A REVIEW ARTICLE ON RASA DHATU IN AYURVEDA AND ITS COMPARISON WITH BLOOD PLASMA

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ABSTRACT
The humoral theory of health and causes of diseases was rejected due to discovery of circulation of blood by William Harvey. Even Ayurveda has had to face an unprecedented crisis to overcome the resistance faced by growing technological usage in the growth of modern medicine. This article tries to adjust the relation between Ayurveda and modern medicine. Rasa dhatu is an important dhatu that has a varied role in nourishment of the human body as well as all the other tissues of the body. Rasa dhatu functions and its various properties are in a way similar to modern day blood plasma. Literary Research for the review was taken from ancient Ayurveda Texts, modern medical books and the internet. On the basis of the above research it was concluded that ‘Rasa dhatu as the foremost dhatu is an important part of the human body. Rasa dhatu has many similarities with Plasma part of the blood’.

Keywords: Humoral, Health, Disease, Technology, Rasa Dhatu, Plasma

INTRODUCTION: In modern Europe in the medieval ages humoral theory of diseases was quite prevalent. This theory was discarded due to the concepts of circulation of blood and the function of the heart published by William Harvey [1578-1657][1]. The above publication lead to widespread research in blood, further leading to its division into plasma and the blood[2] and furthered the relevance of disease spread through blood. In Ayurveda the role of blood in causing diseases was discussed by Acharya Sushrutha[3] but it was stated that as blood is the life sustaining entity of every human being, it will not cause diseases by its own but by other factors [namely- the tridoshas] that will vitiate it.

Rasa dhatu according to Ayurveda is a very important component of the human body and is basically one of the Sapta Dhatus [tissues] that are supporting the human body structurally as well as functionally. Also, Rasa Dhatu is quite similar to the modern day blood plasma.

MATERIAL AND METHODS
The literary references and discussions related to Rasa Dhatu from ancient and modern Ayurveda texts were compiled for the above review article.

Literary Review of Rasa Dhatu-
Rasa dhatu is formed after digestion of food and is also known as Aahara Rasa[Vachaspati][4]. According to Acharya Sushrutha ‘Rasa’ word is derived from ‘Rasa Gatou’ and it means that it is the entity in the human body that is continuously circulating[3]. According to Acharya Sushrutha Rasa dhatu is formed after complete digestion of consumed food. The food that is consumed is Panchabhautik [formed from all five elements], is of four types [Peya, Lehya, Bhakshya, Bhojya] , has six Rasas [Madhura, Amla, Lavana, Katu, Tikta, Kashaya], two potencies [Dwividha-
Veerya-Sheeta & Ushna] or eight potencies [Asthavidha Veerya- Sheeta, Ushna, Snigdha, Ruksha, Picchila, Vishada, Mridu, Kathina] and many other properties. This consumed food is acted upon by the Jatharagni and complete digestion is completed. After digestion the most important part that is beneficial to the body and provides nourishment to the whole body is known as Rasa\[^3\].

The characteristic features of Rasa Dhatu according to Madhava Nidana are that it is Tejo Bhuta [Lustrous], Param Sukshma [it is highly diffusible] and hence is known as Rakta-Rasa [the juice of blood]\[^5\].

The location of Rasa Dhatu according to Acharya Sushruta is the heart and it circulates in the whole body through the 24 dhamanis [24 arteries], 10 urdhwaga dhamani [10 arteries going in the above direction], 10 Adhoga Dhamani [10 arteries going in the downward direction] and 4 tiryak Dhamani [4 going in other directions]\[^3\].

Bhel Samhita also states that the location of Rasa Dhatu is Hridaya [the heart]\[^6\].

According to Charaka Samhita, Rasavaha Srotas [Rasa Dhatu producing channels] has its roots in Hridaya [The heart] and Dasha Dhamani [10 arteries]\[^7\]. Acharya Sushruta has also mentioned the same, except he mentioned Rasavahi Dhamani [arteries transporting Rasa Dhatu]\[^3\].

The causes of vitiation of Rasavaha Srotas have been mentioned by Acharya Charaka and they are- eating Guru gunatmak food [food having heavy property], Sheeta food [cold food], Atisnigdha food [very unctuous food], Atimatra food [excessive eating] and excess thinking [chinta] and mental stress [Atichintan]\[^7\].

According to Acharya Sushrutha Rasa Dhatu is a Drava [liquid] dhatu and it helps in the Snehana of the body organs [unctuousness or oiliness to the body organs], Jivana [provides sustenance of life], Tarpana [provides satisfaction of urges like thirst, etc.] and also Dharana [supports the body]. This dhatu is Saumya in nature\[^3\].

Rasa Dhatu helps in Tushti [satiation of hunger, thirst, etc.], Preenan\[^8\] [hydration] and nourishment of Rakta Dhatu\[^3\].

The circulatory nature of Rasa dhatu has been propounded by Acharya Sushrutha in a very thorough manner- he says that Rasa dhatu circulates in the body like- Shabdasantanvat [Circulation of sound waves], Archisantanvat [Circulation of fire] and Jalasantanvat [circulation of water]\[^3\].

The above terms have been explained by Dalhana and Chakrapani as-Shabdasantanvat means Teeryaggamitva [zig-zag motion- similar to oscillating sound waves], Archisantanvat means Urdhwagamitva [upward movement similar to that of flame] and Jalasantanvat means Adhogamitva [downward flow of water]\[^3,9\].

For circulation of Rasa Dhatu in the whole body, Vyana vayu plays an important role. Vyana vayu helps in circulation of Rasa dhatu simultaneously [Yugpat] and continuously [Ajasra]without stopping in the whole body and spreads the Rasa dhatu everywhere in the body\[^7\] .

According to Acharya Charak when Rasa dhatu kshaya occurs following symptoms are seen in the human body- Ghattate means heaviness in the heart, intolerance to sound [sahate shabdam na-
ucchaïhiḥ]. Hrudrava means palpitation, Hrudadāyam Tamyaṁ means pain in the retrosternal area on performing mild physical activities\(^7\).

According to Ashtang Hridayam Samhitā Rasa Dhatu Kṣaya leads to- Raukṣhya [dryness], Shrāma [exertional fatigue], Shoshā [Emaciation], Glaani [Mental fatigue] and Shabda- asahishnuta[intolerance to sound]\(^6\).

When Rasa Dhatu increases in the body Hrudayotkleda [Nausea] and Praseka [excessive salivation] are seen in the human being\(^3\).

Ashtang Hridayam has stated that Rasa dhatu vruddhi lakshanas are similar to Kapha Dosha vruddhi lakshanas and they are as follows- Agnisadana [Decreased digestive power], Praseka [Excess salivation], Alasya [Laziness], Gaurav [heaviness in the body], Shwaitya [pale discoloration of the body], Shaitya [feeling of cold], Shlathangatva [looseness in the body parts], Shwaasa [Bronchial Asthma], Kaasa [Coughing] and Atinidra [Excess sleep]\(^8\).

Rasa Kṣaya should be treated by administering medications having properties similar to Rasa Dhatu\(^3\).

Rasa Vruddhi should be treated by Langhana Chikitsa [treatment that involves various types of fasting techniques as well as administration of medications that cause healthy decrease in body weight and improved digestive power]\(^7\).

Achārya Charak has described diseases caused due to vitiation of Rasa dhatu and they are as follows- Ashraddha [Anorexia], Aruchi [loss of interest in food], Asyavairasya [Asymmetry of Gustatory function], Arasagnyata [Loss of gustation], Hruhhlas [Nausea], Gaurav [Heaviness in the body], Tanda [Lethargy/Somnolence], Angamarda [Generalized body ache], Jwara [Pyrexia], Tama [Temporary loss of vision], Panduta [Pale appearance of skin/anaemia], Srotasaavaroḍha [obstruction of secretory channels in the body], Klaibya [Impotence], Saada [Dis-spiritedness], Krushangata [Emaciation], Agnīnasha [loss of digestive power], Ayathakala Valaya [wrinkles in early age], Ayathakala Palītya [greying of hair in early age]\(^7\).

Pramana or quantity of Rasa Dhatu is 9 anjali [about 1700gm]\(^7\).

When the Rasa dhatu is in a very pristine form in an individual, the individual will show features of Rasa dhatu sarata that is known as Twaksarata. A person with Twaksarata will show great characteristics in the body like- his/ her skin will be Singdhā [unctuous], Shlakshna [Smooth], Mridu [Soft], Prasanna [Clean & clear]. Features like Sukshma loma [very fine body hairs], Alpa loma [very little amount of body hairs], Gambhira Loma [deeply rooted body hairs], Sukumar Loma [delicate body hairs], Upabhogvana [is able to satisfy all his/her needs in life], Buddhi [is decisive], Vidyavana [interested in pursuing various study courses], Praharshana [is of jolly nature] and is Ayushyavana [lives a long & contented life]\(^7\).

Also Achārya Sushrutā has stated that Twaksara individual has skin and body hairs that are clean and clear and soft in nature\(^3\).

Comparison between Rasa Dhatu and Blood Plasma-
Rasa Dhatu is formed from digestion of food\(^3\), while Plasma contains 92\% water and 1 \& solute part that is formed from digested food and absorbed by the intestinal tract\(^{10}\).

Rasa Dhatu is known as Raktarasa\(^5\), which means it is a part of Rakta Dhatu, i.e. blood. Plasma is also a part of blood\(^{11}\).

Rasa dhatu is the clear, liquid part of Rakta Dhatu\(^3,5\) and plasma is also the clear liquid part of blood\(^{11}\).

Rasa dhatu is that part of Rakta dhatu which is continuously circulating in the whole body\(^3\) and plasma in the blood is the liquid extracellular matrix mostly composed of water that circulates the formed elements and dissolved materials throughout the cardiovascular system\(^{10}\).

The major role of Rasa dhatu is nourishment\(^3\), while that of plasma is also nourishment of the body\(^{12,13}\).

The quantity of Rasa Dhatu is 9 anjali [about 1700gms]\(^7\), while plasma is 55\% of blood [about 2750ml]\(^{12,13}\).

RESULT AND DISCUSSION

From the above discussion it can be scientifically said that Rasa dhatu described in Ayurveda is a very important element of the body and is essential for the nourishment and growth of the body. This dhatu is continuously circulating in the body and is helping the body maintain proper hydration that is necessary for all the necessary activities of life. On comparing with Plasma, it can be said that Rasa dhatu has many similarities with Plasma. New additions in terms of plasma proteins and other solutes is necessary and should be used by Ayurveda physicians for understanding the core concepts of disease formation. Hridayotkleda [accumulation of Kleda or excess Rasa dhatu in the heart] is a feature of Rasa Dhatu vruddhi, while Congestive Cardiac Failure is the feature of Hypervolemia. Such features establish that ancient Ayurveda physicians were the pioneers of medicine and it is time Ayurveda physicians realize and use modern technology to enhance and explore their true potential.

Conclusion

Rasa dhatu as the foremost dhatu is an important part of the human body. Rasa dhatu has many similarities with Plasma part of the blood. The use of new technology is essential for understanding our concepts in a more radical manner, so that the Shashvatatva of our science is maintained for eternity. Thus, from the above discussion we can truly conclude that Rasa Dhatu is very similar to Plasma part of blood in its constitution as well as functions.

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