



## Review Article

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### A REVIEW ON RAKTA DHATU: EVERYTHING YOU NEED TO KNOW ABOUT

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#### ABSTRACT

The movement of dosha, dhatu, mala in the body concerning digestion and metabolism occurs through the srotas (channels). Srotas are those channels that transport and transform the substances to respective tissues, cells of the human body required for life sustenance. Based on their anatomical and physiological functioning, they are broadly classified into 13 types by Acharya Charaka. The main motto of the srotas is to nourish and sustain the dosha, dhatu, mala of the body. Rakta dhatu is an asthaya dhatu predominant in pruthvi and jala mahabhutas. Rakta saara purusha (prevailing of blood cells) are endowed with anantibalaklesh asahishnuta (withstands physical and mental stress). Rakthavahasroto vikaras are abundant in day-to-day clinical practice. Hence diagnosing the same is the need of the hour.

**Keywords:** Rakta Vaha Srotas, Pareeksha, Chikitsa, Upavaasa, Iron profile.

#### INTRODUCTION

Ayurveda is the oldest and most scientific system of healing. It is the Indian medicinal arrangement of restorative and support to an individual. In Ayurveda, there are Dosha (3 primary energies), dhatu (7 body tissues), mala (metabolic wastes), which are crucial columns and basic blocks upon which body stands.<sup>1</sup> Rakta (blood) is the 2<sup>nd</sup> dhatu (tissue) among the seven dhatu (7 body tissues) explained. Rakta (blood) has assumed an essential job in the progress of different organs and their working. Rakta dhatu has been compared to blood but has a much broader concept than blood. Acharya Sushruta opines that Rakta dhatu is the base of living, and it maintains life sustenance; hence Rakta dhatu must be taken care of.<sup>2</sup>

This can be done by following a proper regimen and diet. Acharya Sushruta tried to parallel this entity with a dosha (basic energy) and emphasize control of this dhatu (body tissue) on other body entities. Like Vata, pitta and Kapha, they are responsible for creating the living body in the same way Rakta also takes part in origin sustenance and is also accountable for the death. Acharya Sushruta opines that there will be no existence of the body without Kapha (potential energy), pitta (thermal energy), Vata (kinetic energy) and Shonita (blood), the body is always supported by these.<sup>3</sup> Rakta (blood) itself is life. The body is dependent on food, and four factors are responsible for any deviation of the body from its homeostatic states, namely Vata (kinetic energy), pitta (thermal energy), Kapha (potential energy) and rakta (blood). This science bases its theory on the existence of panchamahabhuta (five basic elements those are Akasha (space), air/wind (Vayu), fire (Tejas), water (Jala) and earth (Prithvi) in the human body Teja (fire) brings this red color to rasa

dhatu(plasma), and when produced healthily and physiological quantity it is fresh and called Rakta.<sup>4</sup>

**Data source** - A thorough review of Ayurvedic classical texts Charaka vimana, Charaka sutra, Sushruta sutra sthana, physiology and pathology books, embryology, contemporary science books, relevant articles are cited for the present study.

#### DISCUSSION

##### Formation of rakta dhatu (blood)

Rasa dhatu (plasma), the first dhatu produced in the body, contains tejamahabhuta (fire) and pitta dosha; with the help of both Tejani and heat of pitta (thermal energy), the rasa dhatu is transferred to Rakta dhatu<sup>5</sup>. Rakta dhatu is formed from Ahara rasa, which is colorless. When it reaches yakrit (liver) and pleeha (spleen), that is, liver and spleen by the help of their ushna guna (hot nature), this rasa dhatu (plasma) is converted to rakta dhatu (blood).<sup>6</sup> Ranjaka pitta situated in amashaya or yakrit and pleeha gives the red color to rakta dhatu (blood).<sup>7</sup>

##### Synonyms of rakta dhatu (blood)

Rakta dhatu (blood) has been given the following synonyms (a)Rudhira-Acharya Charaka says rudhira is an element that comprises prana. (b)Asruka-As rakta moves continuously all over the body. (c) Lohita - As rakta contains iron loha. (d) Shonita- Red color liquid element. (e) Asra- (f)Kshatriya - This word is given as a synonym because, after injury, the first element which will be visible is rakta dhatu(blood).

**Quantity of rakta dhatu (blood)**

Total quantity of rakta dhatu(blood) in the body is about 8 anjali. 1anjali=16 tola =5120ml. <sup>8</sup>

Blood is a body fluid in humans and other animals that delivers necessary nutrients and oxygen to the cells and transports metabolic waste products away from those same cells. Blood accounts for 7% of the human body weight, with an average density of around 1060 kg/meter cube. The average adult has a blood volume of roughly 5 liters.

**Qualities of shuddha rakta (pure blood)**

Pureblood can resemble the color of gold purified with fire, indragopa (firefly), Padma (red lotus), alaktaka (lac), gunja phal (fruits of gunja) depending upon the individual constitution. <sup>9</sup> blood that is not too thick and not discolored should be understood as normal<sup>10</sup> shuddha Rakta dhatu is slightly sweet and salty. It is neither cold nor warm, not thickened. Little thicker than liquid. Its color resembles the color of lotus, indragopa insects, gold, blood of sheep and rabbit. <sup>11</sup>

In vertebrate blood, it is composed of blood cells suspended in blood plasma Blood is composed of plasma and formed elements. Plasma is about 55% of the blood that is 2.7-3.0 L. Plasma circulates dissolved nutrients such as glucose, amino acid and fatty acids, removes waste products such as carbon dioxide, urea and lactic acid

Formed elements forming 45% of blood include:

RBC -red blood cells -consist of hemoglobin and distribute oxygen	4.7-6.1 million(male) 4.2-5.4 million (female)
WBC- leukocytes -form a part of the body's immune system	4,000-11,000 cells
Thrombocytes -Platelets -take part in clotting (coagulation of blood)	200,000-300,000 platelets mm-3

**Raktasara lakshana (pure blood)**

The signs and symptoms of a person endowed/having pure blood in their body are clarity in complexion, physiological functioning of the sense organs, natural urges for the objects of sense organs, unobstructed digestion and motion, happiness, nourishment, and strength. <sup>12</sup> The person having fully developed rakta dhatu (blood) in his body from birth is known as Raktasara purusha. Their ears, eyes, face, tongue, nose, lips, palms, soles, nails, forehead, penis etc., look bright red due to appropriate blood circulation, glistening and attractive. This gives happiness, intelligence, and tenderness to the person. But these Rakta sara people, due to their delicacies and tenderness, are weak in strength and unable to withstand any stress. <sup>13</sup>

**Rakta Vrddhi (increase)**

When Rakta dhatu increases (due to guna and karma), it gives rise to signs and symptoms like the reddish complexion of the body and eyes fullness of veins. <sup>14</sup> Increased Rakta dhatu (blood) produces dermatological disorders or skin diseases, cellulitis, boils, menorrhagia, burning sensation in eyes, mouth and rectum, tumor / abdominal growths, abscesses, blackish discoloration of the skin, jaundice, loss of digestive fire, darkness in front of eyes, reddish discoloration of eyes, peripheral vascular disease and other symptoms of increased pitta dosha. <sup>15</sup> Symptoms like

enlargement of the spleen, bleeding, disorders, tooth problems, jaundice, blackish spots on the face, and decreased digestive power. <sup>16</sup>

**Rakta Kshaya (decrease)**

When there is excessive diminution (due to guna and karma) of Rakta dhatu in the body, there is the roughness of skin, cracks in the skin, and dryness. <sup>17</sup> Desire for cold and sour things, the collapse of veins and loss of complexion. <sup>18</sup> Reduction of the quantity of blood in blood vessels. Acharya Sharangadhara says the excessive loss of Rakta dhatu causes diminution of digestive fire and aggravation of Vata dosha. This may give rise to some complications like blindness, reduced rakta dhatu(blood) causes dryness of skin, desire for sour and cool comforts. <sup>19</sup>

**Raktavaha Sroto dushti karana and lakshana**

The moola/origin of Rakta vaha srotas (channels of blood) is functions of yakrit and pleeha to explain the liver and spleen.

Functions of the liver; Liver is the largest solid organ in the body. This organ is responsible for converting Rasa dhatu (clear plasma) to Rakta dhatu(blood). The liver maintains the purity of the blood by keeping impurities from mixing with it.

1. The liver removes toxins from the body's blood supply
2. Maintains healthy blood sugar levels
3. Regulates blood clotting and performs hundreds of other vital functions
4. Filtration of blood - all the blood leaving the stomach and intestines passes through the liver, removing toxins, byproducts and other harmful substances.
5. Regulates blood clotting - blood clotting coagulants are created using vitamin K, which can only be absorbed with the help of bile, a fluid the liver produces.
6. Functions of spleen
7. The spleen stores and filters blood and makes WBC that protect you from infection.
8. Helps keep harmful microorganisms away from the bloodstream.
9. Removes unhealthy and old RBC out of the bloodstream.
10. Stores blood

This states that the nutrients required for plasma and blood storage occur in rakta vaha srotas moola (origin of a channel). <sup>20</sup> Rakta vaha srotas (channel of blood) gets vitiated by food particles causing a burning sensation to the body, excessive intake of unctuous substances, exposure to sun or fire. <sup>21</sup> Vitiating of rakta vaha srotas (channels of blood) is also caused by pitta aggravating factors, day sleep, eating during indigestion and eating antagonistic food. <sup>22</sup>

Rakta dhatu (blood) vitiated by	Features seen
Vata (Kinetic energy)	Reddish, frothy or foamy, blackish, dryness, thin, moves fast and takes more time for coagulation.
Pitta (Thermal energy)	bluish, yellowish, greenish, blackish in color, slightly warm, having amagandhi (foul smell), insects like flies are disliked to these qualities of rakta (blood), it takes more time to thicken
Kapha	slightly pale, slimy, cold, thick and thready whose movement is slow and dazzling like muscular tissue.

There are many diseases caused due to the vitiation of Rakta dhatu (blood). Acharya Charaka explains the following: stomatitis, conjunctivitis, rhinitis, halitosis abdominal tumor, hemorrhagic disorder, drowsiness, abscess, hematuria,

menorrhagia, gout, pallor, excessive thirst, heaviness of the body, burning sensation, excessive weakness, anorexia, headache, bitter and sour eructation, excessive anger, bewilderment, saline taste in the mouth, excessive sweating intoxication, tremors, aphonia, drowsiness, feeling of entering darkness, pruritus, leprosy, dermatoses.<sup>23</sup> Inflammation of anus, splenic disorders, blue mole, jaundice, leukoderma red-coloured patches all over the body.<sup>24</sup>

### Raktavahasroto Pareeksha

Acharya Charaka opines that analyzing and diagnosing an individual's disease plays a prime role before treating any patient. For analysing the condition, different types of pareekshas are used as a tool. Out of which, Pratyaksha (inspector examinations), Anumana (examination through inference), and Aaptopadesha (examinations through classical Ayurvedic textbooks) play a significant role. Pratyaksha Pareeksha can be elicited by the pancha-indriyas (five sense organs) – shrotendriya (sense of hearing- ears), sparshanendriya (sense of touch- skin), chakshur indriya (sense of vision- eyes), rasendriya (sense of taste- tongue) and gyanendriya (sense of smell- nose).

### Knowledge of signs and symptoms through sense organs

Chakshur indriya (sense of vision-eyes)	The reddish complexion of body and eyes Skin disorders Blackish discoloration of the skin Abdominal growths Paleness
Sparshanendriya (sense of touch-skin),	Dryness of skin Roughness of skin Withering of skin Cracks in skin Fever

### Knowledge of causes, signs, and symptoms through pramanas

Pramana	Signs
Pratyaksha (Inspection)	The reddish complexion of body and eyes, Skin disorders, blackish discoloration of the skin, Abscesses, Abdominal growths, Bleeding disorders, Tooth problems, Jaundice, Dryness of skin, the roughness of skin causes
Anumana (Examination through inference)	All the causes of vitiation such as consuming food and drinks causing a burning sensation, eating antagonistic food, Eating during digestion, Excess anger, exposure to fire or sun, Day sleep

### Aptopadesha gamya bhavas

Features of every disease can be understood by the following: This is the history taking protocol of every disease, aggravating factors of the disease, Pathogenic material, Etiology, Specific features responsible for the severity of the disease, site of disease manifestation, pain, symptoms, association with sound, touch colors, taste, smell, complications of diseases, types of aggravations, static stage and diminished, maintenance and nomenclature of disease.

### Laboratory tests for blood-related disorders

Estimation of hemoglobin	To detect anemia, diarrhea etc.
Estimation of bleeding time	To assess the vascular defect
Estimation of clotting time	Cases of severe hemophilia
Estimation of blood group	Blood transfusion
CBC (complete blood count)	To get a count of RBC, WBC and Platelets

**Iron profile:** Panel of blood tests that check the iron level in the blood. The iron profile includes serum iron, Total Iron Binding Capacity and %transferrin saturation

Lab Exams	Normal values	
Serum iron	(50-100 mcg/dL)	Concentration bound to transferrin
Total Iron Binding Capacity	(250-410 mcg/dL)	Indirect measurement of the iron-binding capacity serum transferrin (protein)
% Saturation of Transferrin	(20-55) %	The ratio of serum iron level to TIBC in %

### Raktavaha sroto Chikitsa (treatment)

Acharya Charaka mentions therapies like purgation, fasting and bloodletting indicated for the treatment of Rakta pitta are advised for the treatment of diseases caused due to vitiation of Rakta dhatu (blood).<sup>25</sup>

Acharya Charaka mentions drugs helping in purgation therapy

1) Draksha	<i>Vitis vinifera</i>
2) Kashamaya	<i>Gmelina arborea</i>
3) Parushaka	<i>Grewia asiatica</i>
4) Abhaya	<i>Terminalia chebula</i>
5) Amalaki	<i>Emblca officinalis</i>
6) Vibhitaki	<i>Terminalia bellirica</i>
7) Kuvala	<i>Zizyphus sativa</i>
8) Badara	<i>Zizyphus mauritiana</i>
9) karkandhu	<i>Zizyphus nummularia</i>
10) Peelu	<i>Salvadora persica</i>

Acharya Charaka mentions the following for therapeutic purgation<sup>26</sup>

Trivrit - <i>Operculina turpethum</i>
Triphala
Amalaki - <i>Phyllanthus emblica</i> , Vibhitaki - <i>Terminalia bellirica</i> , Haritaki - <i>Terminalia chebula</i>
Danti - <i>Baliospermum montanum</i>
Neelini - <i>Indigofera tinctoria</i>
Saptala - <i>Euphorbia dracunculoides</i>
Vacha - <i>Acorus calamus</i>
Kampillaka - <i>Mallotus philippinensis</i>
Gavakshi - <i>Citrullus colocynthis</i>
Ksheerini - <i>Manilkara zapota</i>
Udakeerya - <i>Holoptelia integrifolia</i>
Peelu - <i>Salvadora persica</i>
Draksha - <i>Vitis vinifera</i>
Aragvadha - <i>Cassia fistula</i>
Nichula - <i>Barringtonia acutangula</i>

Group of purgatives mentioned in Ashtanga Hridaya<sup>27</sup>

Nimba - <i>Azadirachta indica</i>
Kumbha - <i>Careya arborea</i>
Triphala
Amalaki- <i>Phyllanthus emblica</i> , Bibhitaki- <i>Terminalia bellirica</i> , Haritaki - <i>Terminalia chebula</i>
Gavakshi - <i>Citrullus colocynthis</i>
Snuk - <i>Euphorbia nerifolia</i>
Shankhini - <i>Euphorbia dracunculoides</i>
Neelini - <i>Indigofera tinctoria</i>
Talwaka - <i>Simplocos recemosa</i>
Samyaka - <i>Cassia fistula</i>
Kampillaka - <i>Mallotus philippinensis</i>
Dugdha- milk
Mutra - urine

## Upavasa (Fasting)

Name 10 types of langhana, explain upavasa Upavasa is one among the ten kinds of Langhana

1. Vamana (emesis)
2. Virechana (purgation)
3. Niruh (non-unctuous enemata)
4. Nasya (nasal administration of drugs)
5. Pipasa (control of thirst)
6. Maruta (exposure to wind)
7. Atapa (exposure to sunlight)
8. Pachana (application of digestive measures)
9. Upavasa (fasting)
10. Vyayama (exercise)

Upavasa (fasting) is not just about refraining from food but includes abstaining from pleasures that kindle the senses. Upavasa (fasting) removes the accumulated toxins and clears the blocked channels within us. As the body eliminates metabolic toxins, body fat is also lost, which helps lose weight. Fasting can delay ageing and prevent or even treat some diseases.

Upavasa (fasting) is one among the Daivavyapashraya (divine way of treatment)<sup>28</sup>

Upavasa (fasting) is one among ten types of langhana (reducing therapy)<sup>29</sup>

Ailments like jvara (fever), alaska (laziness), etc., are less severe than they must be treated by fasting.<sup>30</sup>

## Fasting do's and don'ts Who cannot fast?

If you are already stressed, pregnant women, nursing mothers, suffering from severe anemia, anorexia, and liver or kidney disease, Fasting is indicated in the management of certain skin diseases, management of gastrointestinal disease, management of obesity etc.

Acharya Charaka mentions the following *agrega*

1. Milk is best among the vitalizes
2. Purgation is the best therapy for eliminating pitta
3. Trvrt causes easy purgation
4. Aragvadha causes mild purgation
5. Milk of snuhi causes strong purgation
6. Ananta cures Rakta pitta
7. Guduchi is curative of Vata, promotes digestion and is corrective of vitiation of blood
8. Application of sandalwood paste removes foul odor and burning sensation of the body
9. Kashmari does raktapitta prasham

## CONCLUSION

In the present study, an effort is made in understanding the raktavahasroto pathology analysis of diagnostic protocol concerning chikitsa. Raktavahasroto vikaras are bahya and aabhyantararoga margaja vyadhi's, the mode of manifestation of vikara is at the sroto mula sthana or in the sroto marg. Examination of rakta vaha srotas to be emphasized on trividha pariksha, laboratory diagnosis utilizing complete haemogram, iron profile tests. Based on the guna - karma principle, chikitsa to be framed accordingly as pathya (upavasa), aushadha, vihara (vyayama).

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