

## A REVIEW OF *RAKTAVAHA SROTAS* AND ITS DISEASES

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## ABSTRACT

The subject which deals with the study of the human body and its part is called "*Rachna Sharir*" which forms the basic principle for understanding the concept of *Ayurveda*. In *Ayurveda*, the principle of *Srotas* is like the roots of the tree. The channel that transport nutrition to their destiny is called *Srotas*. The human body is the collaboration of the *Srotas*. *Srotas* take part in the modification, conveyance, absorption and excretion of many substances which are transported through them. The number of *Srotas* are different by different authorities of *Ayurveda*. The *Srotas* have their self *Mulasthan* or root. Any disturbance in the *Srota*, at the structural or functional level, leads to the commencement of diseases. Every *Srotas* have different functions and *Dusti Lakshana*. *Raktavaha Srotas* is the *Srotas* which is related to blood circulation and its formation. Its *Mulasthana* are *Yakrit*, *Pleeha* and *Raktavahini-dhamani* as mentioned the *Ayurvedic* literatures. There are many diseases of *Raktavaha Srotas*, which occurs as a result of *Srotas Dusti*. The disease of the *Raktavahasrotas* is *Kustha*, *Visrpa*, *Pidika*, *Kamala*, *Asrgdar*, *Arubuda*, *Arsha* etc. all the skin diseases, haemolytic disease, gynaecological disorders, metabolic disorders. The diseases of *Raktavahasrotas* are important for diagnosis and clinical practices. The presentation is aimed to review the concept of *Raktavaha Srotas* and its importance.

**Keywords:** *Srotas*, *Mulastha*, *RaktavahaSrotas*

## INTRODUCTION

*Ayurveda* is the science of life and longevity. *Sharir* is a basic stream of *Ayurveda* classics which deals with structural and functional aspects of the body. *Ayurveda* has very vividly described the anatomy of the human body. These basic constituents are continuously circulating through different channels or carriers in our bodies. These transportation systems of the body are well known as *Srotas*. *Ayurvedic* classics signify '*Srotamayam hi Shariram*' means comprising of paths or channels. *Srotas* are innumerable in numbers and represent the inner transport system of the body. Generally, the word *Srotas* is used as a common term pointing to all the macro and micro pathways operating in the living organism. The word *Srotas* means channels or passages in which some tissue is formed, some material is metabolized, secreted or transported. The term *Srotas* is derived from *Sanskrit* root '*Sru*' *Gatau* which represents i.e., excretion, filtration, oozing, secretion, transportation etc. The synonyms of *Srotas* are *Sira* (vein), *Dhamni* (arteries), *Rasayani* (lymphatics), *Rasvahini* (capillaries), *Nadi* (ducts), *Pantha* (passage), *Marga* (channels), *Sharirchidrani* (sphincters), *Sthanani* (site), *Niketa* (places), *Ashaya* (recipient), *Rasvahaniya* (lymphatic), *Samvrita-asamvrita* (open and blind passages), *Ashayas* (spaces), *Sharir Dhatwaavaksh Lakshyana-alakshyana* (visible and invisible interstitial)<sup>1</sup>. *Srotas* are the inner transport system of the body which provides a platform for activities of another important bio factor like three *Doshas*, seven *Dhatu*s etc<sup>2</sup>.

*Srotas* are the minutes the structural and functional unit of each organ, which play a very crucial role in biological processes such as physiological and pathological processes of human body.

### Structure of *Srotas*

**Colour-** *Srotas* have a colour similar to that of their *Dhatu*

**Size-** *Anu* (superfine), *Sthula* (visible to naked eyes)

**Shape-** *Vritta* (barrels shaped), *Dirgha* (protracted), *Pratana* (marked like a net)<sup>3</sup>

**Types of *Srotas*-** Different authorities of *Ayurveda* claims different type of *Srotas*. They classified *Srotas* on the different logics such as anatomical,

physiological, pathological, surgical etc. According to *Acharya Charak*, types of *Srotas* mentioned as 13 in number, they are *Pranavaha*, *Udakavaha*, *Annavaha*, *Rasavaha*, *Rudhiravaha*, *Mamsavaha*, *Medasvaha*, *Asthivaha*, *Majjavaha*, *Sukravaha*, *Mutravaha*, *Purisavaha* and *Swedavaha*<sup>4</sup>. *Acharya Sushrut* has classified the *Srotas* into two major groups, they are *Bahirmukha Srotas* and *Antramukha Srotas*. *Sushrut* said that *Srotamsi* which are enumerated as nine in numbers are *Bahirmukha* i.e., major external openings of the body. These are two ears, two eyes, one mouth, two nostrils, one anal opening and one urethral opening (nine) in males while in females there are three more openings, two breasts (nipples) and one vaginal opening<sup>5</sup>. According to *Acharya Sushrut*, types of *Srotas* is mentioned as 11 pairs, they are *Pranavaha*, *Udakavaha*, *Rasavaha*, *Raktavaha*, *Mamsavaha*, *Medavaha*, *Mutravaha*, *Purishavaha*, *Sukravaha* and *Artvavaha Srotas*<sup>6</sup>. These are *Antramukha Srotas*. *Ash-tang Hridaya* also present his views identical to *Sushrut* and he states that there are nine opening or *Bahyasrotas* in man while the females have 12<sup>7</sup>.

**Causes of *Sroto Dusti*:** According to *Acharya Charak* food and behaviour which are similar to *Doshas* and dissimilar to *Dhatu*s in properties causes morbidity in *Srotas*<sup>8</sup>. *Sushrut Samhita* did not mention any causes of *Srotas*, he said, an injury to the *Srotas* revealed incurable conditions that's why such information should be given to the patient and his attended and proceed the treatment to remove the foreign body<sup>9</sup>.

### *Srotas Dusti Lakshana*

*Acharya Charak* has mentioned 4 types of *Srotas Dushti Lakshana*. *Atipravati* (Enhanced flow), *Sanga* (obstruction), *Siragranthi* (formation of nodules) and *Vimargagamana* (flow of contents in the wrong direction) are the symptoms of *Srotas Dushti*<sup>10</sup>. *Astangahridaya*, and *Astangasamgraha*, have a tantamount view on *Srotadushti*. *Acharya Sushrut* has not mention *Srotadushti Lakshana* but states *Viddha Lakshana* and its specific consequences.

### **Mulasthan of Raktavahasrotas**

*Yakrit and Pleeha* (ch.vi 5/7-8), *Raktavahadhamani*, *Yakrit and Pleeha* (su.sa 9/12), *Yakrit and Pleeha* (As sam.6/14)

To know the anatomy of *Raktavaha Srotas* their *Mulasthan* is considered. Both *Acharya Charak* and *Acharya Vaghbhat* has considered *Yakrit* and *Pleeha*, but *Sushrut* has described *Yakrit Pleeha* and *Raktavahinidhamanis* as *Mulas*. *Raktavahanidhamanis* are none other than all blood vessels. *Acharya Sushrut* being a great surgeon always think about such structures from a clinical-surgical point of view and was more practical. In *Ayurveda*, there is no clear details of *Yakrit* (liver) and *Pleeha* (spleen).

**Liver-** The liver is the heaviest gland of the body, weighing about 1.4 kg (about 3 lb) in an average adult. Of all of the organs of the body, it is second only to the skin in size. The liver is inferior to the diaphragm and occupies most of the right hypochondriac and part of the epigastric regions of the abdominopelvic cavity<sup>11</sup>. Hepatocytes form complex three-dimensional arrangements called hepatic laminae. The hepatic laminae are plates of hepatocytes one cell thick bordered on either side by the endothelial-lined vascular spaces called hepatic sinusoids. The hepatic laminae are highly branched irregular structures. Grooves in the cell membranes between neighbouring hepatocytes provide spaces for canaliculi (described next) into which the hepatocytes secrete bile. Bile, a yellow, brownish, or olive-green liquid secreted by hepatocytes, serves as both an excretory product and a digestive secretion. Bile canaliculi are small ducts between hepatocytes that collect bile produced by the hepatocytes. From bile canaliculi, bile passes into bile ductules and then bile ducts. The bile ducts merge and eventually form the larger right and left hepatic ducts, which unite and exit the liver as the common hepatic duct. The common hepatic duct joins the cystic duct from the gallbladder to form the common bile duct. From here, bile enters the duodenum of the small intestine to participate indigestion<sup>12</sup>

### **Blood supply of liver**

The liver receives blood from two sources. From the hepatic artery, it obtains oxygenated blood, and from

the hepatic portal vein, it receives deoxygenated blood containing newly absorbed nutrients, drugs, and possibly microbes and toxins from the gastrointestinal tract. Branches of both the hepatic artery and the hepatic portal vein carry blood into hepatic sinusoids, where oxygen, most of the nutrients, and certain toxic substances are taken up by the hepatocytes. Products manufactured by the hepatocytes and nutrients needed by other cells are secreted back into the blood, which then drains into the central vein and eventually passes into a hepatic vein<sup>13</sup>.

### **Function of liver**

1. **Carbohydrate metabolism-** The liver is especially important in maintaining a normal blood glucose level. When blood glucose is low, the liver can break down glycogen to glucose and release the glucose into the bloodstream. The liver can also convert certain amino acids and lactic acid to glucose, and it can convert other sugars, such as fructose and galactose, into glucose. When blood glucose is high, as occurs just after eating a meal, the liver converts glucose to glycogen and triglycerides for storage.
2. **Lipid metabolism-** Hepatocytes store some triglycerides; break down fatty acids to generate ATP; synthesize lipoproteins, which transport fatty acids, triglycerides, and cholesterol to and from body cells; synthesize cholesterol and use cholesterol to make bile salts.
3. **Protein metabolism-** Hepatocytes deaminate (remove the amino group, NH<sub>2</sub>, from) amino acids so that the amino acids can be used for ATP production or converted to carbohydrates or fats. The resulting toxic ammonia (NH<sub>3</sub>) is then converted into the much less toxic urea, which is excreted in the urine. Hepatocytes also synthesize most plasma proteins, such as alpha and beta globulins, albumin, prothrombin, and fibrinogen.
4. **Processing of drugs and hormones-** The liver can detoxify substances such as alcohol and excrete drugs such as penicillin, erythromycin, and sulfonamides into bile. It can also chemically alter or excrete thyroid hormones and steroid hormones such as oestrogens and aldosterone.

5. **Excretion of bilirubin-** As previously noted, bilirubin, derived from the heme of aged red blood cells, is absorbed by the liver from the blood and secreted into bile. Most of the bilirubin in bile is metabolized in the small intestine by bacteria and eliminated in faeces. Synthesis of bile salts. Bile salts are used in the small intestine for the emulsification and absorption of lipids.
6. **Storage-** In addition to glycogen, the liver is a prime storage site for certain vitamins (A, B12, D, E, and K) and minerals (iron and copper), which are released from the liver when needed elsewhere in the body.
7. **Phagocytosis-** The stellate reticuloendothelial (Kupffer) cells of the liver phagocytize aged red blood cells, white blood cells, and some bacteria.
8. **Activation of vitamin D-** The skin, liver, and kidneys participate in synthesizing the active form of vitamin D<sup>14</sup>.

**Spleen-**The oval spleen is the largest single mass of lymphatic tissue in the body. It is a soft, encapsulated organ of variable size, but on average it fits in a person's open hand and measures about 12 cm (5 in.) in length. A capsule of dense connective tissue surrounds the spleen and is covered in turn by a serous membrane, the visceral peritoneum. Trabeculae extend inward from the capsule. The capsule plus trabeculae, reticular fibres, and fibroblasts constitutes the stroma of the spleen; the parenchyma of the spleen consists of two different kinds of tissue called white pulp and red pulp. White pulp is lymphatic tissue, consisting mostly of lymphocytes and macrophages arranged around

branches of the splenic artery called central arteries. The red pulp consists of blood-filled venous sinuses and cords of splenic tissue called splenic cords of Billroth's cords. Splenic cords consist of red blood cells, macrophages, lymphocytes, plasma cells, and granulocytes. Veins are closely associated with the red pulp. Blood flowing into the spleen through the splenic artery enters the central arteries of the white pulp. Within the white pulp, B cells and T cells carry out immune functions, similar to lymph nodes, while spleen macrophages destroy blood-borne pathogens by phagocytosis. Within the red pulp, the spleen performs three functions related to blood cells:

1. Removal by macrophages of ruptured, worn out, or defective blood cells and platelets.
2. Storage of platelets, up to one-third of the body's supply.
3. Production of blood cells (hemopoiesis) during fetal life<sup>15</sup>.

**Raktavahasrotas Dushti Hetu-Acharya Charak** has mentioned various factors of *Raktavahasrotasdusti*. They are due to intake of *Vidahianna* (food which causes burning sensation) and *Pana* (drinks), *Snigdha* (oily), *Ushna* (hot) *Drava* (liquid) food consumption along with exposure to *Atapa* (sunlight) and *Anila* (air) which lead to *Raktavahasrotas Dushti*<sup>16</sup>.

**Raktavahasrotas Vyadhi-** Different classics of *Ayurveda* has mentioned various types of disease which are due to the result of *Raktavahasrotas Dushti*. Table no.1 shows the difference of *Raktavahasrotas Vyadhi* mentioned in ancient works of literature.

**Table 1:** *Raktavahasrotas Vyadhi* different classics

<i>Charak Samhita</i> <sup>17</sup>	<i>Sushrut Samhita</i> <sup>18</sup>	<i>Ashtanga Hridaya</i> <sup>19</sup>
<i>Kustha</i> (all types of skin disease)	+	+
<i>Visarpa</i> (erysipelas)	+	+
<i>Pidika</i> (pimples)	+	+
<i>Raktapitta</i> (haemolytic disorder)	+	+
<i>Gulma</i> (abdominal tumour)	+	+
<i>Kamala</i> (jaundice)	+	+
<i>Pleeharoga</i> (Splenomegaly)	+	-
<i>Viana</i> (dark shade)	+	+
<i>Vidradhi</i> (abscess)	+	+

<i>Nilika</i> (bluishness)	-	-
<i>Tilakalka</i> (Birth marks like sesamum)	-	-
<i>Asrigdar</i> (all types of menstrual disorder like menorrhagia)	-	+
<i>Pipalava</i> (Port wine mark)	-	-
<i>Dadaru</i> (Ringworm)	-	-
<i>Charmadal</i> (Dermatitis)	-	-
<i>Switra</i> (Leucoderma)	-	-
<i>Pama</i> (Papules)	-	-
<i>Koth</i> (Urticaria)	-	-
<i>Rakta mandala</i> (Red circular patches)	-	-
-	<i>Masak</i> (moles)	-
<i>Gudapaka</i> (inflammation of anus) and <i>Medhrapaka</i> (inflammation of penis)	+	-
-	<i>Mukhapaka</i> (mouth ulcer)	-
-	<i>Lingapaka</i>	-
-	<i>Vatarakta</i> (gout arthritis)	+
-	<i>Indralupta</i> (alopecia)	-
-	<i>Arsha</i> (haemorrhoids)	-
-	<i>Arbuda</i> (tumour)	-
-	<i>Angamarda</i> (whole-body pain)	-
-	-	-
-	-	<i>Agninash</i> (lost of digestive power)
-	-	<i>Tama pravesh</i> (blackout)
-	-	<i>Lalima in Sarir</i> (body) and <i>Netra</i>

### Management of Raktavaha Srotas

Acharya Charak has stated that the diseases caused by blood, one should adopt the treatment which evacuates blood and Pitta such as *Virechana* (Purgation), *Upvasa* (fasting) and *Raktamokshana* (bloodletting)<sup>20</sup>. *Virechana*- The process of expelling unwanted or wastage material through the downward track is called *Virechana* (purgation). The drugs used in *Virechana* are *Ushna* (hot), *Tikshna* (sharp), *Sukshma* (subtle), *Vyavayi* (those pervading the entire body before getting digested) and *Vikashi* (those causing looseness of joints). **Langhana (fasting)** Whatever is capable to reduce the body is known as ‘Langhana’ or reducing therapy. There are many types of *Langhana* mentioned in *Ayurveda* texts. **Raktamokshana** The process of letting out impure *Dosha* from the blood with the help of surgical instruments or non-surgical instruments is called *Raktamokshana*. For example- *Jalukavacharana*, *Shringavacharana*, *Alabuavacharana* and *Ghatyantra*.

### CONCLUSION

According to the construction of the *Srotas*, the *Srotas* are the empty passage, provenance from the root collocation, loft within the whole body to acts as a carriage system for the supply of nutritional needs of the organism. *Raktavaha Srotas* from its origin, we can compare with the Haemopoietic system. From its root of origin, we come to know liver and spleen act as a compilation of blood and from the circulation passage we can also juxtapose with the circulatory system of the body and also the damaged red blood cells are isolated from circulation and devastated by fixed phagocytic macrophages in the spleen and liver, and the remainder products are recycled. The liver and spleen perform a major role life cycle of RBC, its destruction and recycling of components. The anatomical change in liver such as Congenital Billiary Atresia, Billiary cyst etc. Congenital Billiary Atresia is a life-threatening condition in which the bile duct is impeded. This obstructs the flow of bile from liver. Biliary cyst is a



condition in which bile duct have abnormal dilatation, which obstruct the flow of bile and hampers the liver functions. There are wide range of anomalies of spleen including shape, location, notches, clefts, spleenopan-creatic fusion, wandering spleen and many more. These anomalies affect directly or indirectly the function of spleen. Considering the above aspect *Yakrut* (Liver) and *Pleeha* (Spleen) are considered as roots of *Raktavaha Srotas*.

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