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Original Article

Clinicopathological Spectrum of COVID-19

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ABSTRACT

Objective: To analyse the clinicopathological spectrum of COVID-19 among 2000 patients.
Study Design: Cross-sectional study.
Place and Duration of Study: Combined Military Hospital, Abbottabad Pakistan, from Apr to Jun 2020.
Methodology: The study included 2000 patients who came to CMH Abbottabad to seek medical attention during the first wave of the COVID-19 pandemic. Age, gender, contact history, history of foreign travel, clinical features, comorbid conditions and results of SARS-CoV-2 PCR were observed.
Results: From 2000 cases, 1442(72%) were males, and 558(28%) were females. The mean age was 35.02±13.00 years, and 1275(63.8%) cases were from the 3rd to fourth decade of life. 900(45%) of the cases had a contact history with a COVID-19 patient, whereas only 4(0.2%) had a history of foreign travel. 1854(93.0%) of the cases were asymptomatic, whereas only 48(2.4%) presented with fever and cough, the most common symptoms. Only 26(1.3%) cases had associated comorbid conditions, and 263(13.0%) cases showed positive PCR results. The statistical association was found to be significant among age groups, gender, contact history and results of SARS-CoV-2 PCR,(p-value< 0.001).
Conclusion: This study provides an overall view of the COVID-19 pandemic, which has grasped the globe within no time. Efficient preventive and control measures are mandatory, in addition to early identification and diagnosis, to overcome the infection.

Keywords: Clinicopathological, COVID-19, SARS-CoV-2 PCR.

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INTRODUCTION

SARS-CoV-2 is a member of the order Nidovirales, family Coronaviridae, subfamily Orthocoronavirinae, which is subdivided into four genera, namely, α, β, γ, and δ. Based on phylogenetic and genomic analyses, SARS-CoV-2 is a new Betacoronavirus of subgenus Sarbecovirus.[1,2] It is genetically distinct, belonging to one of the seven members of the CoV family that infect humans, producing a wide clinical spectrum ranging from flu to more severe illnesses like SARS.[3] It uses ACE2, but with much higher affinity, for cell entry via its structural spike glycoprotein, explaining its massive spread compared to the other members of the CoV family.[4,5] COVID-19 is a droplet infection transmitted by close contact and has a rapid spread. However, studies are unable to confirm its airborne spread. Viral RNA can be detected on fomites, but urine or serum samples usually remain negative in positive patients.[6] It has a mean incubation period of about 3–9 days, having a range of 0–24 days, with a mean serial interval of about 3–8 days, sugges-ting that one becomes contagious before symptoms arise.[7,8] Factors associated with higher morbidity and mortality that put the patients at risk of severe disease include male gender, pregnancy, old age, smoking, diabetes, pulmonary disease and other immunosup-pressive conditions.[9,10]

The rationale of this study was to analyse the clinicopathological spectrum of COVID-19 and their relative frequencies and to compare the results with other similar studies. Unfortunately, relatively less is known about this within South East Asia, particularly Pakistan. Moreover, there is no local study available in this regard. Therefore, this study will help identify, diagnose, evaluate and manage COVID-19 patients in our setup, thus providing a way to control this pandemic effectively.

METHODOLOGY

The cross-sectional study was carried out at the Pathology Department, Combined Military Hospital, Abbottabad, from April to June 2020, after the Ethical Committee Approval (IERB certificate number: PATH-LAB-001-21). The data of 2000 patients were retrieved from the hospital database, who reported for evaluation of COVID-19 by non-probability consecutive sampling technique.

Inclusion Criteria: All patients, irrespective of age, gender and clinical presentation, undergoing COVID-19 evaluation for the first time were included in the study.

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Exclusion Criteria: Patients who came for reevaluation were excluded from the study.

Age, gender, contact history, history of foreign travel, clinical features, comorbid conditions and results of SARS-CoV-2 PCR were observed.

The computer software program Statistical Package for the Social Sciences (SPSS) version 23.00 was used to analyzed the data. Mean and SD calculated were for Numerical variables such as age. Percentages and frequencies were calculated for gender, age groups, contact history, history of foreign travel, clinical features, comorbid conditions and results of SARS-CoV2 PCR.A statistical analysis between age groups, gender, contact history and results of SARS-CoV-2 PCR was carried out by using the Chi-square test. The *p-value* of ≤ 0.05 was considered statistically significant.

RESULTS

The record from 1st April 2020 to 1st June 2020 showed that a total of 2000 patients were evaluated for COVID-19 at the Pathology department of Combined Military Hospital, Abbottabad. Age, gender, contact history, history of foreign travel, clinical features, comorbid conditions and results of SARS-CoV-2 PCR were noted. The stratification of cases based on age groups, gender, contact history and results of SARS-CoV-2 PCR is shown in Table.

Table: SARS-CoV-2 PCR result based on Clinico-pathological Variables (n=2000)

Clinico-pathological Variables	SARS-CoV2 PCR		*p*-value
	Positive (n=263)	Negative (n=1737)	
Age Groups (years)			
1-20(n=35)	12(9%)	123(91%)	<0.001
21-40(n=1275)	76(6%)	1199(94%)	
41-60(n=508)	164(32%)	344(68%)	
61-80(n=74)	11(15%)	63(85%)	
81-100(n=8)	0	8(100%)	
Gender			
Male(n=1442)	240(17%)	1202(83%)	<0.001
Female(n=558)	23(4%)	535(96%)	
Contact History			
No Contact (n=1100)	67(6%)	1033(94%)	<0.001
<7 days (n=900)	196(22%)	704(78%)	

In our study, most patients belonged to 3rd to the fourth decade, 1275(63.8%). There were 1442 (72%) males and 558(28%) females with a male-to-female ratio of 3:1. Out of 2000 cases, 900 cases (45%) had a contact history with a COVID-19 patient, whereas 1100 cases (55%) were unaware of their exposure. Only 4 cases (0.2%) had a history of foreign travel, one to the Kingdom of Saudi Arabia and the other three to European countries.

Most cases were asymptomatic 1854(93%), whereas only 48(2.4%) presented with fever and cough, the most common symptoms. Only 26 cases (1.3%) had associated comorbid conditions. Only 263 cases (13%) showed positive PCR results, whereas 1737 cases (87%) were negative for SARS-CoV-2 PCR. Positivity was highest in patients in the 5th to sixth decade of life, 164(62%). The statistical association was found to be significant among age groups, gender, contact his-tory and results of SARS-CoV-2 PCR, (*p*-value< 0.001).

DISCUSSION

Evaluation of a patient with COVID-19 should be done in an orderly fashion that begins with a detailed history and clinical examination followed by imaging and laboratory investigations to confirm the diagnosis.[11,12]

In our study, most patients belonged to the 3rd to the fourth decade (63.8%, 1275) of life, similar to the study carried out in South Korea, showing most of the patients in the third decade of life.[13] Our study showed male predominance, with a male-to-female ratio of 3:1.

Of 2000 cases, 900 (45%) had a contact history with a COVID-19 patient, whereas 1100 cases (55%) were unaware of their exposure. These findings are in accordance with the study conducted by Chan *et al.*14 in China, showing person-to-person transmission in hospital and family settings via droplets. Only 4 cases (0.2%) had a history of foreign travel, one to the Kingdom of Saudi Arabia and the other three to European countries, as shown in the study conducted by Wilson *et al.*[15] in the USA.

Most cases were asymptomatic (1854(93%), whereas only 48(2.4%) presented with fever & cough, the most common symptoms. These findings are comparable to the results of studies conducted by Struyf *et al.*[16] in Europe and Martinez-Fierro *et al.*[17] in Mexico.

In our study only 26 cases (1.3%) had associated comorbid conditions, out of which 13 cases (0.6%) had one, 7 cases (0.4%) had two and 6 cases (0.3%) had more than two associated comorbid conditions, respectively. Comorbidities like diabetes mellitus and cardiovascular and pulmonary disease worsen the prognosis in COVID-19 patients, as shown in the study conducted by Mallah *et al.*[18] in Bahrain.

Only 263 cases (13%) showed positive PCR results, whereas 1737 cases (87%) were negative for SARS-CoV-2 PCR. Positivity was highest in patients in

the 5th to sixth decade of life (62%, 164). The positivity in our study is lower as compared to the positivity of 33% in the study conducted by Rosenberg *et al*.[19] in New York, which could be explained by the differences in the genetic and environmental factors prevailing in these regions.

Age groups, gender and contact history, were significantly correlated with SARS-CoV-2 PCR result (*p-value*<0.05) in our study, which is comparable to the South Korean, Italian, Chinese and American studies conducted by Shim *et al*.[10] Grasselli *et al*.[13] Chan *et al*.[14] and Rosenberg *et al*.[19] respectively.

Thus, early and accurate detection of SARS-CoV-2, timely isolation of the symptomatic individuals and appropriate management of the infected patients is the key to curbing this disease. This study is a positive addition to medical literature as it provides clinicopathological parameters related to COVID-19 in the Pakistani population of northern areas.

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CONCLUSION

This study provides the clinical and pathological aspects of the outbreak of COVID-19. The SARS-CoV-2 infected patients must be evaluated and managed peculiarly. Therefore, early identification of clinical features, using pertinent diagnostic criteria, and provision of effective medical care is mandatory to overcome this pandemic. However, a better understanding of various aspects of the disease is still challenging and requires further research.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

SSA: Study design, drafting the manuscript, critical review, approval of the final version to be published.

JS & MZ: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MHK & MH: Conception, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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