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Applied understanding of Post Covid Coagulopathy Disorders through Ayurveda

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ABSTRACT

Blood is the only fluid connective tissue in the body, maintains life and plays vital role in the body, Acharya Vagbhata describes the function Rakta as Jeevanam and Sharkadhara explains it under ten Nanatmaja Vyadhi, and as per Acharya Sushruta Raktamokshana as Ardhachikitsa and he had also described Rakta as the Chaturtha Dosha, hence all the Coagulopathy disorders can be understood under the disorders of Rakta Pradoshaja Vikara. Coagulopathy are caused by disruption in the body's ability to control blood clotting. In the present situation i.e., Pandemic Covid-19, patients with Covid-19 pneumonia exhibits coagulation abnormalities, most commonly elevated D-dimer has been associated with a higher mortality rate. Covid-19 causes a spectrum of disease, with frequent involvement of the hemostatic system. Severe pulmonary inflammation causes activation and may trigger pulmonary thrombosis early in the disease course. So, when compared to other Post Covid -19 Complication, Coagulopathy plays a most important role.

Key words: Rakta, Ardhachikitsa, Ayurveda, Coagulopathy, Covid-19, D-dimer.

INTRODUCTION

Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2) that has swept the globe in 2019 and 2020 causes Coronavirus Disease 2019 (COVID-19), a predominantly respiratory illness with 11.5 - 13% mortality among hospitalized patients. 80% of patient infected by SARS-CoV-2 may be symptomatic, but 10% develop severe respiratory symptoms that evolve to acute respiratory distress syndrome. There is a high incidence of venous thromboembolism (VTE) in hospitalized Covid-19 patients. Particularly those with

severe illness. The incidence of thrombotic complication is 16-69% in the COVID -19 patients.^[1] The incidence of venous and possibly arterial thrombosis remains high in COVID-19 patients despite administering standard thromboprophylaxis in one Italian COVID-19 study, the incidence of VTE (despite thromboprophylaxis) was 27.6% in the ICU and 6.6% in the general ward. The rate of ischemic stroke and acute coronary syndrome was 2.5% and 1.1% respectively. By going through these statistical analyses of death rate, complication in COVID-19 due to the Coagulopathy is more dangerous compare to other complication like acute respiratory syndrome (ARDS), Multiple organ failure etc.

Causes for the Coagulopathy disease in Covid-19 patients

Chronic disease, severe infection, and use of certain medications, viral infection^[2] long term uses of antibiotics^[3] may all affect the body's blood clotting, ,

There all are the common causes for the Coagulopathy while going through it carefully it occurs when the severe viral infections are present in a patient, so in the

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Covid-19 patients there will present of a severe infection and as well as viral infections also present so this also the causative factor for the occurring the coagulopathy disorders Covid-19 patients.

Certain usage of medications

In Covid-19 patients, there is a usage of like the drug called Doxycycline act as an Antibiotic where which adverse effect of drug causes the Low platelet count, Low white blood cell count, Hepatotoxicity and Hemolytic anemia^[4] etc. and another drug which is given is HCQ (Hydroxychloroquine) which has adverse effect like coagulopathy which is a cause for Cardiac arrest.

And uses of steroid causes the cirrhosis of the liver, which usually depresses certain clotting factor.^[5]

By looking the pathophysiology we can be comparing in *Ayurved* that *Rakta Pitta/Raktaja Vikara*. As *Acharya Charaka* in *Nidana Sthana* described that, if *Jwara* is not well treated which leads further complication i.e., *Raktapitta*^[6] which goes similar like a Coagulopathy along with association of different signs & symptoms. And the treatment also will vary accordingly.

The latest mutation of coronavirus are dodging the RT-PCR tests with many people testing negative despite having symptoms of coronavirus. But at the same time, further investigation related to lungs show that they have contracted the virus. By seeing the current trend of failed RT-PCR tests now they taken help of many effective testing procedure such as - D-dimer, CRP, Interleukin-6, and LDH.

D-dimer^[7]

Is a fibrin degradation product that is often used to measure and assess clot formation. A higher level of D-dimer in the body shows that there is a lot of clot presence in the body which can be a dangerous sign when affected with COVID. So, use of D-dimer to assess for severity of COVID disease and if the patient is going to need oxygen in the future, because the higher their D-dimer, higher is the clots in the lungs and higher chances that they will need oxygen.

CRP (C-Reactive Protein)^[8]

CRP has been found as an important marker that changes significantly in the severe patients with COVID-19, is a type of protein produced by the liver that serve as an early marker of infection and inflammation. In blood the normal concentration of CRP is less than 10mg. However in COVID patients it rises rapidly within 6 to 8 hours and gives the highest peak in 48 hours from the disease onset. Its half-life is about 19 hours to 8 and concentration decreases when the inflammation decreases.

Interleukin-6 (IL-6)^[9]

Is a cytokine which controls the immune response in addition to cell proliferation and differentiation. It triggers the activation of leukocytes, therefore after infection, cytokine storm causes and B cell activation and differentiation. Increased levels of IL-6 are demonstrated in low prognoses or metastatic cancers. High levels of inflammatory cytokines were observed in Covid-19 patients with more severe disease and were associated with pulmonary inflammation, lung damage and multiple organ failure.

LDH (Serum lactate dehydrogenase)^[10]

Test looks for signs of damage to the body's tissues. The enzymes turns sugar into energy, normal value of LDH is 140U/L to 280U/L. The LDH test is mainly used to help identify the location and severity of tissue damage in the body.

Understanding Post Covid-19 Coagulopathy in Ayurveda

As in this early stage of COVID-19 there will be a *Amavastha*, as in this *Avastha* with or without knowledge of patient the *Ama* will be Superset and further use of *Teekshana Oushada*, and *Phobia (Chinta)* patient develops the further complication along with a Covid-19 in this one among is Coagulopathy.

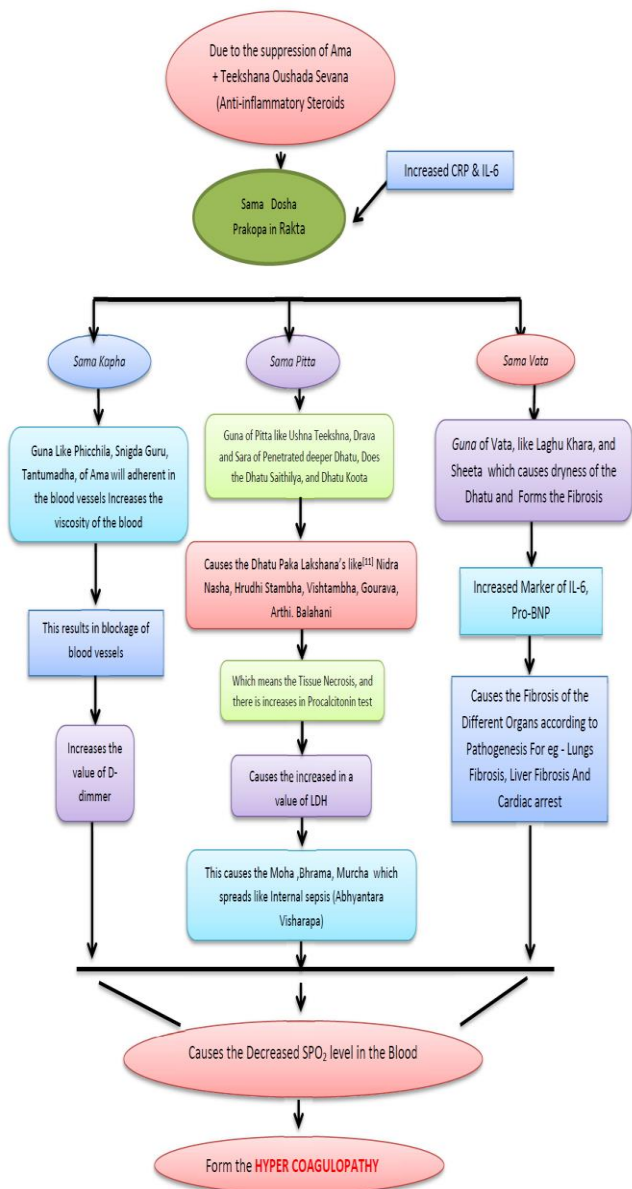
The manifestation of Coagulopathy in COVID-19 according to Ayurveda can be explained in a three different ways;

First one as a *Sama Kapha Prakopha*

Second one as a *Sama Pitta Prakopha*

Third one as a *Sama Vata Prakopha*

Chart 1



Samprapti Ghataka

Dosha	Vata (Samana, Udana, Vyana), Pitta (Panchaka, Ranjaka), Kapha (Avalmbhaka, Kledaka)
Dusya	Rasa, Rakta, Meda (Sanchari Rupa Meda)
Agni	Jatharagni, Rasa Rakta Dhatvagni
Ama	Jatharangnimandhyajanya Ama and Dhatavagni Mandyajanya Ama
Srotas	Rasavaha, Raktavaha, Pranavaha

Srotodusti	Sanga, Vimargakamana
Udbhavasthana	Amashaya
Sancharasthana	Sarva Sharira
Adhithana	Rakta
Vyaktasthana	Sarvasharira
Roga Marga	Marma Asthi Sandhi
Vyadhi Swabhava	Ashukari

Chikitsa Siddhanta

1st line of treatment - Hetu Vipharita Chikitsa

Avoiding the causative factors (*Nidana Parivarjana*) which causes the Hyper Coagulopathy and correction of the *Ama* is most requirement, where is the *Ama* is first Culprits which causes the further development of the *Vyadhi*. So, the first line of treatment always goes for the *Ama Pachana* as there is a two *Rasa* is used for *Ama Pachana*. First one is *Katu Rasa Yukta* & second one is *Tikta Rasa Yukta*, the most of the COVID-19 induced Coagulopathy first and foremost *Ama Pachana* should be used with considering *Dosha* involvement.

If there is involvement of the *Kapha Dosha*, *Katu Rasayukta Dravya* is used, where as in the involvement of the *Vata* and *Pitta Dosha* *Tikta Rasa* is used.

2nd line of Treatment - Dosha Vipharita Chikitsa

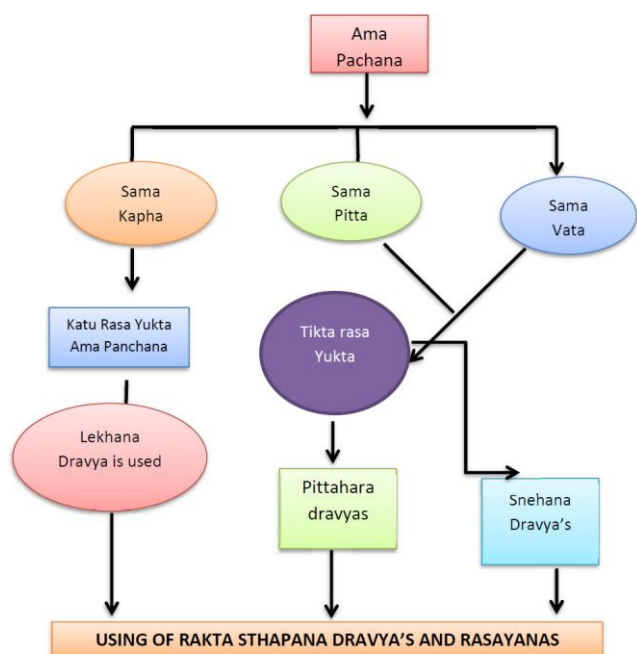
After the conforming the *Dosha Paka Lakshana's* like *Laghuta, Indriya Vaimalya*^[12] and which means *Dosha's* are gets free from the *Ama Lakshanas* then only, the *Dosha Vipharita Chikitsa* is carried *Sroto Vishudhana* and *Medahara* (circulating Fat)^[13] like *Lekhana Dravya's* used for the *Kapha*, for *Pittahara Dravyas* can be used like *Shandanga Paniya*^[14] and *Kashaya* which are used in a *Vishama Jwara* Like *Patola Sariva, Musta Patha, Katurohini, Nimbha, Guduchi* etc.^[15]

As per the *Vata* usage of the *Snehana Dravya's* which are mentioned in the *Kasa Swasa Adhikarana* like *Tejovatyadi Ghitam, Manhshiladi, Rasna Ghitam* etc.

3rd line of treatment - Shonita Sthapana and Dhatu Poshaka

Shonita Sthapana means not only the session of the Blood but also the *Shonita Dushtmaupahrutya, Prakruta Shonita Stapanama*.^[16] Then followed by the *Dhatu Poshana Rasyana's* like *Rakta Prashadaka, Pranavaha Sroto Shodaka* or *Puraka* like

Chart 2



Samanya Chikitsa

The condition of Post COVID-19 coagulopathy *Chikitsa* can be carried on as per guidelines of *Jwara, Swasa, Kasa, Vatavyadhi, Raktapitta, Vatarakta, Hrutaroga Chikitsa Sutra*.

Vishesha Chikitsa

Condition	Vata	Pitta	Kapha
In Ama	Tikta Rasa Yukta Dravyas and Vatahara like - Nagakeshara, Musta Amruta etc.	Tikta Rasa Yukta Dravyas and Pittahara like - Ativisha, Bilwanagakeshara	Katu Rasa & which are Kapha Hara Dravya like - Pipalimula, Uthijja, Ajamoda etc.
Kala Avadhi (Yu.Ra)	7days/7days	10days/9days	11days/12days

Jwara Adhikaran a)			
Vyadhi Pradhyanika	Sneha Dravya which does the Shamana of Vata – like Tejovatyadi Ghritam, Manhshiladi, Rasna Ghritam	Shamnoushadi which possess the Madhura Rasa in condition of without any bleeding and Coagulation are not present. Kashya Rasa – where there is a presence of bleeding and Coagulation	Rukshana, Lekhana Dravya Like - Bhallataka, Shilajitu etc.
Shonita Sthapana Dravyas	Laja, Madhuka,	Lodhra, Gairika, Sharakara	Priyangu, Madhu, Mocharasa

Rasayan	Vata	Pitta	Kapha
Due to Avarana	Bhallataka, Sarpi, Vardhaman Bhallataka	Pippali Rasayana, Agastya Haritahi	Vardhaman Bhallataka, Chitrakadilehya
Due to Dhatu Kshaya	Nagabala Rasayan Usage of Eranda Tailapana	Dhatryavaleha	Shiva Gutika, Punarnava Rasayan

DISCUSSION

In the Post COVID -19 hyper coagulopathy *Hetu Viparita Chikitsa* should be carried out i.e., *Nidhana Parivarjana, Amadosha Nirharna* and later *Lekhana Medohara Dravya* should be used, because if without administrating *Amapanchan* if the *Lekhana Dravya* are used then along with clot *Ama* also lodge in different area and causes the further complication. Which becomes a difficult to handle. So, for this condition first *Ama Panchana* like *Langhana*^[17] and *Ama Panchana Dravya* are used, and followed by *Vyadhi Prathyanika Chikitsa* is carried out. *Lekhana Dravya's* in a *Kapha*

Pradhana, Sneha Dravyas for Vata Pradhana and for Pitta, Pittahara Kashaya's are used after this next treatment should be stepped to Shonita Sthapana. Drug which are having Katu Rasa has property of Shonita Sanghta Bhinnati^[18] and Tikta Rasa has Lekhana and Kleeda, Meda, Shlesma Upshoshana properties which may help in lysis of formed thrombus and in our Samhita there is indirect reference for the Thromolytic drugs, As Acharya Sushruta during description of Rakta Mokshana says that in the process of Raktamokshana if the bleeding doesn't occurs due to clot formation then area should be rubbed by the powdered form of some drugs like Kushta.^[19]

CONCLUSION

Covid-19 is not only related to Respiratory System, but also Hemolytic System, Cardiac System, Urinary System, GIT System. Directly using a Rasayana (like Chavanaprasha etc.) is not a first line of treatment, it will not help improve the Immunity, further which cause the more complication and by the all above point one can treat the Post - Covid-19 Coagulopathy according to the condition.

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