

## CONCEPT OF GASTRO-INTESTINAL SYSTEM IN AYURVEDA: A CONCISE REVIEW

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## ABSTRACT

Concept of gastrointestinal tract is very much elaborated by the *Ayurvedic Saamhitas*. A consistent, clear and precise anatomical description for the most part of the gastro-intestinal tract has been furnished by *Atreya Samhita* which has been quoted by *Vaidyaka-Sabda Sindhu*. The gastrointestinal tract is described by various terms like *Mahsrotas*, *Annavaha srotas* and *Kostha* etc. *Srotasa* are channel system for transportation and transformation of *sharirbhava* and *dhatu*. The term *Annavaha Srotas* points out the functions performed by this channel means the transportation of the food. *Annavahasrotas* is associated with digestion and flow of food material which later forms *rasadhatu*. *Sushruta* explained that *Amasaya* is the most important part of the alimentary tract whereas *Charaka* has included both stomach and small intestine in it. *Annavaha Srotas* is related to structural and functional units associated with mechanical and chemical digestion in mouth, stomach and small intestine as well as absorption from stomach and small intestine. Here absorption of food material forms the first *dhatu Rasa dhatu*.

**KEYWORDS:** Annavaha srotas, Grahni, Agni, Pitta, Vipaka, Pittadharakala.

## INTRODUCTION

*Ayurveda* is the oldest health care system that asserts that science, philosophy and spirituality are necessary aspects for a healthy living. *Ayurveda* is considered not only a comprehensive medical system but also a way of life. *Ayurveda* is a science of life which aims towards maintenance of good health and cure from diseases. It is based on its own fundamental concepts which are distinctly different from modern medical science. These form the basis for understanding physiology, pathology and treatment of disease. Though, *Ayurveda* is the first systematically written record of medicine in the world and incorporating all aspect of human life. The main aim of *Ayurveda* is being to provide guidelines for maintenance and promotion of health as well as prevention and then treatment of diseases.<sup>[1]</sup> Even then it has become the need to study the fundamental and applied aspects of *Ayurveda* in depth with comparison to the science of today. This review highlights to make a concept about understanding the *Annavah Srotas* in present scenario.

## Srotas

*Srotas* is important and unique concept described in *Ayurveda*. *Acharya Charaka* described *Srotas* as the channels for transportation and transformation of *dhatu*. All the bodily substances cannot form or decay without *srotas*, because *Srotas* are capable of circulating the transformed *dhatu*.<sup>[2]</sup> *Srotas* are innumerable in

number,<sup>[3]</sup> this explains that every cell in the body possibly a *Srotas*. Each *Srotas* is attached to a specific anatomical structure called *Moola*. *Srotomoola* is the most vital part of the *Srotas*, just like the root of the tree. Though they are innumerable but for convenience they are divided into several. *Acharya Charak* has described 13 *Srotas*,<sup>[4]</sup> In female there is one more i.e. *Artavwaha Srotas* in *Garbha prakaran*, where as *Acharya Sushrut* has told 11 *srotas* but they are pair in number. *Sushrut* described *Srotasa* as structures within the body in the form of channels performing transport of *dhatu*, and it is different from *Sira* (vein) and *Dhamni* (artery)<sup>[5]</sup> The characteristics of the *srotasa* are it resembles in color to its *dhatu*, these are variable in size *anu* (small) or *sthula* (large) and also variable in shapes like *vritta* (circular), *dirgha* (long), *pratana* (branched).<sup>[6]</sup>

## Annavah Srotas

Verma et al describe *srotas* as structural and functional unit of the body designed to carry specific material, molecules, massages, impulses, emotions and thoughts.<sup>[7]</sup> *Annavaha Srotas* is one of the type of *srotasa* described in all important *samhita*, it can be considered to Gastro Intestinal Tract except colon from modern view. *Mahsrotas*.<sup>[8]</sup> and *Kostha*.<sup>[9]</sup> are describe synonymous to *Annavaha Srotas*. The *pakwashaya* (colon) and further part of alimentary tract are included in *Purishvaha srotasa*.<sup>[10]</sup>

### Moolasthanas of Annava Srotas

Acharya Chakrapani described *moolasthanas* as *prabhavasthanas*.<sup>[11]</sup> meaning anatomical seat of respective *srotas* where pathology of that *srotas* begins. As per Charak these are *Amashya* (stomach) and *vamaparshwa* (left upper quadrant of abdomen) As per Sushrut, *Amashya* (stomach) and *annavahini dhamani* are *moolasthanas* of *annava srotas*. Injury to these produces fullness in abdomen, pain in abdomen, loss of appetite, vomiting, thirst, vertigo and death.<sup>[12]</sup>

### Components of Annava Srotas

#### Amashya (Stomach)

Acharya Charak described location of *amashya* in between *nabhi* (umbilicus) and *stana* (nipples). It performs the function of *pachan* (digestion) of all type of food material.<sup>[13]</sup> Stomach is a muscular bag forming widest and most distensible part of digestive tube. *Amashya* is divided into two parts, *Urdhva* and *AdhoAmashya* is considered as *Kshudrantantra*, *pacyamanasaya* and *agniyasaya*.

#### Grahani and Pittadharakala

*Grahani* is a controversial structure described in *Ayurveda*. *Sushruta* described that *grahani* is located between *amashya* (stomach) and *pakwashaya* (large intestine) and it is the site of *pittadharakala*.<sup>[14]</sup> Acharya Charaka described *grahani* as a seat of *agni* and it is called so because of holding up the food. It holds up the food and releases it after it gets digested.<sup>[15]</sup> This description of *grahani* indicates it to be whole of the small intestine including duodenum, jejunum and ileum. Although Charak *Sushruta* and *Vagbhata*<sup>[16]</sup> have described the anatomy and location of the *grahani* in different ways. *Grahani* receives the food from the *Amasaya* and retains the same till it is digested. After the completion of digestion, the remnants of food i.e. *Kitta* are propelled for excretion. Thus, the process of digestion and absorption both are accomplished in the area of *grahani*. It is the seat of *Agni*,<sup>[17]</sup> and hence the function of *grahani* depends upon the strength of *Agni*. Thus, *grahani* and *Agni* are interdependent.

The *Kala* seem to be the mucous membrane, fascia or other epithelial linings which support the different substances and at the same time help in the maintenance of structure of *Ashayas* and cavities.<sup>[18]</sup> *Pittadharakala* is stated to cover that part of the gastro-intestinal tract which is described as *grahani*, is related with digestion of food. Ultimately the separation of *Sara* and *Kitta* takes place by *Pittadharakala*.<sup>[19]</sup> It is the site of *antaragni*. It receives food bolus from *amashya* and performs *shoshan* (absorption) and *pachan* (digestion), then transmits *pakwa anna* to *pakwashaya*.<sup>[20]</sup>

#### Yakrit

In *Ayurveda*, according to Charaka and *Sushruta* it has been described as *Kosthanga*.<sup>[21]</sup> As six types of *Garbhaja bhava* are viz., *Matrija*, *Pitrija*, *Atmaja*, *Satmyaja*, *Satvaja* and *Rasaja*, origin of *Yakrit* is

described from *Matrija Bhava*.<sup>[22]</sup> Each *bhava* has a specific role for the development of *yakrit* along with other structures. *Yakrit* (liver) serves as a common depot and junction which receives not only the nutrients from *Amapakvashaya* but also the breakdown products of the tissues and maintains the nutrient balance. *Rasa dhatu* goes into *Yakrit* and *pliha* where it changes into *rakta dhatu*.<sup>[23]</sup> It indicates that after the absorption of all kinds of food stuff, they go into liver via portal vein; there metabolic activities take place (protein, fat and carbohydrate metabolism). In *Ayurveda*, *yakrit* is considered as root and place of *Rakta* and *Raktavaha srotas*.<sup>[24]</sup> It means store house of blood. Major portion of RBCs are formed in liver and spleen, proves the above fact.

#### Agni

The vital role of the *Agni* for the existence of human life has been appreciated by the *Acharyas* of *Ayurveda*. According to Charak, *Agni* is as essential for the body as the roots for the plants.<sup>[25]</sup> The term *Agni* denotes both physical and biological fire. There is no fundamental difference between physical and biological *Agni* except that the later is associated with living organism. The main function of *Agni* in the body is the breakdown or to disintegrate the food into their simplest possible components making it suitable for absorption and utilization by the body.<sup>[26]</sup> Technically these functions are termed as digestion and metabolism. The concept of biological *Agni* has been described in *Ayurveda* in two references *Agni* and *Pitta*. The functions attributed to them are *Dahana*, *Pachana Tapan* etc. which are similar to that of *Agni*. In the light of modern developments, these functions are performed by varieties of biological substances, commonly known as 'enzymes'. They perform similar and specific functions located in different parts of the body.

#### Pitta and Agni

Broadly five kinds of *Pitta*- *Pachaka*, *Ranjaka*, *Sadhaka*, *Alochaka* and *Bhrajaka* and thirteen kinds of *Agni*, one *Jathargni*, five *Bhutagni* and seven *Dhatvagni* have been described in *Ayurvedic* texts.<sup>[27]</sup> *Sushruta* states that *Pitta* is same as *Agni* and it performs the function of fire so it is also designated as *Agni* or *Antaragni*.<sup>[28]</sup> According to the opinion of *Hemadri*, there is no difference between *Agni* and *Pitta* with reference to *Pachaka Pitta*, but in reference to other types of *pitta*, there is definite distinction between *Pitta* and *Agni*.<sup>[29]</sup> Therefore, *Agni* covers wider range i.e. physical, chemical and biological spheres. On the contrary *Pitta* is related with living organisms only.

#### Pitta and Bile

Liver bile, according to *Ayurveda*, is a *mala* (waste-product) means to be excreted and its origin is *rakta*. Both Charaka and *Vagbhata* have noted that *pitta* is the *vikrit* product of *rakta*,<sup>[30]</sup> both because of its intimate coexistence with a capacity to vitiate *rakta* and, also due to the fact that these two substances possess identical

color and smell. In addition, the seats of these two factors are the *yakrit* and *pliha*.

In support to the view that the hepatic bile is the *mala* of *rakta* is derived from the references made, by all the ancient authorities of *Ayurveda*, to the symptomatology of *pitta vridhi* i.e., yellowness of the urine, faeces, eyes and skin, increased appetite, thirst, a feeling of burning sensation in the body and insomnia.<sup>[31]</sup> These symptoms, specially, the yellow colour of the urine, faeces, skin and eyes are stated by modern pathology to be due to the circulation of excess bilirubin pigments, a condition described as hyper bilirubinemia.

### The process of Pachan (Digestion)

*Pranavayu* takes *anna* to the *koshtha*. Here it is disintegrated by *drava* (fluid) and made smooth by *sneha*. *Saman vayu* intensify the *agni*. Thus the timely taken and balanced food get digested properly leading to promotion of life span.<sup>[32]</sup> The *pachana* takes place in the presence of *Agni*. Along with *Bhutagni* and *Dhatwagni* especially, *Jatharagni*. The *pacaka pitta* which is responsible for splitting-up of the ingested food materials may be compared with the enzymes like secretin, cholecystokinin, enterokinase, lipase, amylase, invertase, enterogastrone etc.

### Vipaka

In *Ayurveda* Food materials are considered to have six *rasa* (taste.) *Vipaka* is transformation of food material after ingestion by the action of *jatharagni*,<sup>[33]</sup> just after ingestion and on being digested it converted to sweet taste and leads to the formation of *kapha* which is frothy in appearance (*madhur vipaka*). In its further digestion the food becomes acidic (*amla vipaka*) and while coming out of the stomach i.e. in the intestines through pyloric sphincter, it stimulates the activity of the lipid-bile secretion. The food when reaches the large intestines takes the pungent (*katu vipaka*) taste,<sup>[34]</sup>

### Stages of Pachan (Digestion)

The *Madhura bhava* is the stage of digestion carried out by *bodhaka-kapha*,<sup>[35]</sup> i.e. salivary digestion and also *kledaka-kapha* in the fundus portion of the stomach. The second *avasthapaka* starts in the stomach and here the food partially digests. *Charaka* has described this kind of food as the '*Vidagdha-Aharara*' i.e. *Pakwapakwam* (partially digested food). After the food enters in the duodenum (the first part of the *Grahani*) and stimulates the Brunner's glands through which numbers of internal secretions are secreted. Bile and pancreatic juices are also poured in the duodenum to carry-out further digestion of the partially digested acid-chyme. So in *Awasthapaka* ingested food of any *rasa* which will be transformed into the sweet taste and leads to the *kapha* formation and gradually it takes the form of *Amla* and *Katu-bhava*, step by step it leads to the formation of *pitta* and *vata*,<sup>[36]</sup> respectively.

### CONCLUSION

*Annavahini dhamanya* described as *Annavaha srotas* moolasthan in *Sushrut Samhita* can be considered as portal vein, and cisterna chyli with thoracic duct. *Grahani* represent whole of small intestine including duodenum, jejunum and ilium.<sup>[37]</sup> The term *Annavaha Srotas* implies not only the structures immediately concerned with the foregoing three processes i.e. ingestion, digestion and transportation but it also refers to the functions of the minute channels for transport of the digested food from the intestine to the circulating fluid medium, described in *Ayurveda* as the *Rasadhatu* and as blood plasma, in modern physiology. *Pittadharakala* is mucous membrane and epithelium of small intestine where digestion and absorption of food bolus take place. According to modern physiology some movements, which will help for the proper functions of the Gastro intestinal tract, such as digestion, absorption, defecation etc. In the process of digestion, the movements of small intestine are important and these movements of small-intestine are carried out by *Samana vayu* which is equal to the movements carried out by autonomic nervous system (Dwarkanath C.1997).<sup>[38]</sup>

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