CLINICOEPIDEMIOLOGICAL CHARACTERISTICS OF PATIENTS WHO DIED FROM COVID-19 AT A NATIONAL HOSPITAL OF LIMA, PERU

CARACTERÍSTICAS CLÍNICOEPIDEMIOLÓGICAS DE PACIENTES FALLECIDOS POR COVID-19 EN UN HOSPITAL NACIONAL DE LIMA, PERÚ

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ARTÍCULO ORIGINAL

ABSTRACT

Introduction: The COVID-19 pandemic has caused more than 70 thousand deaths worldwide. **Objective:** To describe the characteristics of COVID-19 patients who died in a tertiary hospital. **Methods:** A descriptive study was carried out in the emergency service of the Hospital Rebagliati in Lima, Peru, which includes deceased patients with a positive result for SARS-CoV-2 infection diagnosed by RT-PCR until April 4, 2020. The medical history was reviewed. and hospital records looking for sociodemographic variables, clinical characteristics, radiological manifestations, treatment and evolution. **Results:** 14 cases were identified, 78.6% were male, average age 73.4 years (range 26 to 97). 21.4% of cases acquired the infection out of Peru. Risk factors were found in 92.9% of patients (more frequent elderly, hypertension and obesity). The most frequent symptoms were dyspnea, fever and cough, with illness time 8 days (+/- 3); signs of polypnea and respiratory rales. The most frequent laboratory findings were elevated C-reactive protein (average 22 mg / dL) and hypoxemia. The predominant radiological presentation was bilateral interstitial pulmonary infiltration in ground glass. 78.6% (11 of 14 cases) entered mechanical ventilation; 71.4% of the cases received azithromycin, 64.3% hydroxychloroquine and 57.1% broad-spectrum antibiotics; with a 4.7 day hospital stay (+/- 2.4). **Conclusion:** Those who died from COVID-19 presented bilateral severe pneumonia, more frequent in men, with risk factors (elderly, hypertension and obesity), with a high need for ventilatory assistance.

Key words: COVID-19; Viral pneumonia; SARS-CoV-2 (source: MeSH NLM).

RESUMEN

Introducción: La pandemia debida a enfermedad por coronavirus 2019 (COVID-19) ha producido más de 70 mil muertes en el mundo. **Objetivo:** Describir las características de pacientes fallecidos por COVID-19 en un hospital terciario. **Métodos:** Estudio descriptivo realizado en el servicio de emergencia del hospital Rebagliati Lima-Perú, que incluye los pacientes fallecidos con resultado positivo a infección por SARS-CoV-2 mediante RT-PCR hasta el 4 de abril de 2020. Se revisó la historia clínica y registros hospitalarios buscando variables sociodemográficas, antecedentes, manifestaciones clínicas, radiológicas, tratamiento y evolución. **Resultados:** Se identificaron 14 casos, 78,6% de sexo masculino, edad promedio 73,4 años (rango 26 a 97). Adquirieron la infección en el exterior del país el 21,4% de casos. Se encontró factores de riesgo en 92,9% de pacientes (más frecuentes adulto mayor, hipertensión arterial y obesidad). Los síntomas más frecuentes fueron disnea, fiebre y tos, con tiempo de enfermedad 8 días (+/- 3,0); los signos polipnea y estertores respiratorios. Los hallazgos de laboratorio más frecuentes fueron proteína C reactiva elevada (promedio 22 mg/dL) e hipoxemia. La presentación radiológica predominante fue infiltrado pulmonar intersticial bilateral en vidrio esmerilado. Ingresaron a ventilación mecánica 78,6% (11 de 14 casos); recibió azitromicina 71,4%, hidroxicloroquina 64,3% y antibióticos de amplio espectro 57,1% de los casos; con estancia hospitalaria de 4,7 días (+/-2,4). **Conclusión:** Los fallecidos por COVID-19 presentaron neumonía grave bilateral, más frecuentes en varones, con factores de riesgo (adulto mayor, hipertensión arterial y obesidad), con alta necesidad de asistencia ventilatoria.

Palabras clave: COVID-19; Neumonía viral; SARS-CoV-2 (fuente: DeCS BIREME).

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INTRODUCTION

The new disease associated to the coronavirus originated in China in 2019, designated COVID-19 (Coronavirus Disease 2019) is produced by a new virus denominated Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), with presumed zoonotic origin, but with evident spread from person-to-person which has disseminated rapidly all over the world and has been declared officially as a pandemic by World Health Organization on 11 March 2020[1-4].

This disease is characterized by producing severe progressive pneumonia, notifying more than 80 000 confirmed cases and more than 3000 dead patients in China until February of the present year. All over the world, it has been reported that this virus has infected around one million people, of whom 67 thousand have died, being the most affected countries Italy, Spain and France[1,4-6].

The first reported case in America was in the United States of America (USA) on 23 January 2020, but only at the end of March the number of cases increased abruptly, being currently considered the new epicenter of the pandemic. In South America, it appeared first in Argentina in February 2020, and the countries more affected in this part of the continent currently are Brasil, Chile and Ecuador[5,6].

In our country, the first infected person was confirmed on 6 March 2020, rapidly increasing the number of cases. On 19 March 2020, the first fatalities appeared (three on the same day) and two in the following days. In Peru, until 6 April 2020, 20 414 diagnostic tests were performed, obtaining 2 561 SARS-CoV-2 positive cases, 387 patients were hospitalised, 89 in intensive care unit with mechanical ventilation and 92 fatalities were reported[5,6].

The Hospital Nacional Edgardo Rebagliati, which is part of the Seguro Social de Salud del Perú or Essalud (The Peruvian Social Health Insurance), was considered as the reference center for COVID-19 in Lima and has been treating an important amount of hospitalised patients in the country, having exceeded the capacity of the environments intended for this purpose. The present study aims to describe the demographic, clinic and laboratory characteristics of patients with COVID-19 who died in the emergency service of a tertiary hospital of social security.

METHODS

Design and study area

Observational, retrospective study performed in adults emergency service of Hospital Nacional Edgardo

Rebagliati Martins de EsSalud, located in Jesus María District, Lima, Peru, including the dead patients with positive results for SARS-CoV-2 infection (by RT-PCR) between March 7 and April 4 2020.

Population and sample

The total of dead patients with positive results for SARS-CoV-2 infection (by RT-PCR) between March 7 and April 4 2020 were included. According to the characteristics, the patients were sent home to isolate, went to emergency department or were admitted into an observation room, which was arranged for suspicious, confirmed and critic (with mechanical ventilation) patients. .

Procedures and variables

The patients with COVID-19 diagnostic who died in the hospital were identified, then their medical history and hospital records were inspected in order to find sociodemographic variables, background information, clinical and radiologic manifestation, indicated treatment and evolution.

Statistical analysis

Data was codified and processed in Microsoft Excel 2013, a descriptive statistical analysis was executed by the calculation of measures of central tendency and dispersion for quantitative variables, as well as the absolute and relative frequency distribution, in the case of qualitative variables.

Ethical considerations

Helsinki Principles were complied, the data which permitted the patients identification was encrypted in order to protect their confidentiality by only one member of the research team. Authorization from service leadership was obtained.

RESULTS

14 dead patients with COVID-19 between 11 March and 31 March were identified. The age of patients varied between 26 and 97 years old (average 73,4 +/- 40,7), 78,6% of these cases were male. Age distribution and their epidemiologic characteristics are presented in Table 2. One of the patients was not hospitalised and died in his place of residence two days after being attended in emergency service, knowing his positive nasopharyngeal swab result on the same day of death.

Risk factors for severe disease were found on 92,9% of the cases, in which the more frequent cases were: age (over 60 years), arterial hypertension and obesity. The more frequent districts of origin were Miraflores, Jesus Maria, Chorrillos and La Molina. Two patients acquired the infection in Spain, and one in the United States of America.

A sick time between 3 and 14 days (average 8 +/- 3,0) was reported, The more frequent clinical manifestations at hospital admissions were polypnea, dyspnea, fever, cough and pulmonary rales (Table 2); the admission diagnoses were acute respiratory insufficiency and severe pneumonia in all cases. The more frequent laboratory test abnormalities were elevation of C-reactive protein (CRP), hypoxemia and lymphopenia (Table 2).

Chest x-rays were performed on 9 patients and lung CT scans on 2 cases, there was no studies performed on the first cases due to not having equipment or specific requirements to relocate patients to diagnostic x-rays area. Bilateral radiological abnormalities were found in all of the cases, prevailing the interstitial patterns in ground glass (6 out of 9 of the cases) and mixed alveolar and interstitial patterns in the other 3 cases (Figure 1).

In referring to treatment, 11 cases (78,6%) entered to mechanical ventilation, one of them in non-invasive modality, in a 97-year-old patient with adequate level of consciousness, but with no favorable response. It was administered azithromycin 500 mg orally and diary in 10 patients (71,4%), hydroxychloroquine 400 mg orally every 12 hours in 9 cases (64,3%) and broad spectrum antibiotics (57,1%). All of the patients received supplemental oxygen and symptomatic treatment as analgesics (paracetamol) or antipyretics (metamizole) as conditionals. It was administered sedation (midazolam) and analgesia (fentanyl) by continuous intravenous infusion to 9 of the 11 patients in mechanical ventilation. Systemic corticosteroids (hydrocortisone) were used in a patient with a history of asthma and adverse evolution.

Reported complications were: distributive shock in inotropic support with noradrenaline (four cases), multiple organic dysfunction (two cases), acute renal failure with hemodialysis treatment (one case), cardiorespiratory arrest at the time of admission which responses to resuscitation (one case) and post-procedure posterior pneumothorax with thoracic drainage (one case). Hospital stay average was 4 to 7 days (+/- 2,4).
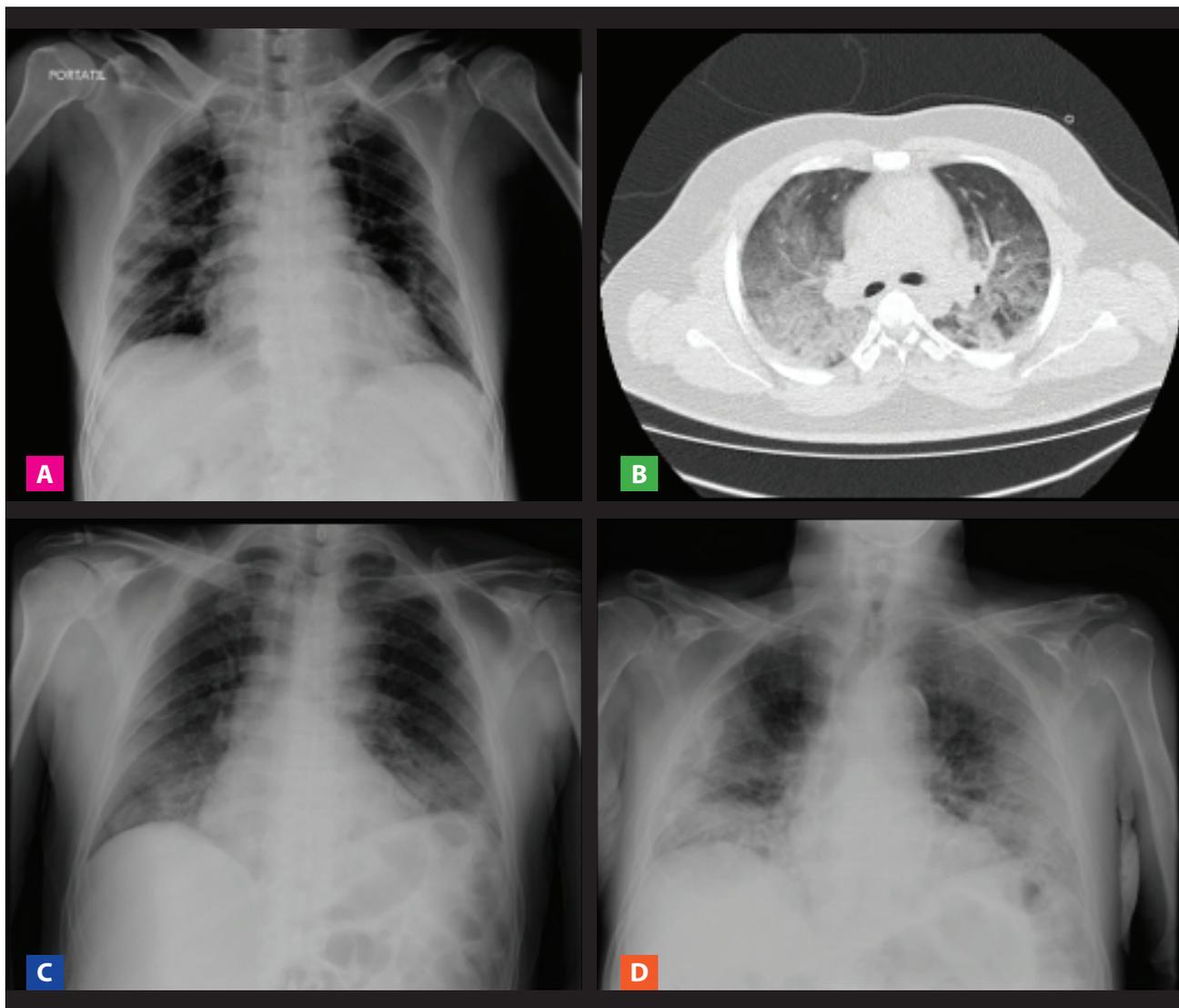
Figure 1. Radiological studies of patients who died from COVID-19, in a tertiary hospital in Lima, Peru.

(A) 61-year-old male with diabetes and arterial hypertension, shows interstitial pattern in bilateral ground glass. (B) 26-year-old male with history of bronchial asthma and obesity, with predominance of interstitial lesions in ground glass. (C) 66-year-old male with no history and bilateral alveolar-interstitial pattern. (D) Woman 97 years old history of arterial hypertension, with bilateral alveolar-interstitial lesions.

Table 1. Epidemiologic characteristics of dead patients with COVID-19 in a tertiary hospital in Lima until April 6, 2020.

Characteristics	n° (14 cases)	%
Age		
Under 30 years old	1	7.2
30 to 39 years old	1	7.2
40 to 49 years old	0	-
50 to 59 years old	2	14.2
60 years old or more	10	71.4
Sex		
Male	11	78.6
Female	3	21.4
District of origin		
Lima Centro	9	64.3
Another zone of Lima	5	35.7
Site of infection		
Foreign	3	21.4
Local	11	78.6
Risk factors		
Older person	10	71.4
Arterial hypertension	6	42.9
Obesity	3	21.4
Chronic lung disease	2	14.3
Diabetes mellitus	1	7.1
Steroid use	1	7.1
HIV infection	1	7.1
Number of risk factors by patient		
One	4	28.6
Two	6	42.9
Three	3	21.4

Table 2. Clinical manifestations and results of auxiliary examinations of patients who died from COVID-19, in a tertiary hospital in Lima until April 6, 2020.

Clinical manifestations and laboratory results at admission	n° (14 cases)	%
Symptoms		
Fever	11	78.6
Dyspnea	11	78.6
Cough	10	71.4
Diarrhea	4	28.6
Rhinorrhoea and odynophagia	2	14.3
Nausea and vomiting	2	14.3
Signs		
Polypnea (> 20 breaths per minute)	12	85.7
Respiratory rales	9	64.3
Oxygen saturation < 90%	8	57.1
Auxiliary examinations		
Elevated CRPa (average 22 mg/dl +/-4.8)	10	71.4
PaFi < 240	10	71.4
Lymphopenia (<1000/mm3)	9	64.3
Leukocytosis (<12000/mm3)	4	28.6
Elevation of transaminases (>40 U/L)	3	21.4
Hyperglycemia (>140 mg/dl)	3	21.4

a: CPR: Ultrasensitive C-reactive protein.

DISCUSSION

The characteristics of dead patients with COVID-19 which have been described are the first that occurred in the research hospital during the evolution of the pandemic in Peru. Similar to the severe cases reported in China and USA, it is been indicated a form of disease which is predominant in male people, whom after more than one week with fever, dyspnea or cough, develop acute respiratory insufficiency due to severe pneumonia and they die after four days, regardless of receiving mechanical ventilation[7-10].

The age (over 60 years), comorbidities as arterial hypertension and obesity were risk factors reported to develop the most severe form of disease, similar to which was reported in China and USA. Only one patient did not present any risk factors, but a significant percentage presented more than one associated to higher mortality. A 26-year-old patient was found to be progressing unfavourably and dying, but he had a history of obesity and bronchial asthma, which are poor prognostic factors for this disease[7,9,10].

Fever and dyspnea are frequent symptoms, but they are not enough as diagnostic or severity criteria, being necessary to associate them to objective data as capillary oxygen saturation or auxiliary examinations to take action on patient. Keep in mind that gastrointestinal symptoms as diarrhea and vomiting are considered atypical forms of presentation (rare), however were reported in 28% of this series of cases[7,10,11].

Associated with the risk factors, important objective data should be used to the assessment of the patient, highlighting the oxygen saturation, breathing frequency, systolic blood pressure and state of consciousness (assessed by Glasgow Coma Scale), the latter three are part of the qSOFA (quick Sequential Organ Failure Assessment)[12]. Indicators which can be used in patients who consult emergency and thus decrease the likelihood of having dead patients in their place of residence without surveillance or timely treatment.

In first cases there was problems to perform auxiliary examinations in COVID-19 area, in order to avoid these setbacks it is necessary to plan and implement appropriately these areas. In the findings it was found an increase in acute phase reactants (C-reactive protein) and lymphopenia, similar to what has been reported in Asia and North America[7,10,13,14].

Multifocal and bilateral pulmonary lesions are evident,

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similar to what has been reported in China, South Korea, France, USA, predominating the interstitial lesion which is characteristic of viral pneumonia[9,10,15-17]. However we have to remark the lack of adequate research on most of the patients, since one week after receiving the first cases, portable x-rays equipment was only available and it was difficult to perform CT scans to patients once they were admitted to the isolation area because of the lack of physical continuity with diagnostic services due to images.

The combination hydroxychloroquine and azithromycin was the most frequent treatment, even though available evidences are not enough yet[18]. Initially, the use of hydroxychloroquine was not authorized, but days later this situation changed in the hospital. Invasive ventilatory support also had problems with availability of suitable equipment and environment, but then the necessary was obtained, despite there was no good clinical response due to the large pulmonary involvement which is produced by the infection, similar to what has been reported in other countries.

Among the limitations of the research are the small number of cases, incomplete clinic data and auxiliary examination results in some patients and lack of research for concomitant infection with other viruses or bacterial complications. However it is an initial report which show the COVID-19 pandemic consequences in a Peruvian hospital.

CONCLUSION

In conclusion, this report presents the characteristic of the first dead patients with COVID-19 in Peru, which developed acute respiratory insufficiency due to severe pneumonia, it is more frequent in males, with older age, arterial hypertension and obesity as risk factors and high ventilatory support need.

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