

THE ROLE OF RAKTADHATU IN THE PATHOGENESIS OF COVID 19 AND ROLE OF RAKTAMOKSHANA IN THE MANAGEMENT: A CRITICAL REVIEW.

Pranav Bhagwat*

India.

Received on: 14/04/2020

Revised on: 04/05/2020

Accepted on: 25/05/2020

*Corresponding Author

Pranav Bhagwat

India.

ABSTRACT

COVID 19 is a novel pandemic with a spectrum ranging from mild disease to death. Internationally, the medical fraternity is struggling to find a cure or vaccine for this disease resulting into losses of thousands of lives. Indian system of medicine, because of its strong fundamentals and superb guidelines to tackle any novel disease, can find an answer for this. *Raktadhatu* is found to be a major culprit in the contact point and progress of the disease. The article provides insights into the role of *raktadhatu* in this process of COVID 19 starting from the contact with the patient, through various typical and atypical symptomatology and complications and even death. The article, after establishing this, predicts, future possible presentations and complications, which hitherto might have been missed by the eyes of the healthcare providers and hence many such patients may not have received required immediate therapy. The probable role of *raktamokshana* (bloodletting by controlled therapeutic phlebotomy) – a procedure described to be the important therapy- is also established with the help of evidences.

KEYWORDS: COVID 19, prophylaxis, *Raktadhatu*, *raktamokshana*, phlebotomy, blood letting.

INTRODUCTION

Beginning in December 2019, a novel coronavirus, designated SARS-CoV-2, has caused an international outbreak of respiratory illness termed COVID 19. The full spectrum of COVID 19 ranges from mild, self-limiting respiratory tract illness to severe progressive pneumonia, multiorgan failure, and death.^[1] Coronaviruses are RNA viruses that are divided into four genera; alphacoronaviruses and betacoronaviruses are known to infect humans.^[2] SARS-CoV-2 is related to bat coronaviruses and to SARS-CoV-1, the virus that causes severe acute respiratory syndrome (SARS).^[3]

There are no approved treatments for COVID 19; thus, people with COVID 19 should be referred to clinical trials. Several agents have been touted as treatments for COVID 19, but at this point, the data are insufficient to inform a recommendation for or against the use of these agents outside of clinical trials; well-conducted randomized trials will be critical in determining how COVID 19 should be treated.^[4]

We have hypothesised a novel understanding of the Corona Virus Disease 19 and its complications in the light of Indian system of medicine- *Ayurveda*. As the article shows, *Raktadhatu* which may be correlated with blood in allopathic science, has a major role in the pathology of this disease. *Raktadhatu* has wide variety of functions in the body such as, from keeping the digestive

system neat to maintaining sense of touch.^[5] The primary treatment of diseases vitiating *Raktadhatu* is *raktamokshana*.^[6] (controlled therapeutic bloodletting) *Raktamokshana* is of four varieties; leech application, cupping, sucking with hollow horns and phlebotomy.^[7]

Understanding of *Raktadhatu*

Raktadhatu is the second *dhatu* (tissues) in the consequence of *dhatu*s. It is manufactured and nourished from *Ahararasa* & *Rasadhatu*. The *poshakaansha* of *Raktadhatu*, which are also called as *poshak Raktadhatu*, comes in contact with *Ranjaka pitta* and as *Harita* has described it transforms through various phases with typical colours before finally turning into *Raktadhatu*. While undergoing this process, it also produces *mala pitta*, *sira* (veins) and *kandara* (tendons) as by products.

This *Raktadhatu* is an important constituent of the body as it is called as *Jeeva*^[8] (life).

Its importance is further specified by following functions^[9] it performs:-

- Gives strength, life
- Gives *prasanna* colour, lusture
- Gives amazing digestive power
- Regulates unobstructed natural urges
- Gives *anubandha* of *sukha* (makes life happy)
- Gives nourishment to tissues.
- Powers sense organs.

Its value is further demonstrated by its major involvement in producing/manufacturing nourishing major organs in embryology. And once we consider *swabhaavoparamavaada*.^[10] & *kshanabhanguravada* which state that the body, its organs, tissues, cells, and cell constituents die every moment & take birth every moment, it becomes obvious that to keep the health of following organs and making them vulnerable to disease, *Raktadhatu* provides a major role-*Yakrut* (Liver), *Pleeha* (Spleen), *Hridaya* (Heart), *Phuphusa* (Lungs), *Antra* (Intestines), *Guda* (Anus), *Basti* (Urinary Bladder), *Unduka* (Caecum), *Vrukka* (Kidneys).^[11]

Role Of *Raktadhatu* In The Pathology Of Covid 19 And Its Complications

The pathology of COVID 19 passes through various phases, involves multiple organs and hence is complicated. We have tried to understand the pathology of COVID 19 in light of the physiology of *Raktadhatu*, specific disease conditions pertaining to it and as an extension, other possible major complications these patients may land into. Further obvious step is to accept treatment of *raktapradoshaja* (due to vitiation of blood) diseases as a possible treatment of COVID 19 to stop further progress of disease. By application of *YUKTI pramanaa*, we derive certain conditions as possible presentations or complications of this disease, hitherto missed.

Portals of entry of COVID 19 and *Raktadhatu*

COVID-19 has 3 major portals of entry into the body

- Conjunctiva (*Shukla Mandala*)
- Nasopharynx (*Nasa*)
- Oral Cavity (*Mukha*).

Covid -19 may manifest as conjunctivitis as it enters the eye and remains present there longer than even nasopharynx. Conjunctivitis is parallel to *Abhishyanda* described in Ayurveda.^[12]

Abhishyanda is a disease which is cured by *siravyadha*.^[13] *Siravyadha* (phlebotomy) is done for the diseases produced due to vitiation of *Raktadhatu*.^[14] Thus conjunctivitis is due to vitiation of *Raktadhatu* by COVID 19. Similarly Nasopharynx and oral cavity which are called as *nasa, gala, talu, kantha, mukha* in ayurveda, are basically formed by *Raktadhatu*.

And hence portal of entries of corona virus 19 are places with the major structural constituent as *Raktadhatu*.

Clinical features of COVID 19 and *Raktadhatu*

If we keenly observe the clinical features of COVID -19, they do match with *Pradoshaja Laxanas* ^[15] of *Raktadhatu* as-

(A)Uncomplicated (mild) cases^[16]

- Mild fever
- Dry cough
- Sore throat

- Nasal congestion
- Malaise
- Headache
- Muscle pain
- Diarrhoea

Out of the above symptoms, headache, malaise and fever have direct references as being diseases^[15] of *Raktadhatu*. Sore throat,^[17] nasal congestion,^[18] are indirectly related to *Raktadhatu* as the treatment is *siravedha/raktamokshana* in these diseases. Diarrhoea is related to intestines and they are embryologically related to *Raktadhatu*.^[11]

(B)Moderate pneumonia^[16] involves vitiation of *phupphusa* (lungs)and lungs are *sthana* of *Raktadhatu*.^[11]
(C)Severe pneumonia^[16] – is associated with

- Fever
- Severe dyspnoea
- Respiratory distress
- Tachypnoea (>30 /min),
- Hypoxia SpO2 <90% or room air.
- Cyanosis can occur in children.

This stage also involves *Raktadhatu* as the *jeevankarma* of *Raktadhatu* is hampered.

(D)Acute Respiratory Distress Syndrome^[16] The diagnosis requires clinical and ventilatory criteria. Depending upon the degree of hypoxia, different forms, viz- mild, moderate, severe are found

(E)Sepsis- It is a life threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection.^[19]

The clinical picture of sepsis in COVID 19 patients is quite peculiar: -

- Severe hypoxia and hypoxaemia
- Renal impairment with oliguria
- Tachycardia
- Altered mental status (*mada*)
- Hyperbilirubinemia
- Acidosis
- High lactate
- Coagulopathy
- Thrombocytopenia.

SOFA score (sequential organ failure assessment) predicts ICU mortality based on lab results & clinical Data.^[20] From this array of clinical features, severe hypoxia & hypoxaemia, coagulopathy^[21] & thrombocytopenia,^[22] are directly related to *Raktadhatu*. Since kidneys, liver, heart are products of *Raktadhatu* metabolism.^[11] renal impairment, increased Sr.Bilirubin and tachycardia can be understood related to *Raktadhatu*. Since this virus affects *Raktad hatu*, the organs made up from this *raktadhatu* particularly are affected & hence liver and kidneys are part of complications suggesting *gambheeravastha* of the pathology. Altered Mental status which is called as *mada* , is a disease of *Raktadhatu*.^[23] Sepsis is also a product of *Raktadhatu* vitiation. This

process is due to formation of *shonita kleda* and *sankotha*.

(F) Unusual features of Covid -19

- Classical respiratory systems may be preceded by haemoptysis.^[25]
- Isolated or Anosmia or hyposmia has been widely reported as a primary symptom^[26] Here haemoptysis is related to *Raktapitta* which is vitiation of Raktadhatu, hypo/Anosmia denotes vitiation of *Raktavaha Sira*.^[9]
- Altered mental status has eventually progressed to Acute Necrotising Haemorrhagic encephalopathy^[27] Again ,underlining importance of Raktadhatu as both necrosis and haemorrhage are due to vitiated Raktadhatu.^[24]
- Toe nail infection is also found to be presenting symptom especially in kids. Toenail is the extension of the *kandara*^[28] which is *upadhatu* of *rakta*.^[29]

Cause of deaths in COVID -19

The researchers found that intravascular coagulation leading to micro-clots within the lungs contributes to death in some patients. The microclots are due to vitiation of *raktadhatu* by *kafadosha*.^[21]

COVID 19 is sometimes complicated by shock and multiple organ failure. A combination of poor predicted outcomes due to old age, co-morbidity, a profound disability and lack of personnel & infrastructure, often leads to death.

Use Of Raktamokshana (Therapeutic Controlled Phlebotomy) In Covid 19

Raktamokshana (therapeutic controlled phlebotomy) is one of the five purificatory measures described in ayurveda.^[30]

The major role of Raktadhatu in the pathology of COVID 19, right from its portal of entry to development of various complications and leading to death is obvious from the above discussion. The treatment of *Raktadhatu* is twofold. One is *shamana* (pacification) and the other one is *shodhana*^[31] (purification).*Shodhana* here implies *virechana* (therapeutic purgation) and *raktamokshana*.^[32]

Patho-physiological studies indicate that in case of considerable blood loss (>100ml) the immediate haemodilution stimulates /triggers a host of beneficial physiological mechanisms making the body alert and adaptive to the various systemic challenges present.^[33]

Role of *raktamokshana* in various viral diseases is proven by research. The Egyptian Journal of Immunology published an article stating significant lowering in the Natural Killer Cells (NK), significant increase in White Blood Cells (WBCs) and marked reduction in soluble interleukin- 2 receptors (SIL-2R).^[34] Studies in Japan have indicated efficiency of phlebotomy in Hepatitis C patients.^[35] They found significant changes

in liver function tests values in seven patients.^[36] The studies in Egypt proved that *raktamokshana* constitutes a therapeutic revolution in hepatitis C viral illness treatment through massive eradication of the virus from the serum in a rapid immediate onset after the cupping session.^[37]

Quantity of *raktamokshna*- Though the quantity of *raktamokshana* by *siravedha* is 540 ml as described in ancient times, for the convenience of time and patient 100- 120 ml is removed at a time.

Contraindications of *raktamokshana*^[38]

Anasarca, emaciated person, pregnancy, person suffering from diseases such as anemia, hemorrhoids, ascites, consumption, and dropsy.

Possible Presentations Of Covid -19 Patients Which Are Not Currently Found

The hypothesis further can be extrapolated to various conditions which can present as a presenting feature or complication in patients of COVID 19. This assumption will help us to check these patients carefully and we would not miss any case and would not be surprised by atypical feature. They are as follows⁽³⁹⁾: -

1. Stomatitis.
2. *Upakusha*- hypertrophic gingivitis.
3. *Gulma*- abdominal and peritoneal infections where bloating, constipation are the presenting symptoms. Peptic ulcerations.
4. *Urdhwaga amlapitta*- hyperacidity.
5. *Visarpa*- herpes.
6. Dermatitis.
7. Menorrhagia/metrorrhagia.
8. *Swarakshaya*- hoarseness/ improper voice.
9. Blackouts/ syncope.
10. Inflammations or irritations in ileus and caecum.^[11] (as *unduka* is *shonita kitta prabhava*)
11. Orchitis.^[11] (scrotum is from *rakta*.)
12. Cardiac arrhythmias, myocarditis.^[11]
13. Tendonitis.^[29]
14. Phlebitis.^[29]
15. Arteritis.^[29]
16. Obstructive vascular diseases.^{29]}

CONCLUSION

COVID 19 seems to be a disease which has baffled every medical person. It evolves everyday and hence causes a lot of new information to create confusion and clarity at the same time. In this scenario, it is necessary to be a step ahead of the virus. Indian system of medicine, owing to its strong fundamentals, may give alternate pathway and a new vision. By understanding the functions and pathology of *Raktadhatu*, we may understand COVID 19 and its ways to attack human health in various ways. Therefore *raktamokshana* (therapeutic controlled phlebotomy for bloodletting) will be a wonderful preventive and prophylactic measure in those people who are not contra indicated for this procedure. Bloodletting which was regularly done in

western medical practice till 1942 is obsolete after advent of antibiotics and hence till we get a vaccine or antiviral against COVID 19, *raktamokshana* may show a newer way.

REFERENCES

- Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020; 395: 497-506.
- Paules CI, Marston HD, Fauci AS. Coronavirus infections — more than just the common cold. *JAMA* 2020; 323: 707-708.
- Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med* 2020; 382: 727-733.
- Rajesh T. Gandhi, John B. Lynch, Carlos del Rio, Mild or Moderate Covid-19. <https://www.nejm.org/April 24, 2020>. DOI: 10.1056/NEJMcp2009249.
- Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). *Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 24, verse 24.* Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg125.
- Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). *Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 24, verse 18.* Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg125.
- Vaidyaraaj J. T. Acharya (editor). (6th edition). *Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, sharirasthana: chapter 8, verse no. 25.* Varanasi: Choukhamba Orientalia ; 1997; pg 383.
- Vaidyaraaj J. T. Acharya (editor). (6th edition). *Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, sutrasthana: chapter 14, verse no. 44.* Varanasi: Choukhamba Orientalia; 1997; pg 66.
- Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). *Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 24, verse 24.* Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg125.
- Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). *Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 16, verse 27-28.* Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 97.
- Vaidyaraaj J. T. Acharya (editor). (6th edition). *Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, sharirasthana: chapter 4, verse no. 25-27, 31.* Varanasi: Choukhamba Orientalia ; 1997; pg 357-8.
- Vaidyaraaj J. T. Acharya (editor). (6th edition). *Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, uttaratantra; chapter 1, verse no.44.* Varanasi: Choukhamba Orientalia ; 1997; pg. 598.
- Vaidyaraaj J. T. Acharya (editor). (6th edition). *Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, uttaratantra; chapter 8, verse no.9.* Varanasi: Choukhamba Orientalia ; 1997; pg. 610.
- Vaidyaraaj J. T. Acharya (editor). (6th edition). *Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, sharirasthana; chapter 8, verse no.4.* Varanasi: Choukhamba Orientalia; 1997; pg. 379.
- Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). *Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 24, verse 11-16.* Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 124.
- Cascella M, Rajnik M, Croma A.et.al. Features, Evaluation and treatment coronavirus(COVID 19) updated 2020 April, 6. In: *statPearls(Internet) (Treasure Island)(PL) (Stat pearls publicity) ncbi.nlm.nih.gov*
- Vaidyaraaj J. T. Acharya (editor). (6th edition). *Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, chikitsa sthana; chapter 22, verse no.59.* Varanasi: Choukhamba Orientalia ; 1997; pg. 484.
- Vaidyaraaj J. T. Acharya (editor). (6th edition). *Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, sharirasthana; chapter 8, verse no.17.* Varanasi: Choukhamba Orientalia ; 1997; pg. 381.
- Singer M. Deutschman Cs et.al. The third International Consensus definition for sepsis (Sepsis-3). *Jama* 2016 Feb 23; 315 (8): 801: 10.
- Seymour Cw, Kennedy DN, et al. Deviation, validation & potential treatment implications of Novel Clinical Phenotypes for sepsis, *JAMA*. 2019 May 28; 321 (20) : 2003 -2017
- Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). *Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 24, verse 20.* Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 125.
- Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). *Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 24, verse 21.* Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 125.
- Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). *Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 24, verse*

27. Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 125.
24. Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 21, verse 70. Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 563.
25. Shif. YUQ, Huang W 2019 corona virus pneumonia with haemoptysis as the initial symptom: C T & clinical features. Korean Journal & Radiology (Internet) 2020 Feb 16; 21, <https://doi.org/10.3348/kjr.2020.0181>
26. Hopkins c. Kumar N. Loss of Sense of Smell as a marker of Covid -19infection .Pdf(Internet) ENT UK, 2020(cited 2020 Apr 5. www.entuk.org
27. Poyicdji N, Shahin G. Et al –Covid -19 associated Acute Haemorrhagic Necrotising encephalopathy : CT &MRI findings Radiology.2020 Mar 31; 2011.87.
28. Vaidyaraaj J. T. Acharya (editor). (6th edition). Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, sharir sthana; chapter 5, verse no.11, Varanasi: Choukhamba Orientalia ; 1997; pg. 364.
29. Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, chikitsasthana; chapter 15, verse 17. Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 514.
30. Vaidya Harishastri Paradkar (editor). (6th edition). Sarvangasundara commentary by Arunadatta and Ayurvparasayana commentary by Hemadri on Ashtangahridaya of Vagbhata, sharir sthana; chapter 14, verse no.5, Varanasi: Krishnadasa Academy, 1995; pg. 223.
31. Vaidya Harishastri Paradkar (editor). (6th edition). Sarvangasundara commentary by Arunadatta and Ayurvparasayana commentary by Hemadri on Ashtangahridaya of Vagbhata, sutrasthana; chapter 1, verse no.25, Varanasi: Krishnadasa Academy, 1995; pg. 16.
32. Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 24, verse 18. Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 125.
33. Adithya Acharya, Ahalya Sharma, Evaluation of the efficacy of *siravyadha & guduchi siddha yogabasti* in the management of *Vatarakta* w.s.r.t. Gout; Int. J. Res. Ayurveda Pharma.4(3) May-June 2013, DOI: 10.7897/2277-4343.04319
34. Ahmed SM, Medbouly NH, Makkad SS, et al Immunomodulatory effects of bloodletting cupping therapy in pts with Rheumatoid arthritis, The Egyptian journal of immunology, 01 Jan 2005, 12(2): 39-51:
35. Naoki Tanaka, Akira Hourichi et al Efficacy and Safety of Addition of Minor Bloodletting (Petit Phlebotomy) in Hepatitis C Virus-Infected Patients Receiving Regular Glycyrrhizin Injection, J Gastroenterol. 2009; 44(6): 577-82. doi: 10.1007/s00535-009-0034-x. Epub 2009 Apr 8.
36. Yoshio Sumida, Kazuyuki Kanemasa. Utility of a Little Phlebotomy Intermittently Just Before Intravenous Injection of Glycyrrhizin for Patients With Chronic Hepatitis C 2007 Jul; 104(7): 1044-50. PMID: 17611380.
37. Nasrat et al., Hepatitis C Virus; Its Eradication from the Serum is Just Possible. Gen Med (Los Angeles) 2016, 4: 3 DOI: 10.4172/2327-5146.1000249.
38. Vaidyaraaj J. T. Acharya (editor). (6th edition). Nibandhasangraha commentary by Dalhana on Sushrutasamhita of Sushruta supplemented by Nagarjuna, sharir sthana; chapter 8, verse no.3, Varanasi: Choukhamba Orientalia ; 1997; pg. 379.
39. Vaidya Yadavjirikamaji Acharya, editor.(1st edition, Reprint 2000). Charaka samhita of Agnivesha revised by Charaka and supplemented by Dridhabala, sutrasthana; chapter 25, verse 11-16. Varanasi: Chaukhambha vishwabharati Prakashana, 2000; pg 124.