas are channels of the body having originated from vacant hollow spaces and later spread into entire body.\(^2\) Srotas are 13 in number according to Acharya Charaka and 11 pairs according to Acharya Sushruta and as per Acharya Kashyapa, referred Srotas as Sukshuma (Nabhi, Romkopa) and Mahan (head & lower body parts). Acharya Charaka mentioned many synonyms related to word Srotas as Sira (vein), Dhamani (artery), Rasyani (lymphatic channel), Nadi (duct), Panthan (passages) etc.
SROTONOOLA:
Every Srota is elucidated with the area of origin as any infection will lead to alteration in the normal physiology. The Moolasthana are responsible for the well being and carrying vital functions of the Srotas.

DEVELOPMENT OF THE ROOT ORGANS OF THE SROTAS:
Acharya Sushruta has demonstrated the development of organ in the chapter IV entitled ‘Garbha vyakarna’ in Sharir Sthana. He has mentioned the origin of Twacha, Yakrit-Pleeha, Antra, Guda, Vasti, Vrikka, Hridaya and Vrishana. Each one of them is described as follows. When fertilization or combination of Shukra-Shonita takes place, fetus develops very rapidly through process of transformation. The seven layers of skin formed similar to the different layers of skin on surface boiled milk occurs. The modern embryology says that the integumentary system develops at 6th week of IUL from surface endoderm and underlying mesoderm. The development of Yakrit-Pleeha takes place via Rakta Dhatu. The liver develops from endodermal hepatic bud of foregut, mesenchyme of septum transversum and vitelline, umbilical veins with in septum transversum. Spleen is mesodermal in origin and develops from dorsal mesogastrium close to stomach. The splenic tissue condenses between two layers of mesogastrium.

The Antra, Basti and Guda of fetus develop from Rakta, Kapha and digested by Pitta and Vayu enters into. The intestine develops from the endoderm, the distal par of duodenum, jejunum, ileum, colon upto right 2/3rd of transverse colon from midgut. Remaining 1/3rd of the transverse colon, descending colon, sigmoid colon develops from hindgut. Rectum develops from endoderm cloaca, a blind pouch of hindgut. Urinary bladder develops from urogenital sinus. The epithelium is derived from vesico-urethral canal (endoderm). Tri-gone epithelium is mesodermal.

The Vrikka formed as essence of Rakta, Meda. The kidneys develop on either side of vertebral column. Develop from nephrogenic cord and by ureteric bud. Vrishna arises from the Prasada part of Mamsa, Rakta, Kapha & Meda. Genital system develops from intermediate mesoderm, part of cloaca & ceolomic epithelium of mesoderm. Initial development is similar for both sexes and later on converts in definitive stage. Hridaya is made from essence of Rakta and Kapha. Dhamanis are attached to the heart for flow of Prana. It develops from the primitive heart tube (cardiogenic area of embryo). Mesenchymal cells in cardiogenic area condense to form 2 angioblastic cords which canalized to form heart tube. The table listed below gives a comparison to the development of these organs.
Table 1: Illustrating the comparison in development of Srotas

<table>
<thead>
<tr>
<th>S.NO</th>
<th>NAME OF THE ORGAN</th>
<th>RELATED SROTAS</th>
<th>AYURVEDIC VIEW</th>
<th>MODERN EMBRYOLOGICAL VIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Twacha (skin)</td>
<td>Mamsavaha Srotas</td>
<td>Combination of Shukra-Shonita under influence of transformation</td>
<td>Develops from surface ectoderm &amp; underlying mesoderm</td>
</tr>
<tr>
<td>2</td>
<td>Yakrit (liver)</td>
<td>Raktavaha srotas</td>
<td>From Rakta</td>
<td>Endodermal hepatic bud of fore-gut</td>
</tr>
<tr>
<td>3</td>
<td>Pleeha (spleen)</td>
<td>Raktavaha srotas</td>
<td>From Rakta</td>
<td>Mesodermal origin from dorsal mesogastrium</td>
</tr>
<tr>
<td>4</td>
<td>Antra (intestine)</td>
<td>Purishvaha Srotas</td>
<td>From essence of Rakta, Kapha under act of Pitta &amp; Vayu</td>
<td>Endodermal in origin. Dual origin from midgut and hindgut.</td>
</tr>
<tr>
<td>5</td>
<td>Basti (urinary bladder)</td>
<td>Mutravaha Srotas</td>
<td>From essence of Rakta, Kapha under act of Pitta &amp; Vayu</td>
<td>Urogenital sinus (some part from endoderm &amp; mesoderm)</td>
</tr>
<tr>
<td>6</td>
<td>Guda (rectum)</td>
<td>Purishvaha Srotas</td>
<td>From essence of Rakta, Kapha under act of Pitta &amp; Vayu</td>
<td>From Endoderm cloaca, blind pouch of hindgut</td>
</tr>
<tr>
<td>7</td>
<td>Vrikka (kidneys)</td>
<td>Medovaha Srotas</td>
<td>From Rakta and Meda</td>
<td>Definitive kidneys develop by metanephros</td>
</tr>
<tr>
<td>8</td>
<td>Vrishana (genitals)</td>
<td>Shukravaha Srotas</td>
<td>From essence of Rakta, mamsa, Kapha &amp; Meda</td>
<td>By intermediate mesoderm, part of cloaca</td>
</tr>
<tr>
<td>9</td>
<td>Hridaya (heart)</td>
<td>Pranavaha, Rasvaha Srotas</td>
<td>From essence of Rakta &amp; Kapha</td>
<td>Mesenchymal cells in cardiogenic area</td>
</tr>
</tbody>
</table>

CONCLUSION

From the above text, we observed that development of Moolasthana of the mentioned Srotas in Ayurveda is far different from the modern embryology. But in case of some organs a diminutive similarity can be studied. Basically, in Ayurvedic text the development of organs has Rakta Dhatu in common. This shows the importance of blood which is the carrier of Prana to the entire body. Embryology gives reference to liver as important haemopoietic centre which begins at 6 week of IUL, later on done by spleen and bone marrow. In case of liver development, the reference of vitelline and umbilical veins present within septum transversum gives relation to the involvement of Rakta (blood). Similarly the Hridaya (heart) develops from Rakta & Kapha. In development of heart we examined that heart tube is separated from myoepicardial mantle by cellular gelatinous connective tissue which is termed as “Cardiac jelly”.

This can be close to the Kapha mentioned by Acharya Sushruta. Thus, at last here the development of Moolasthana of Srotas from
Ayurvedic view and contemporary science is concluded.

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