



## Review Article

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### AN ANATOMICAL CONSIDERATION OF ANNAVAHA SROTAS WITH SPECIAL REFERENCE TO ANNAVAHA DHAMANI: A REVIEW

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#### ABSTRACT

Any vacant space which starts with an opening and extends up to other ends in human body for transportation of dhatu, ras or mala is called srotas, barring sira and dhamani. We can consider srotas as a network of capillaries which transport the above material. Annavaaha srotas is an important among these. This srotas is two in number and their origin is Amashaya (Stomach) and rasvahi dhamani (capillaries or vessels which carry nutrient). Injury to annavaaha srotas causes flatulence, pain, anorexia, vomiting, thirst and death. Stomach is a reservoir of food. Esophagus, small intestine, large intestine are passages for digestion and absorption of food, So, stomach and these passages are considered as annavaaha srotas. Annavaaha dhamani /rasavah dhamani carries digested food to the liver for assimilation. Annavaaha dhamani/rasavah dhamani should be considered as superior and inferior mesenteric veins forming portal vein and lacteals. We will try a consolidate consideration for annavaaha srotas and annavaaha dhamani along with anatomical aspect.

**Keywords:** Annavaaha srotas, annavaaha dhamani, superior mesenteric vein, inferior mesenteric vein, lacteals

#### INTRODUCTION

Different segments of annavaaha srotas are the channels which carry food material for nutrition of body these channels are-pharynx, oesophagus, stomach, small intestine, large intestine. Stomach is considered as moola (Base) only because it is said to be first station of food material travelling through annavaaha srotas. Esophagus above and small intestine, large intestine below are attached to stomach at its cardiac end and pyloric end respectively. Rasavaha dhamani carries the aahar rasa means it transport nutrient products. Stomach is a reservoir of food, so it is considered as moola (base) while oesophagus, duodenum, intestine are the passages of food. On this view both are proved as annavaaha srotas. When we consider anna as nutrient, an end product of digestion than superior mesenteric vein, inferior mesenteric vein and lacteals are the ducts which carry this nutrient product.

#### Ayurveda Literature

According to Sushruta the moola (origin or base) of annavaaha srotas are amashaya (Stomach) and annavaaha dhamani but according to acharya Charaka the moola are amashaya (Stomach) and vaam parshwa (Left flank). According to acharaya Sushruta injury to this srotas will cause adhmana (flatulence), shoola (pain), annadweshha (loss of appetite and anorexia), vamaana (vomiting), pipasa (thirst), and mriyuu (death). According to Charaka sroto dushti lakshanas (symptoms) are anorexia, improper digestion, and vomiting. Stomach is a reservoir of food and oesophagus carries food from mouth to stomach and small intestine carries the food to further structure. The cause of deformity in this srotas are excessive amount of food intake, inappropriate timing of having food, food which are harmful and abnormality in jathara again. We should consider for small intestine as duodenum because it is directly related with digestion, absorption of food. Akaash mahabhut is dominant in formation of srotas. Acharya Charaka considers thirteen, while maharshi Sushruta considers twenty-two in number. The hollow

and soft structures which carry nutrient, product, waste product are srotas. Srotas should be channels, openings, passage, vein, artery, lymphatic duct, nutrient vessels, capillary, external and internal apparatus or passage of the body, spaces, site, resorts. Sushruta has described the srotovidha lakshana (Traumatic signs) which can be justified on the basis of applied anatomy. These lakshanas (symptoms) are-

1. Adhmana (flatulence) - Gastric disorder causes flatulence. It is characterized by anorexia, nausea and vomiting. There is discomfort or pain in epigastric region associated with sour eructation.
2. Shoola (pain) – Gastric pain is felt in epigastric region due to nerve supply to stomach from T6 –T10 segments of spinal cord. Pain may also due to peptic ulcer, gastritis or other pathology in different segments of annavaaha srotas.
3. Chhardhi (Nausea) – This is the prominent symptom of pyloric stenosis which is a type of congenital or acquired anomaly. Nausea is the commonest symptom due to trauma or disease in annavaaha srotas.
4. Annadweshha (Loss of appetite or anorexia) –Trauma on stomach mucosa by gastric carcinoma or gastric ulcer causes loss of appetite. Duodenal ulceration accompanied by stenosis may also result in loss of appetite and profound weight loss.
5. Pipasa (Thirst) – Any hemorrhage leading to blood loss is characterized by thirst. Abnormal thirst is also a result of excessive vomiting.
6. Mriyuu (Death) – Severe injury on any part of annavaaha srotas leads to perforation leading to internal hemorrhage and death. Trauma on annavaaha srotas also causes agonizing pain resulting in death.

#### Modern Review

The functional importance of small intestine is absorption. Maximum absorption of digested food products takes place in small intestine. The proximal part of small intestine is duodenum.

The mucous membrane of small intestine is covered by minute projection called villi. The height of villi is about 1mm, and the diameter is less than 1 mm. The villi are lined by columnar cells, which are called enterocyte. Each enterocyte gives rise to hair like projections called micro villi. The villi and micro villi increase the surface area of mucus membrane by many folds. This facilitates the absorptive function of intestine. Within each villus, there is a central channel called lacteals. The lacteal opens into lymphatic vessels. It contains blood vessels also. The digested products of foodstuffs, proteins, carbohydrates, fats and other nutritive substances such as vitamin, minerals and water are absorbed mostly in small intestine. From the lumen of intestine, these substances pass through lacteals of villi, cross the mucosa and enter the blood directly or through the lymphatic. The lymph capillaries are called lacteals because absorbed fat gives the lymph a milky appearance. Absorption and some final stage of digestion of nutrients take place in the enterocyte before entering the blood and lymph capillaries. The superior mesenteric artery supplies the whole of the small intestine, and venous drainage is by the superior mesenteric vein that joins other veins to form the portal vein. The portal vein contains a high concentration of absorbed nutrients and this blood passes through the liver before entering the hepatic veins and ultimately into the inferior vena cava.

#### Dissection

- Give an incision from xiphoid process till the umbilicus. Made a small circular incision around the umbilicus and extend it till the pubic symphysis. Carry the incision laterally from the umbilicus till the lateral abdominal wall on both sides. Give curved incision from anterior incision to pubic symphysis on either side.
- Finally gave a horizontal incision across the xiphoid process till the lateral abdominal wall. Carefully reflected the skin in four flaps leaving both the layers of superficial fascia on the anterior abdominal wall.
- Made a transverse incision through the entire thickness of the superficial fascia from the anterior superior iliac spine to the median plane. Raised the lower margin of cut fascia and identified its fatty and membranous layers.
- Divide the superficial fascia vertically in the median plane and in the line of posterior axillary fold as far as the iliac crest. Reflected the fascia by blunt dissection from these two cuts and find the anterior and lateral cutaneous branches of the lower intercostal nerves along with respective blood vessels coming out from the anterior and lateral regions of the abdominal wall.
- Exposed the extensive abdominal cavity. Identified the peritoneum and omentum and its adjacent anatomical structures. Pulled the liver superiorly and lift its inferior margin anteriorly to expose the lesser omentum. Examined the right free margin of lesser omentum, containing the bile duct, hepatic artery and portal vein.
- Identified the short trunk of coeliac trunk of coeliac axis artery at the level of the inter vertebral disc between T12 and L1 vertebrae. Dissected its relation especially with the coeliac ganglion and identify its three branches and their further divisions. Cleaned the superior mesenteric vessels already dissected, with its branches both from its right and left surfaces. Dissected these branches and trace them till the organs of their supply. Identified the inferior mesenteric artery arising at the L3 vertebra. Traced its course and branches.
- Portal vein-Identified the large portal vein formed by the union of superior mesenteric and splenic veins posterior to the

neck of pancreas. Traced it upwards towards the remains of free margin of lesser omentum till the porta hepatis where it divides into two branches. Identified the veins taking part in portosystemic anastomoses.

#### Findings of Dissection

- Esophagus
- Stomach
- Coeliac trunk
- Intestine
- Superior mesenteric artery
- Inferior mesenteric artery
- Lacteals

**Superior mesenteric artery** is the artery of the midgut. It supplies all derivatives of the midgut- (1) lower part of duodenum below the opening of the bile duct (2) the jejunum (3) the ileum (4) the appendix (5) the caecum (6) the ascending colon (7) the right two third of the transverse colon (8) the lower half of the head of the pancreas.

**Inferior mesenteric artery** is the artery of the hindgut. It supplies the parts of the gut that are derivatives of the hindgut and posterior part of the cloaca, the anorectal canal, namely (1) the left one third of the transverse colon (2) the descending colon (3) the sigmoid colon (4) the rectum (5) the upper part of anal canal, above the anal valves.

**Lacteals**-The lymph capillaries are called lacteals because absorbed fat gives the lymph a milky appearance. Absorption and some final stage of digestion of nutrients take place in the enterocyte before entering the blood and lymph capillaries. The villi and micro villi increase the surface area of mucus membrane by many folds. This facilitates the absorptive function of intestine. Within each villus, there is a central channel called lacteals. The lacteal opens into lymphatic vessels. It contains blood vessels also. The digested products of foodstuffs, proteins, carbohydrates, fats and other nutritive substances such as vitamin, minerals and water are absorbed mostly in small intestine.

#### DISCUSSION

Rasavaha srotas means channels which carry nutrients. Thus, capillaries which are branches of arteries and venules are rasavahi dhamani. They supply nutrients and oxygen to every cell of the body. Its moola (Origin or base) is hridaya (Heart) and rasavahi dhamani. On the other view rasavahi dhamani carries digested food to the liver for assimilation. Thus, the annavaha dhamani are the veins of small intestine i.e. duodenum, jejunum, ileum, and large intestine i.e. caecum, ascending colon and right two third of transverse colon. We can consider other than these (1) Portal veins and (2) lacteals are also annavahi dhamani.

#### CONCLUSION

The aim of above discussion is to consider the anatomical aspect of annavaha srotas and annavaha dhamani. The dissection of cadaver is very essential to understand the anatomy of human body which will help in entire medical science as well in surgery. Without any confusion amashaya should be considered as Stomach. Consideration of annavaha dhamani has controversies but after above discussion, we can conclude the rasavahi dhamani as Superior mesenteric artery, Inferior mesenteric artery and Lacteals.

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