



**Research Article**

**HISTOPATHOLOGICAL FINDINGS OF LUNGS IN COVID- 19 POSITIVE PATIENTS:AUTOPSY CASES AT RAJENDRA INSTITUTE OF MEDICAL SCIENCES(RIMS), RANCHI (JHARKHAND)**

**Khushboo Kumari<sup>1</sup>, Vinay Bhushan<sup>2</sup> and Ratna Choudhary<sup>3</sup>**

<sup>1,3</sup>Department of Pathology RIMS Ranchi

<sup>2</sup>Ex-Senior resident UCMS& GTBH (New Delhi), Specialist Paediatrician at Sbmch Hazaribagh Jharkhand (India)

**ARTICLE INFO**

**Article History:**

Received 06<sup>th</sup> December, 2020

Received in revised form 14<sup>th</sup>

January, 2021

Accepted 23<sup>rd</sup> February, 2021

Published online 28<sup>th</sup> March, 2021

**ABSTRACT**

**Background/Aim:** The prevalence of type of pneumonia in COVID -19 positive patient, results obtained when histopathological examination performed on autopsy specimen of lungs. **Material & Methods:** for this 12 cases of lungs specimens taken from the autopsy cases who died due to COVID -19 (positive patients). The specimen were selected from pathology department, RIMS, Ranchi over a period of 6 months. **Results:** Mostly features of interstitial pneumonia were found in most cases and some cases shows lobar pneumonia.

**Key words:**

COVID-19, Interstitial pneumonia, Lobar pneumonia, Autopsy, Histopathology

Copyright©2021 *Khushboo Kumari et al.* This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**INTRODUCTION**

A coronavirus is a kind of common virus that cause upper respiratory tract infections and affect lungs widely. Coronavirus belongs from SARS family so the name given SARS-CoV-2. In late 2019, a new coronavirus outbreak due to SARS-coronavirus-2(SARS-CoV-2) began in wuhan, china, which cause an illness in humans, designated as coronavirus disease 2019 (COVID-19) by the WHO<sup>1</sup>. As we know many study is going on that how coronavirus affect different organs of human body, main organ affected by coronavirus is lungs, it also affect different parts of body like blood vessels, eye, heart, liver. As lungs affected most, so symptoms are mainly related to respiratory tract like illness like coughing, fever, shortness of breath, trouble breathing, sore throat, loss of smell or taste, congestion/runny nose, besides this other symptoms are fatigue, chills, bodyache, headache, diarrhea, nausea, etc.SARS-CoV-2 continues to spread as the number of deaths continue to increases<sup>2</sup>.The mode of transmission of the virus is thought to be largely by inhalation of respiratory droplets although acquisition via the skin surface is another possibility<sup>3</sup>. Most patient with COVID-19 have a mild disease course; however, approximately 20% develop severe disease with high mortality rate and is associated with older age and immunosuppression<sup>4</sup>.

**MATERIALS AND METHODS**

For this retrospective study, 12 cases for histopathological examination of lungs of those patients died due to covid-19 disease which were sent in pathology department over a periods of 6 months. These were confirmed cases of COVID 19(positive). Autopsy performed itself in Forensic medicine and Toxicology (FMT) department, at RIMS and organs were sent to pathology department, RIMS for further histopathological examination. In histopathological examination of lungs we found type of pneumonia in different cases.

**Grossing of Specimen**

As previously mentioned that organ were sent from autopsy cases so, portion of both lungs or whole lungs were sent for histopathological examination. Specimen were kept for fixation. The lung tissue is very spongy and difficult to cut when fresh. The lungs has to be distended with formalin so that its architecture is well visualized on histology .Place the specimen in a large container with large volume of formalin (10 to 20 times the volume of specimen) and allow it to fix overnight.

**Steps in Grossing<sup>5</sup>**

1. Orientate the specimen and measure its three dimensions.
2. firstly, identify the bronchial and vascular margin at the hilum (if whole lung)

\*Corresponding author: **Khushboo Kumari**

Department of Pathology RIMS Ranchi

3. Identify the parenchymal cut margin with the help of staples.
4. Serially slice the specimen in horizontal plane from one end to other.
5. Place the lung slices serially.
6. Note any abnormal parenchymal areas for consolidation, fibrosis, tumour or emphysema.
7. In case of any marked pathology take section from that area.
8. In case of homogeneous area seen then section from different areas were taken.

## RESULTS

### Pathological Findings of Lungs in Covid-19

**Gross Appearance**-Received tissue specimen portion of lung – greyish black in colour with black spots on surface, frothy on press, soft in consistency in 9 cases; Lung consolidation in 3 cases.(figure1).



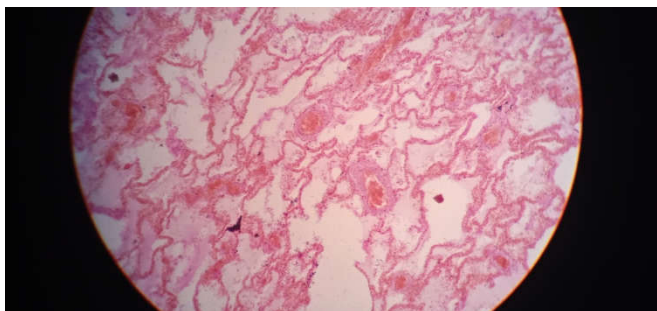
**Figure 1** Gross appearance of autopsy lung;COVID-19 patient Cut Open Section-Homogeneous areas seen with multiples black spots-in all 12 cases.

### Microscopic Findings

On the basis of study of histopathological slide of different cases of lung we noticed predominantly findings of interstitial pneumonia in 8 cases and findings of lobar pneumonia in 4 cases. microscopic findings are discussed below with diagrams.

#### Section Shows Interstitial Pneumonia Findings (Figure 2)

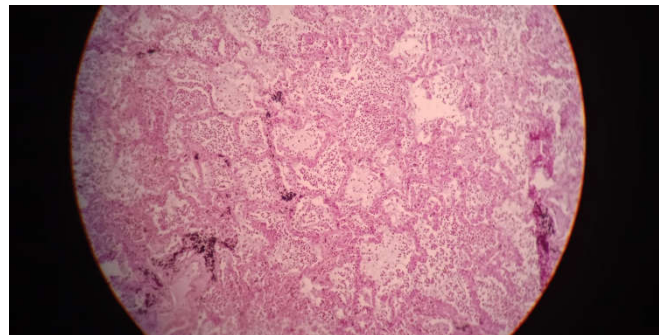
1. Diffuse and lung uniform inflammation on low power of alveolar wall.
2. lymphocytic or plasmacytic infiltration in alveolar wall
3. loose fibrosis
4. Alveolar hemorrhage



**Figure 2** low power view (10x) shows features of interstitial pneumonia, alveolar hemorrhage

#### Section Shows Lobar Pneumonia (figure 3)

1. Dilatation and congestion of the capillaries the alveolar walls
2. pale eosinophilic oedema fluid in the air spaces.
3. The cellular exudates of neutrophils is reduced due to disintegration of many inflammatory cells as evidenced by their pyknotic nuclei. The red cells are also present few in numbers.
4. The macrophages begin to appear in the exudates.
5. The cellular exudates is often separated from the sepal walls by a thin clear spaces.



**Figure 3** low power (10x) view shows cellular exudates of neutrophils, with carbon particles

## DISCUSSION

As the COVID -19 pandemic has unfolded, some have suggested that COVID-19 is characterized by novel acute lung injury pattern<sup>6</sup>.

Some reports have identified microthrombi as a prominent features af lung injury in patients with COVID-19<sup>7,8,9</sup>.

This novel virus was identified as a cause for pneumonia in china<sup>10</sup>. Much of the recognition of this pneumonia has been radiologic, described as ground glass nodule with progression to consolidation<sup>11</sup>.

The first paper reported severe pulmonary damage with features of acute lung injury<sup>12</sup>.Most findings from single institute case series, have also described edema and proteinaceous exudates with AT2 hyperplasia<sup>13</sup>. Perivascular lymphocytic inflammation with possible inclusions in atypical AT2 cells<sup>14</sup>, large airway mucus plugging with hyaline membrane and inflammation<sup>15</sup>.

## CONCLUSION

Overall, our study on histopathological examination of lung on autopsy cases shows type of pneumonia in COVID- 19 patients. we found microscopic changes in lungs of COVID-19 patients. Our study highlight which type of pneumonia is predominantly found in COVID -19 patients and result shows that interstitial pneumonia is seen in most of cases whereas lobar pneumonia is on second number .All these aspects could have impact on clinical management.

### Acknowledgement

The author would like to thanks Dr vinay Bhushan co-author for designing study and help in editing this manuscript.I would also like to thank Dr Ratna choudhary for her kind support in whole study procedure.

**Disclosure of conflict of interest:** None

## References

1. World Health Organization. Director General's remarks at the media 2019-nCoV on 11 february 2020. secondary director Genral's remarks at the media briefing on 2019-nCoV on 11 february 2020, 2020.
2. European Center for Disease prevention and control. Threats and outbreaks: COVID-19 secondary threats and outbreak: COVID-19,2020.
3. Osborn M, Lucus S, Stewart R, *et al.* Autopsy practice relating to possible case of COVID-19(2019-nCoV, novel coronavirus from china 2019/2020) secondary autopsy practice relating to possible cases of COVID-19(2019-nCoV, novel coronavirus from china 2019/2020)2020.
4. Huang C, Wang Y, Li X, *et al.* Clinical features of patients infected with 2019 novel coronavirus in Wuhan, china. *The Lancet* 2020; 395:497-506.
5. Nicholson AG,gibbs A, Kerr K, Gosney J. Dataset for Lung cancer Histopathology Report 3<sup>rd</sup> Edition. April 2011.published by Royal College of pathologists.
6. Copin M-C. Parmentier E. Duburcq T. Poissy J. Mathieu. Times to consider histology pattern of lung injury to treat critically ill patients with COVID 19 infection. *Intensive care Med.*2020; 46:1124-1126.
7. Ackermann M. Verlenden S.E. Kuehnel M.*et al.* Pulmonary vascular endothelialitis, thrombosis, and angiogenesis in COVID-19.*N Engl J Med.* 2020; 383:120-128.
8. Carsana L.Sonzogni A. Nasr A.*et al.* Pulmonary post-mortem finding in a series of COVID-19 cases from northern Italy:a two-center descriptive study. *Lancet Infect Dis.*2020;20:1135-1140.
9. Margo C.Mulvey J.J. Berlin D. *et al.* Complementary associated microvascular injury and thrombosis in the pathogenesis of severe COVID-19 infection: a report of 5 cases. *Transl Res.*2020; 220:1-13.
10. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, *et al.* A novel coronavirus from patients with pneumonia in china, 2019. *N Engl J Med.*2020;382:727-33.
11. Xia T J, Gao J, Xu X. small solitary ground –glass nodule on CT as an initial manifestation of coronavirus disease 2019(CIVID -19) Pneumonia. *Korean J Radiol.* 2020;21:545-9.
12. Yao XH, He ZC, Li TY, Zhang HR, Wang Y, Mou H, *et al.* pathological evidence for residual SARS-CoV-2In pulmonary tissues of a ready-for-discharge patients. *cell Res.*2020;30:541-3.
13. Tian S, Hu W, Niu L, Liu H, Xu H, Xiao SY. Pulmonary pathology of early phase 2019 novel coronavirus (COVID-19)pneumonia in two patients with lung cancer. *J Thorac Oncol.*2020; 15:700-4.
14. Zeng Z, Xu L, Xie XY, Yan HL, Xie BJ, Xu WZ, *et al.* pulmonary pathology of early phase COVID-19 pneumonia in a patient with a benign lung lesion.*Histopathology.*2020.
15. Konopka KE, Wilson A.Myers JL. Postmortem lung findings in an asthmatic patients with coronavirus disease 2019.*chest.*2020; S0012-3692:30775-3.

### How to cite this article:

Pavani Kiranmayi Munagala *et al* (2021) 'Histopathological Findings of Lungs In COVID- 19 Positive Patients: Autopsy Cases At Rajendra Institute of Medical Sciences (Rims), Ranchi (Jharkhand)', *International Journal of Current Advanced Research*, 10(03), pp. 24067-24069. DOI: <http://dx.doi.org/10.24327/ijcar.2021.24069.4771>

\*\*\*\*\*