A CRITICAL REVIEW OF PACHAKA PITTA IN MODERN PHYSIOLOGICAL PERSPECTIVE

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ABSTRACT

Science of Ayurveda is based on tridosha theory. Pitta, one among those doshas plays a major role in digestion and metabolism. Pitta dosha is of five types namely pachaka, ranjaka, alocaka, bhrajaka, and sadhaka pitta. Pachaka pitta is responsible for digestion of food, Vibhajan of Sara and Kitta and it nourishes the Agneya part of Pitta located in different parts of body. It is also termed as Jatharagni. This agni form Pitta helps in digestion of food, and afterwards separates the Sara and Kitta bhuga. Being in its location it nourishes and provide strength to rest Pitta. Pachaka Pitta is responsible for Aahar Pachan and this is well proved in our text. On the other hand, modern or the contemporary science after so many studies proves this that various digestive juices are responsible for digestion of food. As the functions of pachaka pitta suggest, all enzymes responsible for digestion like amylolytic, proteolytic and lipolytic enzymes, may be compared with pachaka pitta. Few works have been mentioned on conceptual features of pitta. In this article correlation of the physiological activity of pachaka pitta with modern medical science has been stated. For this study, the basic materials have been collected from the Ayurvedic classics with the available commentaries, as well as Text books of modern medical science better understanding of the concept and its comparison with contemporary science.

KEYWORDS: Digestive enzyme, Jatharagni, Pachaka pitta, Pitta

INTRODUCTION

In Ayurveda a healthy person is he whose humours and metabolic state are in equilibrium, whose functional activities of the tissues and excretory products (i.e. physical state) are in balance amnd the soul, senses and mind (i.e. mental state of the body) fell well. Concept of tridosha is basically a theory and any single substance or structure cannot represent a dosha. Among three doshas pitta is responsible for digestion, metabolism, production of heat and other forms of energy. That’s why is termed as agni by different acharyas. Pitta dosha has been divided into five types on the basis of location namely paachak, ranjaka, saadhadh, alochaka, bhrajaka pitta. All these five type of pitta doshas have their location and function as well. Among the five types of pitta, paachak pitta has an important function in digestion and metabolism. It also has other functions which act at different level. It performs its function with the help of samana vaya, prana vayu and kledak kapha. These entities cooperate and coordinate with each other while performing these types of physiological functions. So there is a need of proper understanding the functions of pachaka pitta according to modern prospective.

Pachaka pitta cannot be represented by a single entity at all the time as there is variation in the functions. Again Ayurveda is the science based on the concept of functional understanding. In these modern era students particularly first year of Bachelor of Ayurvedic Medicine and Surgery face a lot of problem in understanding the concept of Ayurveda. There is no specific correlation of Pachaka pitta mentioned in Ayurvedic literature in terms of supporting modern literature. Increased demand of Ayurveda science is required to understand the depth of Ayurvedic principles on criterion of modern medical science in an easy mode. In this review we are trying to identify anatomical structures based on its physiological functions retrospectively described under the function of pachaka pitta.

SITE AND FUNCTION OF PACHAKA PITTA BY DIFFERENT ACHARYA

<table>
<thead>
<tr>
<th>Sthana (Location)</th>
<th>Astanga Samhita 1</th>
<th>Astanga Hridaya 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Resides in between the amashaya and pakvashaya</td>
<td>Located in the interior of pakvashaya and aamashaya</td>
</tr>
<tr>
<td>Karma (Function)</td>
<td>Digests the food, separate the essence and wastes from it; it supports the other pittas located in different places.</td>
<td>Cooks the food, divides it into essence and waste separately, it bestows grace (help) to other pitta present there also the others by giving them strength.</td>
</tr>
<tr>
<td></td>
<td>Digestion, separation of doshas, rasa, mutra, and purisha, it helps the other sites of pitta dosha elsewhere in the body by bestowing properties of fire.</td>
<td></td>
</tr>
</tbody>
</table>

Acharya Dalhana in Nibandha Sangraha, described about Pachaka Pitta and mentioned that it resides in Nabhi between Amashaya and Pakvashaya and responsible for separation of Dosh, Rasa, Mutra, and Purisha. Acharya Sharangadhar mentioned Agnishaya as the site of Pachaka Pitta where it is present in form of Agni Rasa Rupa and also it has Lakshana like Agni. It is secreted in tila pramana quantity and termed it as Tilonnmita which means it can be secreted or it can penetrate very minute channels. A.S. and A.H. describes about pachaka pitta. It is Panchabhutamaka but tejo dominant, devoid of liquidity performs the function of digestion and metabolism with the help of vayu and kleda. Acharaya sushruth narrated pachaka pitta as pachakagni. Pachakagni residing in its own place nourishes various Agni or provides Ushna to various Dhatvagni. For nourishment of this Agni also Pachakagni is responsible. It can be stated that if Pachaka Pitta is strong then it provides strength to rest Pitta and Agni and when it is weak it leads to weak Agni and functions of rest Pitta. Therefore, Pachaka Pitta is basis for all and hence given outmost importance among various types of Pitta.
MODERN ASPECTS

AHARA PACHANA AND AHARA RASA FORMATION

Agni is responsible for aahara pachana. There are 13 types of agni described in ancient literature. These are jatharagni, bhutaagni and dhatavagni. After the intake of panchabhojitakha ahara agni act upon it and leads to formation and nourishment of dhaatus. The ingested food is carried to koshtha by prana vata. The food disintegrates because of the liquids, and further it becomes soft because of the mucous substances. This action is performed by kledaka kapha. The samana vata, intensifies the pachakagni (digestive enzymes) and properly digests the food11. Here the agni is meant for jatharagni or pachakagni or pachaka pitta. Seat of Pachaka Pitta is the site between Pakwashaya and Amashaya. In this region various srotas secrete various pachaka srava. Grahani Pradesh where Anna Pachana occurs also called as Pittadhara Kala is stated as the main Sthana of Pachaka Pitta.

Digestion is a process which is responsible to breakdown complex part of food particles into simpler form. The process of digestion begins from the mouth itself but as food stays for shorter duration so complete digestion do not occur. Similarly in stomach complete digestion do not occur. Digestion continues up to small intestine. Maximum absorption of digested food products takes place in small intestine. In Ayurveda Grahani may be compared with duodenum where most of the digestion occurs. Various digestive enzyme and hormones help in the digestion of protein, carbohydrate and fat.

Various digestive enzymes and their action11

<table>
<thead>
<tr>
<th>Digestive enzyme</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trypsin, Chymotrypsin</td>
<td>Breaks down protein into peptides</td>
</tr>
<tr>
<td>Carboxypeptidase</td>
<td>Splits some peptides into individual amino acids</td>
</tr>
<tr>
<td>Pancreatic amylase</td>
<td>Hydrolyzes starches, glycoegen, and other carbohydrates to disaccharides and a few trisaccharides</td>
</tr>
<tr>
<td>Pancreatic lipase</td>
<td>Hydrolyses neutral fat into fatty acids and monoglycerides</td>
</tr>
<tr>
<td>Cholesterol esterase</td>
<td>Hydrolysis of cholesterol esters</td>
</tr>
<tr>
<td>Phospholipase</td>
<td>Splits fatty acids from phospholipids</td>
</tr>
<tr>
<td>Salivary amylase</td>
<td>Convert starch into maltose</td>
</tr>
<tr>
<td>Maltase</td>
<td>Convert maltose into glucose</td>
</tr>
<tr>
<td>Lingual lipase</td>
<td>Converts triglyceride of milk fat into fatty acids and diacylglycerol</td>
</tr>
<tr>
<td>Pepsin</td>
<td>Convert protein to proteoses, peptide and polypeptide</td>
</tr>
<tr>
<td>Gastric lipase</td>
<td>Converts triglyceride of butter to fatty acids and glycerol</td>
</tr>
<tr>
<td>Gastric amylase</td>
<td>Convert starch to dextrin and maltose</td>
</tr>
<tr>
<td>Gelatinase</td>
<td>Convert gelatin and collagen of meat to peptide</td>
</tr>
<tr>
<td>Urase</td>
<td>Convert Urea to ammonia</td>
</tr>
</tbody>
</table>

VIBHAJANA OF SARA AND KITTA

It means separation of essence and waste products of digested food which is performed after the digestion of food. Samana vayu initiate the pachaka pitta (digestive enzyme) for hydrolysis. After that nutrient and waste products are divided. Nutrient products are absorbed by the help of samana vayu and waste products are eliminated by apana vayu12.

NOURISHES VARIOUS PITTA STHANA

Pachaka pitta which is termed as jatharagni located, at its own place (between the Amashaya and Pakwashaya) and by virtue of its inherent power, it augments the actions of the other sites of pitta present elsewhere in the performance of metabolic functions of the body. Pachaka pitta may be compared with digestive enzymes that help in digestion of food material.

- Ranjaka pitta which resides in yakrit and pihla help in coloration of rasa dhatu means the formation of rakta dhatu. Factors regulating erythropoiesis and maturation of RBCs are vitamin B12, folic acid, pyridoxine, Vitamin C (helps iron absorption), minerals like iron, copper which mainly comes from diet13. If the digestion of food is not occurred properly vitamin B12, iron, folic acid and others cannot absorb properly.

- Sadhaka pitta which resides in hridaya helps in fulfilling the desires of mind. If there is improper digestion, ajirna will occur. During ajirna bhrama, murchha like symptoms are appeared so that function of sadhak pitta is hampered.

- Alochaka pitta which resides in dristhi (eye) helps in perception of vision. Vitamin A is present in both cytoplasm of the rods and in the pigment layer of retina. Vitamin A is responsible for formation of Rhodospin. A chemical route by which all-trans retinal can be converted in to 11 cis-retinal. First all trans retinal is converted in all trans-retinol. All trans-retinol is one form of vitamin A. Then all trans-retinol is converted into 11-cis retinol under the presence of isomerase enzyme. Finally the 11 cis-retinol is converted into 11-cis retinal. 11-cis retinal is combined with scotopsin to form rhodopsin. β carotene is present in plants (particularly carrots). In the intestine β carotene splits into two molecule of retinol (vitamin A). Retinal is the aldehyde derived from alcohol. In the rods of retina a pigment rhodopsin is present which are required for seeing in dark/dim light. If β carotene containing food products are not properly digested retinol cannot formed so that there is difficulty in formation of rhodopsin and perception of vision in dim light disappears14.

- Bhrajaka pitta which resides in twak helps in digestion and absorption of substance that is being used in mardan, sechana, avagahana and expression of shades in the skin. Mainly pachaka pitta is responsible for all chemical reaction. It helps bhrajaka pitta for this type of function. Dhatavagni depend upon pachakagni. Aggravation and diminution of pachakagni results in the aggravation and diminution of other agni. Pachaka pitta helps in the formation of nutrient products which is used for the nourishment of every cell. After the proper growth of the cell bhrajak pitta perform its function. The substance which is lipid in nature enters the cell membrane of the cell.

ABSORPTION OF AAHAR RASA

After the intake of aahara, it moves towards the koshtha by the help of prana vayu. The site of pachakagni is grahami or pakwashaya better known as pittadhara kala. Samana vayu which is present in amashaya stimulate the pachakagni for the digestion and separation of food as well as shoshyati i.e., absorption of water and nutrients15. This absorption of nutrients and water requires movement which is the main function of vata. So here both samana vata and pachakagni is responsible for absorption.

Absorption from small intestine each day consists of several hundred grams of carbohydrate, 100 or more gram of fats, 50-100
Two types of paka occur in process of digestion namely avastha paka and nistha paka. Avastha paka is of three types i.e., madhura avastha paka, amla avastha paka, katu avastha paka. In the process of katu avastha paka (soshyamana vanhina) jatharagni helps in absorption of water. Most of the water present in the chyme is absorbed in the colon. This process may be similar to kedakikulya nyayat. It does not require energy. This theory explains the importance of pressure-gradient which determines the flow of fluid into the tissue spaces. This theory can explain the passive diffusion where different field receive water through different channel without expenditure of energy.

DISCUSSION

Basically Vata, Pitta, Kapha constitute three regulatory systems i.e. nervous, endocrine and immune system respectively of all living system. Among five types of pitta, pachaka pitta is termed as jatharagni by all the Acharyas. Pachaka pitta is located in grahami and responsible for pachan, sara kitta vibhajana, anugrahana of other pitta. Mainly pachaka pitta is responsible for digestion. Mostly three factors are responsible for digestion. Kledaka kapha, pachaka pitta and samana vayu. Samana vayu stimulates pachaka pitta for digestion of food as well as separation of nutrient and waste product. Kledaka kapha helps in disintegration as well as softness of food. After the digestion of food Pachakagni and samana vayu by munchana action helps in propelling chyme in their respective way i.e., waste materials towards large intestine and saara bhaag is propelled towards intestinal villi. By the soshyati action of agni, saara bhaag is absorbed through intestinal villi and reached to superior mesenteric vein with the help of samana vayu it reaches to heart through portal vein and inferior vena cave via liver. From the above details the functions of Pachaka pitta, described by acharyas can be compared with the physiological functions of Trypsin, Chymotrypsin, Carboxypolypeptidase, Pancreatic amylase, Pancreatic lipase, Cholesterol esterase, Phospholipase, Maltase, Pepsin, Gelatinase, Urase. Pitta dosha stands for all type of chemical reaction in our body in which there is production of heat and other forms of energy. Pachaka pitta has a great role in digestion which helps to catalyze the other chemical reaction or function of other pitta.

CONCLUSION

There are five type of pitta namely pachaka, ranjaka, sadhaka, alocchaka, bhrajaka. The main site of pachaka pitta is between pakwashaya and amashaya. The main function of pachaka pitta is digestion of food, separation of nutrient and waste material, and it nourishes the other pitta located in different parts of the body. It is panchabhoutika in nature but due to dominance of agneya bhaga it performs function like pachana and dahana. Therefore it is termed as agni. As Ayurveda is based on functional understanding pachaka pitta may be correlated with digestive enzymes. There is a need of further research to evaluate in detail of all other pitta dosha for the betterment of mankind.

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