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Review Article

Psychology for Curing Mental Health

Critical Analysis of role of Ranjak Pitta and Raktagni in Perspective of Modern Physiology

Dr. Pradnya Deepak Dandekar

Professor & Head, Department of Kriyasharir, Mahatma Gandhi Ayurved College, Hospital and Research Centre, Salod (H), Wardha, Maharastra, India.

Abstract: Pitta dosh is one of the fundamental entities mentioned in Ayurveda. Ranjak pitta is one of the types. Ranjak name of pitta itself suggests its role. Rasasya ranjant is it's function mentioned in compendia. It means coloring of rasa dhatu and converting it into raktadhatu which is of red color. All Acharyas Charak, Sushrut, Vagbhat, Sharangdhar all have mentioned the same function of this pitta. In spite of this, there is some discrimination related to the site of this pitta. Charak and Sushrut have mentioned the site of this in Yakrit, Pleeha and Vagbhat has mentioned it in Amashay. Sushrut has mentioned this Ranjak Pitta as Ranjakagni. In the context of Agni, total 13 types of Agni are mentioned which includes Raktagni. Raktagni is responsible for formation of Rakta and the role of Ranjakagni is colouring of ahara rasa. To know if these are same or different, the present review is made andwith the overview of modern physiology it can be concluded that agni and pitta have Ashray and Ashrayi relation. The discrimination relates to different sites of Ranjak Pitta and can be justified according to modern physiology. Ranjak Pitta mentioned by Vagbhat can correlate with the factor secreted by gastric glands which is called intrinsic factor of castle and Ranjak Pitta mentioned by Charak and Sushrut is extrinsic factor which is stored in Yakrit and participated in process of erythropoiesis. These intrinsic and extrinsic factors are equally important for RBCs formation which carries out the function of Rasasya Ranjanam. Raktagni is responsible for formation of Rakta Dhatu from Ahararasa and Ranjak Pitta or Ranjakagni is partially part of Raktagni.

Keywords: Ranjak Pitta, Rasasya Ranjan**,** Ranjakagni, Raktagni, Intrinsic factor, Extrinsic factor.

***Corresponding Author**

Dr. Pradnya Deepak Dandekar , Professor & Head, Department of Kriyasharir, Mahatma Gandhi Ayurved College, Hospital and Research Centre, Salod (H), Wardha, Maharastra, India.

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1. INTRODUCTION

Pitta is the concept mentioned in Ayurveda as an entity in the body which is responsible for conversion of one form into another. The term Pitta is derived from the root "Tap Dahe", "Tap Santape", "Tap Aishwarya". "Tap" means to heat, Dahe which leads to dahan i. e. burning, Santape to heat and Ashvarye refers to the factor which facilitates for best achievement. [1] The significance of action of pitta is reflected as the functions of Agni. Sushrut has mentioned as pitta and agni to be the same. He has mentioned all pittas in terms as Agni. Ranjak pitta as Ranjakagni, Bhrajak pitta as Bhrajakagni[2]. It creates controversy in interpretation of concept of pitta and agni. Then in the view of Pitta's actions as dahan (burning, oxidation, combustion), pachan (digestion), transformation which are mentioned in the context of functions of pitta; these functions are not possible without Agni. So Sushruta himself gave the statement as pitta is antaragni. Pitta performs the functions of Pitta as Pachan, maintenance of body temperature, Darshan, Kshudha, Trishna, taste, complexion, understanding capacity, intelligence, courage, Softness of body which are not possible without the presence of Agni. [3]Our aim of study is to **c**ritically analyse Ranjak pitta and of Raktagni in the context of Ayurved and Modern Physiology. Our objective is to Study the role of Ranjak Pitta and Raktagni in perspective of Ayurved Physiology, to interpret its role in perspective of Modern Physiology and to correlate the role of Ranjak pitta and Rakta Dhatwagni.

2. MATERIALS AND METHODS

All the literature from Classical texts of Ayurveda viz. Charaka Samhita, Sushruta Samhita, Ashtanga Sangraha and Ashtanga Hridaya were reviewed. Modern Physiology books were referred for review of modern perspective. The information of research databases from various search engines, journals, Ayurvedic samhita, books were referred for recent information. Critical analysis of available literature was also done.

2.1 OBSERVATIONS

From the point of view of Ayurveda, Pitta has been described as Agni (fire) since it performs fire-like actions i.e. Paka, which refers to Pachana (Digestion); Dahana (Burning) including Bhinna Samghata (splitting), Tapana (Heat production) Parinamana (Conversion), Paravritti (Transformation) Prakashana (Illumination), Ranjana or Varnakara (Colouration) and Prabhakara (to cause luster) [4, 5]. In a general sense, the term Kaya or body itself has been equated to Agni. Total thirteen types of agni are mentioned. Kayagni, Dhatwagni and Panchamahabhutagni. Agni and Pitta both have similar functions but are not the same[25]. They have relations as Ashray and Ashrayi. Agni is the active component residing in Pitta. When pittaperform the function of pachan or tapan or dahan; it is performed by the active entity – agni which resides in it. [26-27.] Ranjak Pitta is designated by Sushruta as Ranjakagni[2]. According to Sushruta and Charak the site of Ranjak pitta is Yakrit and Pleeha[6,7]. Both Vagbhat has mentioned the site of Ranjak pitta is Amashaya.[8,9] According to Sharangadhar, liver is also the site of Ranjak Pitta[10]. In function he has stated the function of Ranjak Agni is to give color to the Rasa dhatu. It means Rasa dhatu gets converted into Raktadhatu by action of Rajakagni i.e. Ranjak Pitta present in Yakrit and pleeha. This Rakta dhatu formation means coloring of rasa dhatu. The root site of Raktavahasrotas is also Yakrit and pleeha[6]. The formation of Rakta dhatu is the work of Raktagni. Coloring of rasa dhatu is the function performed by Ranjak pitta or Ranjakagni. Ranjakagni and Raktagni are not the same. Vagbhat has identified Ranjak Pitta's location as in amashaya and described the same functions of it as that mentioned by Sushrut[8]. Charak has mentioned that rasa dhatu gets color by the action of Agni and that colored form is called Raktadhatu[11]. The concept of Rajakagni and Raktagni both is different. The process of formation of all dhatus revealed that each respective dhatwagni is responsible for formation of that dhatu. The process showed that after ingestion of food it is digested by Jatharagni which resides at Amapakwashaya madhyastha. The absorbable part gets absorbed in the form of aharaprasadaj rasa. The remaining material is assimilated in the form of the kitta part. The absorbed aharprasadaj part first enters into first srotas i.e. rasavaha srotas where rasagni will act on it. The prasadansha which will be digested by rasa dhatuagni will be converted into poshya rasa dhatu[12]. At the same time nourishment of Upadhatu and Mala will take place from part of it. The remaining part of the prasadansha will be next dhatu poshakansh which will consist of all ingredients required for the other dhatus viz. rakta, mamsa, meda, asthi, majja and shukra. The circulation of ahar prasadansh is explained by Kedarkulya nyaya. The selection of ingredients for nourishment of dhatu by respective dhatuagni is explained by Khalekapot nyaya and after selecting required ingredients get converted into the main poshyadhatu is explained by ksheerdadhi nyaya which is also called as Sarvatma parinaman nyaya. The site of formation of each dhatu is its respective srotas. Charak and Srushrut have mentioned the root sites of Raktavaha srotas areYakrit and Pleeha. Same is the site of Ranjak Pitta or Ranjakagni also[7]. Sushrut appears to have been the first authority in the world to have associated with some principle present in the liver and also relates spleen to the formation of blood[13]. He has recommended the administration of raw liver of goats, in the treatment of loss of blood in rakta pitta (idiopathic hemorrhagic)[14]. Acharya Vagbhat has observed that in spite of good functions of Yakrit and pleeha the person has the problem of rakta dhatu kshaya. In such cases he observed the pathology related to the stomach. Here he identified and documented the hematopoietic function of the stomach. There are also references in Charak Samhita to use of intestines etc. of goats in cases of loss of blood and faces in hemorrhoids [15]. All these facts revealed that the stomach and liver contribute an identical factor as ranjak pitta which is essential for the formation of that factor which gives color to blood and it becomes visualized red.

3. DISCUSSION

The term "Blood" comprises the Rasa dhau and Rakta dhatu. Blood Plasma relates to Rasa dhatu and blood cells relates to Raka dhatu. The rasa dhatu gets color and rakta dhatu forms; this conversion is not only related to coloring of dhatu. Rakta dhatu has the composition of three cells viz. Red Blood Cells, White Blood Cells and platelets. The color of the blood is basically because of the presence of red blood cells. When we review the modern physiology this concept is confirmed. According to modern sciencethe factor secreted in the stomach has correlation with the factor present in Yakrit and responsible for coloration of rasa dhatu that means RBCs formation. The site of Ranjak pitta mentioned by acharya Vagbhat is Amashaya. It means this ranjak pitta

can correlate with the factor secreted by gastric glands which is called intrinsic factor of castle. Intrinsic factor of a castle is produced in gastric mucosa by the parietal cells of the gastric glands. It is essential for the absorption of vitamin B_{12} from the intestine. This vitamin $B_{12}$is called extrinsic factor. In the absence of intrinsic factors, vitamin B_{12} is not absorbed from the intestine. That leads to pernicious anemia [16]. It's very interesting to note that both Acharyas Sushrut and Vagbhat have stated that formation of Rakta is Yakrit or liver and pleeha or spleen [17]. Sthan is the word in reference to either formation of rakta or reservoir of it or both. Sthan word also implies storage depot or the place of production or both. The sthan of rakta dhatu is Yakrit and pleeha is fully appreciated by this and also supported by modern physiology. According to modern physiology the process of formation of blood cells i. e. hemopoiesis occurs in Liver, Spleen and Bone marrow. In fetal life, the erythropoiesis occurs in three stages as Mesoblastic Stage, Hepatic Stage and Myeloid Stage. Mesoblastic stage is for the first two months of intrauterine life; in this stage, the RBCs are produced from mesenchyme of yolk sac. Hepatic stage is from the third month of intrauterine life. It lasts up to the 6th month. In this stage the liver is the main organ that produces RBCs. Spleen and lymphoid organs are also involved in erythropoiesis. Third period of the intrauterine period is the third trimester. During this period, the RBCs are produced from red bone marrow and liver. After birth up to the age of 5 to 6 years this process occurs in liver and red bone marrow of long bones. After 6 years, it shifted to red bone marrow of long bones. As age progresses the bone marrow of shafts of long bones get converted into yellow bone marrow by deposition of fatty tissues. After the age of 20 years the RBCs are produced from membranous bones like vertebra, sternum, ribs, scapula, iliac bones and skull bones and from the ends of long bones. After 20 years of age, the shaft of the long bones becomes yellow bone marrow because of fat deposition and loses the erythropoietic function. In adults if bone marrow gets destroyed the function of erythropoiesis takes place in liver and spleen [18]. This overview supports the fact that the liver and spleen are the root sites of raktavahasrotas. The process of haemopoiesis also emphasized that after the age of 20 years, it is shifted to bone marrow inparticulat to the end points of long bones and bone marrow of flat bones [19]. In Ayurveda there is no direct reference to the Site of Raktadhatu of Majja i. e. bone marrow. However in Sushrut Samhita Saraktamedait is mentioned in small bones. Sushruta has mentioned that majja is present inside the sthulasandhis. The substance present in sukshmas and his is spoken as Sarakta meda[20]. By implication, the majja which is present in stools which isaraktamedas and of anuasthi is saraktamedas. This saraktameda can be correlated with Red bone marrow. Charak has also mentioned that the filling of bones by meda is calledmajja[21]. According to Sushrut, this majja is responsible for strength of the body, fills the internal cavities of bone and provides strength to the body. It contributes to the formation of Shukra which is saptamdhatu. No work related to hemopoiesis is mentioned by any Acharyas. This majja composition is mentioned as Shuddha sneha. Kaviraj Gananath Sen opined that majja is of two kinds, viz. pitta and rakta. Pitta is found in nalahasthi, while rakta is found in other bones[22]. Process of dhatu formation showed that at root sites of srotas, respective dhatwagni will act on it and with the help of all ingredients available in ahar prasadansh the respective dhatu will form and at the same time dhatu mala will also form. This process can be interpreted with the help of modern physiology. Erythropoiesis is the process of generation and maturation of Red Blood Cells. During this process of generation of RBCs, haemoglobin starts to appear in the cells in the intermediate normoblast stage. This haemoglobin is responsible for the red color of the blood. This process is supported by Ranjakagni or Ranjak pitta. This erythropoiesis is one part of haemopoiesis. Haemopoiesis also includes leucopoiesis and thrombopoiesis. It includes the process of generation of all cells. This is the function of Rakta dhatwagni. The factors essential for hematopoiesis as erythropoietin and thyroxine hormones are essential to prepare cells by using haemopoietic growth factors and vitamins B, C, D & E [23]. These erythropoietin and thyroxine hormones can be correlated as Raktagnio. It helps to carry out the process & helps for generation of blood cells which is qualitatively & quantitatively Raktadhatu. In reference to Ranjak pitta, Sushrut has mentioned the site as Yakrit and pleeha. On the other hand Vagbhata have been mentioned as Amashaya. The role of Ranjak Pitta is only coloration of Rasa dhatu. It means it is limited to RBCs which have the role of hemoglobin. On the other hand, the factors responsible for the formation of RBCs like Vitamin B12 and Folic acid which are required for the maturation of RBCs are mostly stored in the liver. Vitamin B12 is called an extrinsic factor since it is obtained mostly from diet. The Vitamin B12 & folic acid are required for maturation of RBCs [24]. This process supported that the root site of raktavaha srotas is Yakrit and pleeha which are mentioned by Sushrut. Total raktadhatu formation is the work of Raktagni which includes the process of haemopoiesis that means formation of RBCs, WBCs and platelets also. Coloring of rasa dhatu means it relates to formation of RBCs only that is the process of erythropoiesis. This role is performed by Ranjakpitta or Ranjakagni. [28-31] The Rakta dhatu must comprise of all the three cells as it has the main function of Jeevan. This is provided by all the three cells. RBCs deal with the function of carrying oxygen with the help of hemoglobin. WBCs relate with the function of immunity. Platelets have the role in haemostasis. In this way all the cells have the main role to protect & provide life.

4. CONCLUSION

It can be concluded that the rajak pitta is labeled as rajakagni by Sushrut. The role of this Ranjakagni is one part of Raktagni. Both relate to the function of formation of Rakta dhatu. Sushrut has mentioned sthan of Ranjakagni or ranjaka pitta and Raktagni in Yakrit and Pleeha. Vagbhat has mentioned the site of ranjaka pitta is Amashay. Both acharyas' opinions are correct and justified by modern physiology. Sthan word implies storage depot or the place of production or both. Function of ranjakagni i.e. ranjak pitta is related to RBCs formation and Raktagni is related to all cell formation.

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6. CONFLICTS OF INTEREST

Conflict of interest declared none.

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