CONCEPTUAL STUDY OF PURISHDHARA KALA IN RELATION TO ASTHIDHARA KALA W.R.T. Ca+- Na+ ION CHANNELS

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ABSTRACT

Kala is defined as limiting or separating membrane between dhatu and ashaya. It does dharan of respective dhatu and helps in their smooth functioning. Acharya Sushrut has described Saptakala amongst which Purishdhara Kala is one located in Pakwashaya, commencing from Yakrut and intestine it separates mala from the saar bhag after digestion at Unduk. As per modern science, the smooth muscle layer of intestine contains Calcium Sodium ion channels in large number. This functions as the initiators of smooth muscle contractions of intestine. The extracellular fluid is the provider of Calcium ions. Purishdhara Kala can be considered as its internal layer. Acharya Dalhan has called Purishdhara Kala as Asthidhara Kala reasoning that as there is saptaKala involved in vishavegantar and asthi related symptoms are found when visha is in Purishdhara Kala. By this we can co-relate Purishdhara Kala with Asthidhara Kala and role of Calcium ion channels in pakwashaya.

Keywords: Purishdhara Kala, Asthidhara Kala, Calcium Sodium ion channels, Pakwashaya

INTRODUCTION

Acharya Sushrut has described 'Kala' in "Garbhavkranti ShareerAdhyay" giving an evidence of study of microscopic level. It is defined as Dhatvashayantar maryada i.e. it is a limiting membrane between dhatu and ashaya. Just like skin envelops the whole body from external environment. In the same way the internal structures of the body are covered with Kala, so that they can be protected and carry out their respective function. Anatomically it separates different dhatu and ashayas, whereas physiologically it does the dharan of its respective dhatu. When either of the two functions is disturbed, pathology occurs and so for the treatment purpose study of Kala is important. Acharya Sushrut has explained saptakala⁴, the fifth Kala amongst these is “Purishdhara Kala”, which is present inside pakwashaya (large intestine) separates the mala (waste product) from the saar bhag after its digestion. Purishdhara Kala is situated inside the alimentary tract, commencing from Yakrut (liver) and the intestine, this Kala separates the mala at the unduk (Caecum) hence it is also called as “Maladhara Kala”. The function of Large Intestine is mainly formation, holding, and proper excretion of stool. Purishdhara Kala does dharan of purish for proper
time. In intestine the smooth muscle layer consists of Ca$^+$ - Na$^+$ ion channels which helps in gastrointestinal movements. Dharan of purish in intestine is depended on its motor function. This context consist study of Purishdhara Kala, explanation of verse 'Purishdhara Kala sa eva Asthidhara Kala' and its correlation with concept of Ca$^+$ - Na$^+$ ion channels in intestine.

**Aim and Objective**
1. To explore Purishdhara Kala.
2. Explanation of 'Purishdhara Kala sa eva Asthidhara Kala' with concept of Ca$^+$ - Na$^+$ ion channels in intestine.
3. Absorptive function of Colon and bilirubin metabolism

**Material and Methods**
1. Classical text of Ayurveda i.e. Laghutrayee and Bruhatrayee along with the tika's were taken as reference.
2. Journals, Books, Research articles, Web search was used for more precised information.

**Observation**
Kala is the lining membrane between dhatu and ashaya or a limiting membrane between two entities of body [2]. They provide support and protection to the organs. According to Acharya Sharangdhara [3] the kleda or moisture or liquid portion present in between dhatu and ashaya is processed by the heat of the body and converts it into Kala. The fifth amongst the saptakala is Purishdhara Kala [4] which is located in Pakwashaya (Large Intestine) inside the antah koshta (Abdomen). This Kala is particularly located in the intestine at the level of Yakrit (Liver) and within the Koshta differentiates mala situated at the site of Unduk (Caeum). This means Purishdhara Kala is situated all through the large intestine but mainly in the unduk or caecum. It receives digested food from small intestine and Purishdhara Kala then separates the saar and kitta bhag and forms stool and feces in Large Intestine. This Kala is also called as 'Maladhara Kala'.

**Purishdhara Kala Sa Eva Asthidhara Kala**
Acharya Sushrut has not considered Asthidhara Kala under saptakala but Acharya Dalhan[5] has considered Purishdhara Kala same like Asthidhara Kala. The reason why Purishdhara Kala is called as Asthidhara Kala is made clear by following explanation:
- Asthidhatu is fifth amongst Saptadhatu's. According to Ach. Sushrut [6], visha vega are are seven because they take the ashray of SaptaKala for Vishavegantar and exhibits symptoms accordingly.
- In the fifth vishavega, when the visha is in fifth Kala i.e. Purishdhara Kala there is Parwabhedha i.e. it exhibits symptoms related asthi dhatu when in fifth vegawastha.

Acharya Kashyap has explained about Fakka (Rickets) in childrens, in this child is unable to stand even after completing a year. In Rickets, there is decreased absorption of calcium and phosphorus from the intestine, leading to the bending and softening of bone. Large intestine contains large number of Ca$^+$ - Na$^+$ ion channels, which takes up Calcium from the extra cellular fluid.

In Ayurveda, basti is given via rectal route, so in this way basti nourishes the asthivaha srotas and thereby treats vataj vikars and asthi dhatu kshay. From the above discussion, the term Asthidhara Kala appropriately suits to Purishdhara Kala.

**Ca- Na ion channels of Large Intestine**
According to modern science, the nature of mahasrota's i.e. GIT is made up of four layers- Mucosa, Submucosa, muscular, serous or fibrous layer. This can be co-related with the Purishdhara Kala and can be attributed as Gastrointestinal Tract. [7][8] Smooth muscles of GIT are situated in muscular layer and few in deeper layer of mucosa. The contractile process in smooth muscle is activated by Ca$^+$ ions. The smooth muscle cell membrane has more Ca$^+$ channels than skeletal muscle but few sodium channels. Therefore, sodium participates little in the generation of action potential in most smooth muscle. Flow of calcium ion to the anterior of fibre is main cause of action potential. Almost all the Ca$^+$ ions that causes contraction enter the smooth muscle cell from the extracellular fluid at the time of action potential.
Absorptive function of Colon and Bilirubin Metabolism

- Colon has one of the functions of water absorption and immunity. The chyme entering colon is already concentrated as most of the water has already been absorbed, the colon must work against a large osmotic pressure gradient than rest of Gastrointestinal Tract\(^9\).
- Colon helps to absorb small volume of water from lumen. It transports ions; nutrients released by Gut bacteria and dissolved in water are also absorbed in Large Intestine and used for body metabolism.
- Bilirubin Metabolism\(^9\) - Conjugated bilirubin is metabolized by colonic bacteria to form stercobilinogen, which may be further oxidized to stercobilin. Both stercobilinogen and stercobilin are then excreted in the stool. A small amount of stercobilinogen (4mg/day) is absorbed from bowel, passes through liver and is excreted in the urine, where it is known as urobilinogenor following further oxidation, urobilin.

Co-relation of Purishdhara Kala with Ca- Na ion channels of intestine

Purishdhara Kala is situated in pakwashay, which starts from Unduk i.e. Caeum. In gastrointestinal smooth muscle fibres, the channels responsible for action potential allow large number of calcium ion to enter along with small number of sodium ion, hence called as Ca\(^+\) - Na\(^+\) channels.

The movement of large amount of Ca\(^+\) ions to the interior of the muscle fibre during the action potential plays a special role in causing the intestinal muscle fibre to contract. Calcium is parthiv dravya. It can be considered as one of the components of asthi dhatu. As told earlier, Ca\(^+\) - Na\(^+\) ion channels are necessary for the functioning of intestine, these channels do Dharan of asthi dhatu for appropriate time, so this can be said as Asthidhara Kala of Pakwashay.

CONCLUSION

Due to the symptom of Parwabhed in fifth vishavega i.e. when the visha is in Purishdhara Kala it depicts symptoms of Asthivaha srotas, hence Purishdhara Kala is called as Asthidhara Kala. Ca - Na ion channels of intestine are necessary for the functioning of intestine, these channels does dharan of asthi dhatu for appropriate time. Function of Purishdhara Kala is compared with absorptive function of colon and Bilirubin Metabolism. Asthidhara Kala is co-related with Ca - Na channels containing layer of Colon.

REFERENCES


Source of Support: Nil
Conflict of Interest: None Declared