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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/20817
DOI URL: http://dx.doi.org/10.21474/IJAR01/20817

RESEARCH ARTICLE

AYURVEDIC PERSPECTIVE ON THE STRUCTURE AND FUNCTION OF THE DIGESTIVE SYSTEM

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Manuscript Info

Manuscript History
Received: 17 February 2025
Final Accepted: 20 March 2025
Published: April 2025

Key words:-
Annavaha
Srotas, Mahasrotas, Amashaya, Grahani,
Agni, Agnimandyadigestion.

Abstract

The greatest channel is the MahaSrotas or gastrointestinal tract in the human body. (Maha – substantial or significant). This can be associated with the alimentary, gastrointestinal, or digestive tract. Acharya Charaka categorizes the interior of the stomach into three compartments, but he claims that this separation is merely conceptual. The Srotas, or conduits that transport 'Anna' or food, are referred to as AnnavahaSrotas. According to Charak, AnnavahaSrotas comprises the mouth, throat, left lateral aspect (annanalika), stomach, small intestine, and rectum. Consequently, Aamashaya should also pertain to the esophagus and the majority of the small intestine, as they also transport food. AnnaVahaSrotas are the bodily channels that convey food and beverages. The concept of the gastrointestinal tract is extensively detailed in the Ayurvedic Samhitas. The Atreya Samhita provides a consistent, unambiguous, and exact anatomical description of the majority of the gastrointestinal tract, as referenced in Vaidyaka Shabda Sindhu. The gastrointestinal tract is referred to by several words, including Mahsrotas, Annavahasrotas, and Kostha. In Ayurveda, the digestive tract is seen essential for overall health and is referred to as "Agni," signifying digestive fire. This article offers a succinct examination of the Ayurvedic viewpoint of the physiology of the digestive system. Ayurveda posits that the digestive system has multiple organs and processes functioning synergistically to digest and assimilate food. The primary organ systems implicated include the oral cavity, stomach, small intestine, large intestine, liver, and pancreas. The efficient operation of these organs is crucial for sustaining maximum health and averting disorders.

Introduction:-

Srotas serve as the foundation for the transformation of nutrients within biological entities, acting as the metabolic center of specific dhatus and facilitating the flow of nutrients and waste materials.“Srusarati” denotes the actions of flowing, exuding, oozing, filtering, and permeating. Srotas is the functional channel within the organism, dedicated to a singular vital function.[1]Although conceptually srotas are many, a specific number is recognized based on their designated functions, totaling 13 according to Acharya Charak and Acharya Sushrut.[2]

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According to Sushruta-[3]

AnnavahaSrotas originate from the Aamashaya (stomach) and the AnnavahiniDhamanis (the channels that transport food). Injury, obstruction, or damage to the AnnavahaSrotas results in the following symptoms like Adhmana, Shula, Anna Vidwesha, Chardi, Pipasa, Aandhya,Maranam[4]

According to Charaka-There are two AnnavahaSrotas. They are situated in the Aamashaya – Stomach and Vama Parshva – (left lateral aspect of the abdomen). When AnnavahaSrotas becomes impaired or compromised, it causes the below mentioned symptoms like Anannaabhilasha, Arochaka.[5]alsoAtimaatrasyaakaale, Ahitabhojana, VaigunyatpaavakasyaCauses for vitiation of Annavaha Srotas.[6]

Digestion and Annavahasrotas

The quantity of Srotas is equivalent to the total of cells, tissues, and organs combined. AnnavahaSrotas is a major channel in the body that delivers nutrition to every cell. Proper nourishment and digestive vitality are crucial for the effective operation of the digestive process. Asthvidha principles are established about food and beverage. The elements are: Prakrti (nature), Karana (transmutation), Samyoga (combination), Rasi (measure), Desha (place of origin), Kala (season and age), Upayoga-Samstha (conditions of use), and Upayoktri. The stomach secretes acid and enzymes that further decompose food, transforming it into a liquid or paste-like consistency. then, food transitions from the stomach to the small intestine and is then propelled through the remaining intestines for excretion.[7]

Aim and Objective

- Review of literature Origin of AnnavahaSrotas
- To explain the structure and function of the digestive system.

Materials and Methods

References to Agni and the food digestive process have been documented in Ayurvedic samhitas and analyzed in modern physiology texts. All data were compiled, analyzed, and discussed herein.

Structure Of Annavaha Srotas

Anna Vaha Srotas are the channels in the body that convey food and beverages. The Srotas, or conduits that transport 'Anna' or food, are referred to as AnnavahaSrotas. This can be associated with the alimentary, gastrointestinal, or digestive tract. The transport of food occurs through the body's channels, known as AnnaVahaSrotas, which extend from the mouth to the intestines. (Anna = Nourishment, Vaha = Convey, Srotas = Pathways).

In modern science, the digestion and absorption of carbohydrates, proteins, lipids, electrolytes, vitamins, and minerals occur at several stages in the gastrointestinal tract, accompanied by the production of metabolic end products. This comprehensive process entails secretions from endocrine glands, enzymes, acids, and other substances. Alterations in these disrupt normal physiological processes and facilitate the emergence of diseased diseases.[8]

Function Of Digestion

The mechanisms described in Avasthapaka can be associated with food digestion as understood by contemporary science.

- Madhura Avasthapaka
- Amla Avasthapaka
- Katu Avasthapaka

Digestion in Upper GIT:

The initial phase of digestion is termed 'Madhura Avasthapaka.' This occurs in the stomach. At this stage, froth-like 'Kapha' is released. Salivary fluid and mucus produced in the stomach perform numerous protective functions but do not directly engage in the digesting process. Madhura bhava refers to the digestive phase facilitated by bodhaka-kapha, which involves salivary digestion, and kledaka-kapha in the fundus region of the stomach. Saliva initiates the entire process by facilitating the breakdown of meals into particles. One of the numerous reasons Ayurveda promotes mindful eating is that consuming food slowly and chewing completely enables saliva to function effectively. Saliva contains the enzyme amylase, which facilitates the breakdown of carbohydrates. During the initial

hour post-consumption, your body assimilates the simple sugars present in the food, resulting in an elevation of blood sugar levels; hence, this phase of digestion is referred to as the sweet stage.

Digestion in Small Intestine:

Pachak pitta, or agni, is secreted as numerous pancreatic digesting enzymes and operates together at grahni. As per Acharya Charaka, grahani is situated above the umbilical region and serves as the seat of agni. Grahani retains undigested food upon which agni exerts its influence, facilitating vigorous digestion, while samanavayu aids in the absorption of sara bhag; the residual undigested food is advanced by peristaltic movement. Acharya Sushruta has indicated that grahni is located between amashya and pakvashya, also referred to as pachyamanashya. Internally, it is lined by a specialized membrane known as Pittadharakala, which serves as the locus of agni. 'Pāchak Pitta' is directly accountable for food digestion and encompasses all amylolytic, proteolytic, lipolytic, and nucleic acid-degrading enzymes. Gastrointestinal hormones like as gastrin, secretin, and cholecystokinin should also be considered as representations of 'Pācaka Pitta.' The 'Sara' (Nutrient) part isolated at this stage is absorbed and subsequently referred to as 'Rasa Dhātu'.

Release of Bile Juice:

During the second stage of digestion, 'Accha Pitta' (bile) is secreted in the small intestine. This phase is referred to as 'Amla' 'Avasthāpāka.' Diverse secretions are produced by various organs such as the pancreas, gut, and liver. I-cells in the duodenum and jejunum emit cholecystokinin, which enhances pancreatic enzyme secretion, stimulates gallbladder contraction, and relaxes the sphincter of Oddi to facilitate bile release. Achchha pitta has a crucial role in maintaining optimal pH levels, enabling various enzyme secretions of the small intestine (agni) to work on partially digested food. Consequently, end products such as peptone, proteoses, fatty acids, and glycerol are produced, leading to the food becoming vidagdha while preserving the characteristics of amla rasa, hence referred to as amlavastha. Post-digestion, the ahararasa is assimilated via the pittadharakala (mucosal membrane of the duodenum and jejunum), while the residual apakva food is eliminated into the pakvashaya with the assistance of samanavayu. Hydrochloric acid generated by the stomach initiates the denaturation of protein molecules, eradicates harmful bacteria and virus remnants in food, and transforms the digestive enzyme pepsinogen into its active form, pepsin. The second stage is termed "sour" because to the acidic activity in the gut, which causes food to literally sour in the stomach.

Digestion in Large Intestine:

The desiccating influence of 'Agni' results in the development of solid fecal matter accompanied by the emission of 'Vāta' of 'Katu' (pungent) quality. This phase represents the third step of digestion, referred to as 'KatuAvasthāpāka.'KatuAvasthapak denotes the bitter flavor and its influence on the operation of the big intestine.In Ayurveda, the bitter taste is classified as one of the six fundamental flavors, linked to the elements of air (Vayu) and ether (Akasha). The bitter taste possesses specific qualities that affect the digestive system, particularly the large intestine. The large intestine is responsible for the final phases of digestion, the absorption of water and electrolytes, and the excretion of waste products from the body. It is essential in the generation and excretion of feces. The ingestion of bitter flavors activates taste bud receptors, which transmit signals to the brain, so affecting the operation of the large intestine. The acrid flavor is said to exert a desiccating and refrigerating influence on the body, aiding in the regulation of surplus heat and humidity within the digestive tract.[9]

Discussion:

Food is a fundamental necessity for the survival of all living organisms. It performs numerous essential activities in the body and provides energy. Its primary role is to form and sustain the different Dhatus, which protect the body's integrity. It not only nourishes and fortifies the Dhatus, but also aids in preserving their homeostasis. Madhura bhava refers to the digestive phase facilitated by bodhaka-kapha, which encompasses salivary digestion, as well as kledaka-kapha in the fundic region of the stomach. The second avasthapaka commences in the stomach, where the meal undergoes partial digestion. Charaka has characterized this type of meal as ‘Vidagdha-Aharara,’ meaning partially digested food. Upon entering the duodenum (the initial segment of the Grahani), food activates Brunner's glands, resulting in the release of various internal substances. Bile and pancreatic secretions are additionally released into the duodenum to facilitate the further digestion of partially digested acidic chyme. In Awasthapaka, ingested food of any rasa is converted into a sweet taste, resulting in kapha production, which further evolves into Amla and Katu-bhava, ultimately leading to the development of pitta and vata, respectively. Food cannot fulfill its diverse roles without good digestion. The digestion of food is influenced by Agni (fire), which facilitates the process. The

gastrointestinal tract is anatomically divided into the Amasaya (stomach), which receives ingested food, while the Aamashaya serves as the locus for digestion or the processing of inadequately digested food. The digestive process commences here, with the Grahani (small intestines) completing digestion, followed by the Pakvasaya (big intestines), where the products of the Grahani are dried and then expelled from the body.
Consequently, Aamashaya should also pertain to the esophagus and the majority of the small intestine, as they also transport food. According to Acharya Charak, AnnavahaSrotas comprises the mouth, throat, esophagus (annanalika), stomach, and small intestine. The distal section of the aamashaya processes food through pachak pitta, jatharagni, bhootagni, and samaanvayu, with digestion continuing until the conclusion of the small intestine, after which it is expelled as mala after a designated period.[10]

Conclusion:

Ayurveda posits that the entire body comprises several Srotas. This indicates that each human cell may function as a Srotas or channel. Food is the paramount necessity for humanity, essential for sustenance and vitality. The body must transform it into a form compatible with bodily tissues to sustain energy, health, immunity, and vital processes. Improper functioning of the organs associated with Annavahasrotas, such as Amashaya (stomach), Antra (intestine), and Grahani, results in indigestion, referred to as Agnimandya. Ayurvedic teachings identify the digestive system as Agni, categorizing it into thirteen distinct types, so emphasizing the uniqueness of digestion and the necessity of balanced Agni for good health.Agni is typically utilized for the digestion and metabolism of food, making it suitable for the body's use. This condition leads to the formation of 'Ama' in the human body, resulting in various systemic ailments or additional Agnimandya. In contemporary society, due to the consumption of fast food and several detrimental dietary practices, it is imperative to prioritize the health of our stomach and hunger.

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