JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

AN OBSERVATIONAL STUDY TO INTERPRET IMAGIOLOGICAL AND CLINICAL FINDING OF COVID PNEUMONIA IN AYURVEDIC PERSPECTIVE

[1]Dr. Abhirami Nath.O, [2]Dr. Mini P

[1] Department of Roganidana, Assistant Professor, IAAMC&H, Marthandam, Kanyakumari, Tamil Nadu,
[2]Department of Roganidana, Associate Professor, Govt. Ayurveda Medical College Tripunithara, Kerala

Abstract : COVID-19 Pneumonia is an inflammation of the air sacs of the lungs, which occurred as a complication of COVID-19 especially in the person having comorbidities. Pneumonia was the major cause of COVID-19-related deaths. In order to detect COVID pneumonia, radiological imaging particularly HRCT (High-Resolution Computed Tomography) is crucial. The majority of patients exhibit peripheral and one or more ground-glass opacities (GGOs) in the early stages of the disease; later, this progresses to consolidation, fibrosis, and crazy paving. The symptoms showed in COVID-19 Pneumonia can be correlated with the various diseases that are mentioned in Ayurveda like *Swasa, Kasa, Jwara* etc. In Ayurveda, *anumana pramana* is one of the important methods to acquire knowledge, particularly the things which beyond our perception of the naked eye. After the invention of new instruments, many things that were beyond our naked eye became perceivable. And now radiological studies are helpful in these kinds of circumstances. Since COVID-19 is a recently discovered illness, it might be regarded as an *anuktavyadhi* in Ayurveda. It will be easier to comprehend the state of *dosha*, *dushya*, and expansion of *samprapti* if we can interpret the relationship between the *lakshana* of the ailment and imagiological discoveries. Currently, there is not enough data regarding Ayurvedic interpretation of imagiological findings.

IndexTerms **- COVID-19 Pneumonia, HRCT, Status of *Dosha* and *Dushya***

I. INTRODUCTION

Ayurveda is an ancient system of medicine which have abundant source of knowledge. The object of *Ayurveda* includes providing a long, healthy, balanced life for human beings not merely the absence of diseases. *Ayurvedic* medicines are acting very well even in newly emerged diseases. However, these are poorly accepted globally due to the lack of evidence. Many of the concepts in *Ayurveda* are still not scientifically validated. For the acceptance of the concepts of *Ayurvedic* science globally need more evidence-based research works. Currently, large numbers of studies are conducted in the field of *Ayurvedic* science. *Ayurveda* is mainly conducting research in the fields of literary, fundamental, drug, pharmaceutical, and clinical research. *Ayurveda* described the importance of research centuries ago. *Ayurvedic* research methodology is based on *pareeksha*. *Prama* or true knowledge can be acquired by the *Pratyaksha* (direct observation), *Anumana* (the inference), *Yukti* (logical reasoning) and *Aptopadesha* (the authoritative testimonies or literature)[1].

The research are enhancing and advancing the knowledge of society. So research studies should be conducted in every field of science to improve and update the knowledge about concerned topics. Research is essential in the field of *Ayurveda* because many of the principles in our science are not proven.

COVID-19 is a globally affected infectious disease which is caused by the virus SARS-CoV-2, i.e. Severe Acute Respiratory Syndrome Corona Virus-2. It affects many aspects of the human population along with health issues. The disease mainly affects the respiratory system with other systems. The symptoms vary from asymptomatic to severe conditions like Pneumonia. Pneumonia is one of the symptoms as well as complications seen in COVID-19[2]. It dreadfully affected elderly and

immunocompromised peoples[3]. Diagnosis of COVID-19 mainly by nucleic acid amplification test, antigen detection tests, antibody detection test [4]. The best diagnostic method for COVID-19 Pneumonia is High-resolution computed tomography (HRCT). The most common HRCT feature is ground glass opacity (GGO). Other features include consolidation, crazy pavement pattern, and bronchial wall thickening etc [5].

SCOPE OF STUDY

Many things in the current scenario are varied from the classical texts. Many diseases are newly emerging nowadays due to our changed lifestyle and environmental changes. Such diseases are named *Anukta Vyadhi*[6]. COVID-19 is one among them. Pneumonia is inflammation of the lung caused by different types of bacterial or viral infections whic has been explained since centuries ago. COVID-19 Pneumonia is caused by the novel microrganism SARS-CoV-2.

Charakacharya in *Trisopheeyadhyaya* in *Sutrasthana* stated that, by understanding the vitiated *dosha* and *dushya* we can treat any disease and no need to name all the diseases specifically[7]. Even though COVID-19 Pneumonia is not explained in our classics we can correlate it with diseases like *Swasa, Kasa* and *Jwara* by symptomatically.

In contemporary science, different laboratory and radiological findings are using for the proper diagnosis of a disease. Ancient texts did not have such methods for the diagnosis of diseases. By HRCT of the chest, we can get knowledge about stages of the Pneumonia. As per *Ayurveda, dosha, dhatu* and *mala* are the main fundamentals of *shareera* [8]. This study focuses on whether the status of fundamentals such as *dosha, dhatu* and *srotas* can be interpreted by imagiological findings such as HRCT. If it possible, we can easily identify the status of *dosha, Dushya* and *srotodushti* by seeing the HRCT findings of patients.

II. METHODOLOGY

2.1 STUDY DESIGN

This study was a cross-sectional study. It focused on the imagiological and clinical findings in person with COVID-19 pneumonia.

2.2 STUDY SETTING

The study samples were collected from Punarjani OPD of Govt. Ayurveda Hospital, Kannur.

2.3 STUDY POPULATION

The 30 COVID-19 Pneumonia individuals from Punarjani OPD of Govt. Ayurveda Hospital, Kannur, were collected based on inclusion and exclusion criteria.

2.4 SAMPLE SIZE

The sample size was 30.

2.5 INCLUSION CRITERIA

- CT/HRCT Diagnosed case of Pneumonia during covid stage.
- Within 6 months of onset of symptoms.
- Patient of either sex.
- Patient of age group 30yr – 70yrs

2.6 EXCLUSION CRITERIA

- Terminally ill patient.
- Chronic Smokers.
- Diagnosed case of other respiratory illness

III. RESEARCH QUESTION

Can Ayurvedic interpretation in Covid pneumonia be assessed by imagiological and clinical findings in patients between age group 30yrs – 70yrs from the Punarjani OPD of Government Ayurveda College Hospital, Kannur?

IV. HYPOTHESIS

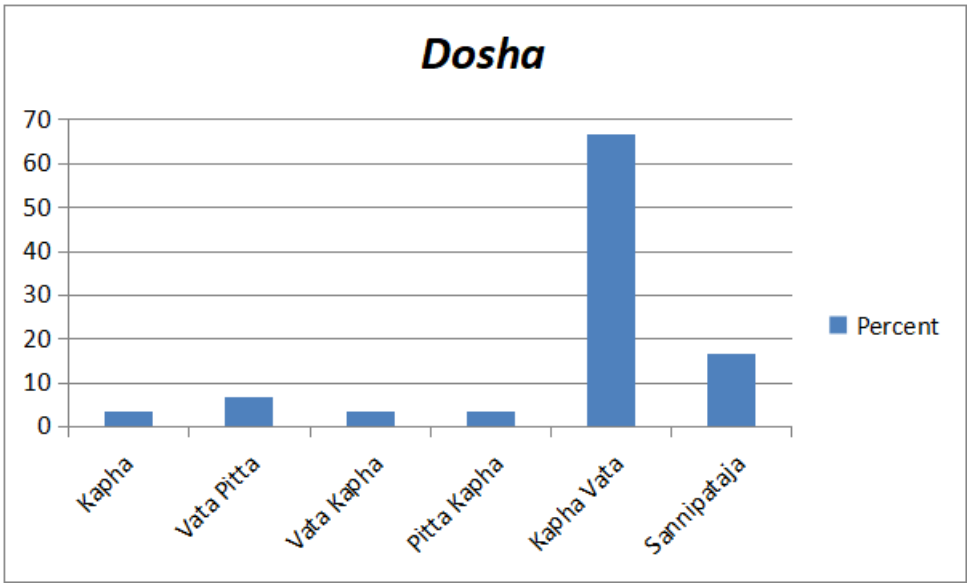
As this was an Observational study hypothesis is not necessary.

V. AIM AND OBJECTIVE

To interpret the imagiological and clinical findings of covid 19 pneumonia individual in Ayurvedic perspective.

VI. RESULTS

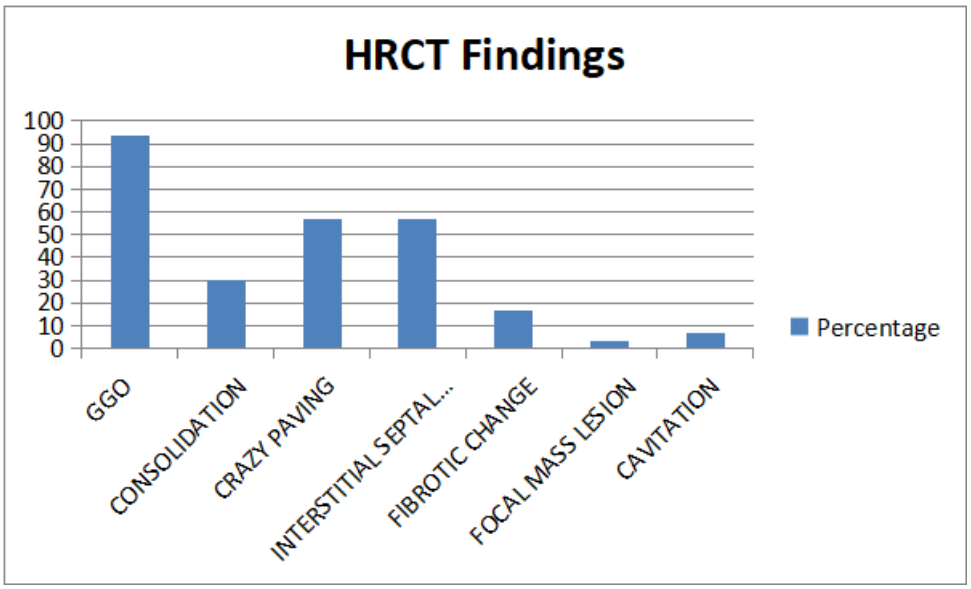
Distribution of sample according to *dosha*



Distribution of sample according to *srotas*

Srotas	Frequency	Percent
Pranavahasrotas	30	100
Annavahasrotas	23	76.6
Udakavahasrotas	4	13.3
Rasavahasrotas	28	93.3
Raktavahasrotas	4	13.3
Purishavahasrotas	6	20

Distribution of sample according to HRCT findings



VII. DISCUSSION

Normally, the lungs appear black on the HRCT film due to the relative lower density of air compared to the surrounding tissues. This indicates that they are free of visible blockages. Grey areas in HRCT films indicate that increased density which means something partially filling the airspaces inside the lungs.

Depending on the inflammatory response to viral infection, the impression on HRCT varies.

- Ground Glass Opacity - GGO

Ground Glass Opacity is the hazy opacity that does not obscure the underlying bronchial structures or pulmonary vessels. In chest CT it appears greyer colour due to increased density. Even though GGOs are mostly observed in the early phases of the disease, it may see in subacute/chronic clinical manifestations also. GGO occurs due to the partial filling of the airspaces with oedema fluid or inflammatory debris. The size and location of opacity may vary depending on disease progression. GGO may either focal or diffuse (multiple lobes) in distribution. COVID Pneumonia commonly affected the lower lobe of the lungs, particularly the left side (93.3%). As the disease progressed, it affected all lobes. In the early phase i.e congestion phase of Pneumonia, the lung is become heavy, enlarged, dark red and congested.

As per Ayurveda, proper respiration is possible by the action of *prakruta vata* and *kapha dosha*. Structural changes of *kapha* will hamper the normal *gati* (movements) of *vata*. In GGO, the *prakruta kapha* in the *uras* becomes *sama* stage. This causes *vibandha* (congestion) in lungs. The mucus in the respiratory system can be considered as *prakruta kapha* which protects epithelial cells in the lining of the respiratory system from pathogenic microbes. The stages of congestion represent an early acute inflammatory response to infection. Therefore, in this phase along with *samakapha*, sama *pitta* is also responsible. *Ghanatwa* and *guruta* of *urapradesa* is also due to *samapitta*. The enlarged and heavy lobes of the lungs may be due to the *sthula* and *guru guna* of the *kapha*, respectively. In addition, the dark red colour of the affected lobe may be due to involvement of the *pitta dosha*. The alveolar capillaries were also congested. In the stage of congestion *snigdha, guru, manda* and *slakshana guna* of *kapha* and *sneha, sara, drava guna* of *pitta* is responsible. *Rakta dhatu dushti* is also involved in this stage.

- **Interstitial septal thickening and Crazy paving**

As the disease progresses, interstitial septal thickening occurs in the subacute or chronic phase due to the chronic obstruction of pulmonary vessels as well as lymphatic vessels by fluid. Interlobular septal thickening is visible as thin linear opacity. It is due to pathology in the periphery of the pulmonary lobules which comprises pulmonary vein, capillaries and their associated interstitium. If GGO is observed with superimposed interlobular and intralobular septal thickening, it is called crazy paving.

As this stage is the continuation of GGO, in this phase also *samakapha*, sama *pitta* and *rakta dhatu dushti* are responsible for lung changes.

- **Consolidation**

In the consolidation phase of Pneumonia, the lobes of the lung have a firm, red, airless, dry, granular, and liver-like consistency. The oedema fluid is replaced by strands of fibrins. In this phase *sama kapha* becomes in *nirama* stage and *vata dosha* is more prominent especially the *Ruksha* and *khara guna*. The *Ruksha guna* of *vata* make *soshana* of *kapha*. It manifest as, oedema fluid is replaced by fibrin strands. In this stage *sthira guna* of *kapha* is more evident. In the late consolidation phase, due to the action of *vata*, lungs become more *syava varna* (grey). Colour of lungs changes from red to grey from early consolidation phase to late consolidation phase. In this phase, HRCT of the lungs show consolidation.

- **Fibrotic change**

In severe case of covid pneumonia, the alveoli undergo fibrotic changes. In this stage are tiny balloon shaped alveoli become damage and thickened scar will develop and eventually lose lung elasticity.

In this stage, *ruksha guna* of *vata* is causing *soshana* of *kapha*. *Kapha* became more *sthira* and *soumyamsa* in *urapradesa* will reduce. Here *ruksha* and *khara guna* of *vata* and *sthira guna* of *kapha* is responsible for pulmonary fibrosis. *Vata* makes the *kapha* is more *sthira* by *soshana karma*. In this stage *Soumyamsa* of *kapha* will completely loss.

- **Cavitation**

Pulmonary cavity is a gas filled area of consolidation of the lung. Cavities are formed by the expulsion of necrotic tissue.

Vata dosha is predominantly involving in this stage. *Mamsadhatu paka* occurs in this stage. This will *leads mamsa dhatu kshaya* and *vata vridhi*.

VIII. CONCLUSION

- HRCT findings of COVID Pneumonia individuals include GGO (93.3%), interstitial septal thickening (56.6%), crazy paving (56.6%), and consolidation (30%).
- In the congestion phase of Pneumonia, *sama kapha* and *sama pitta* are responsible. *Ghanatwa* and *guruta* of *uraradesa* occur may be due to *sama pitta*. The enlarged and heavy lobes of the lungs may be due to the *sthula* and *guru guna* of the *kapha*, respectively. In addition, the dark red colour of the affected lobe may because of the involvement of the *pitta dosha*. The alveolar capillaries were also congested. In the stage of congestion, *snigdha, guru, manda* and *slakshana guna* of *kapha* and *sneha, sara, drava guna* of *pitta* are responsible. *Rakta dhatu dushti* is also involved in this stage.
- In early consolidation, *kapha dosha* changed from the *sama* stage to the *nirama* stage. *Ruksha* and *khara guna* of *vata dosha* becomes prominent. The *Ruksha guna* of *vata* makes *soshana* of *kapha*. It can correlate with the replacement of oedema fluid by fibrin strands. In this stage, *kapha* becomes more *sthira.* The lungs become more *syava varna* (grey). The colour of the lungs changes from red to grey from the early consolidation phase to the late consolidation phase. In this phase, HRCT of the lungs shows consolidation.
- Gradually the *ruksha guna* of *vata* becomes more prominent and causes *soshana* of *kapha. Kapha* became more *sthira*. *Soumyamsa* in *ura pradesa* will reduce. *Ruksha* and *khara guna* of *vata* and *sthira guna* of *kapha* are responsible for pulmonary fibrosis. *Vata* makes the *kapha* more *sthira* by *soshana karma*. In this stage, soumyamsa of kapha will be completely loss.
- Expulsion of necrotic tissues in lungs causing cavitation. *Mamsadhatu paka* occurs in this stage. This will lead *mamsa dhatu Kshaya* and *vata vridhi*. *Vata dosha* is predominantly involved in this stage

LIMITATIONS OF THE STUDY

- As there is no tool to analyze the status of vitiated dosha, a self-protocol was used which is not a standardized one.
- Recall bias was experienced as the information was collected after a long time of exposure to the incident.

The study sample was difficult to obtain as the incidence of COVID Pneumonia is limited after the discovery of vaccines and also missing HRCT reports from participants.

IX. REFERENCES

1. Vaidya Jadavji Trikamji Acharya edited Agniveshas's Caraka Samhita Sutrasthana with Ayurveda dipika commentary, chapter 11, sloka no 17 Reprint 2022, Chowkambha Sanskrit series, Varanasi.Page No 70
2. Jakubec P, Fišerová K, Genzor S, Kolář M. Pulmonary complications after COVID-19. Life. 2022 Feb 28;12(3):357.
3. Bertini CD, Khawaja F, Sheshadri A. COVID-19 in the Immunocompromised Host. Clinics in Chest Medicine. 2022.
4. Rong G, Zhe Rong G, Zheng Y, Chen Y, Zhang Y, Zhu P, Sawan M. COVID-19 diagnostic methods and detection techniques. Encyclopedia of sensors and biosensors. 2023:17.
5. Rong G, Zheng Y, Chen Y, Zhang Y, Zhu P, Sawan M. COVID-19 diagnostic methods and detection techniques. Encyclopedia of sensors and biosensors. 2023:17.
6. Cozzi D, Cavigli E, Moroni C, Smorchkova O, Zantonelli G, Pradella S, Miele V. Ground-glass opacity (GGO): a review of the differential diagnosis in the era of COVID-19. Japanese journal of radiology. 2021 Aug;39(8):721-32.
7. Vaidya Jadavji Trikamji Acharya edited Agniveshas's Caraka Samhita Sidhisthana with Ayurveda dipika commentary, chapter 12, sloka no 41-44 Reprint 2022, Chowkambha Sanskrit series, Varanasi.Page No 736
8. Vaidya Jadavji Trikamji Acharya edited Agniveshas's Caraka Samhita Sutrasthana with Ayurveda dipika commentary, chapter 18, sloka no 44-47 Reprint 2022, Chowkambha Sanskrit series, Varanasi.Page No 108