



Sars-Cov2 Pneumonia in Mexico

Bertha Zenaida Acevedo Martínez

Department of Surgery of the General Hospital
"Dr. Rubén Leñero", Ministry of Health of Mexico City

Óscar Escalante Piña

Department of Surgery, Regional Military Hospital of Tampico,
Tamaulipas. Ministry of National Defense

Javier López Jarquín

Emergency Service of the General Hospital of Zone No. 29,
"Dr. Belisario Domínguez", Mexican Institute of Social Security

Olaf Alejandro López Arias

Anaesthesia Service of the General Hospital
"Dr. Rubén Leñero", Ministry of Health of Mexico City

Bruno París Romero Ángeles

Central Offices of the Mexican Institute of Social Security

Marta Estela Miranda Rendón

"Dr. Atanasio Garza Ríos" Health Center,
Ministry of Health of Mexico City

Karla Ixchel Contreras Solís

Emergency Department of the Regional Hospital
"Lic. Adolfo López Mateos" of the Institute of Security
and Social Services of State Workers

Carolina Jimarez Franco

Emergency Service of the High Specialty Medical Unit,
General Hospital "Dr. Gaudencio González Garza" National
Medical Center "La Raza" of the Mexican Institute of Social Security

Morelos Adolfo García Sánchez

Surgery Department of the General Hospital,
Ministry of Health of Mexico City. "Dr. Rubén Leñero"

ABSTARCT

Introduction: pneumonia is a very common pathology and, in some countries, it is a fatal in-hospital complication. However, at the end of November 2019, the first cases of acute respiratory syndrome were reported in people in the city of Wuhan, China. It was initially called atypical pneumonia. **Objective:** to report the experience of

SARS-COV2 pneumonia at the "El Vergel" Zone Military Hospital. Method: this is a retrospective, longitudinal, cross-sectional, observational and descriptive study, in a period of time carried out in a second-level medical care hospital. Results: 220 patients with SARS-COV2 pneumonia disease are reported. Of which 145 male patients are 66% and 75 female patients representing 34%. Confirmation of the diagnosis for covid 19 was carried out by nasopharyngeal PCR for Sars-cov-2. Most of the cases are severe and present hypoxia on admission, classifying the covid 19 disease as mild (3.6%), moderate (15.9%) and severe (80.4%). Conclusions: atypical pneumonia due to SARS-COV2 is a disease with a high level of virulence and/or pathogenicity in terms of clinical progression and aggressiveness, its mortality is overwhelming, hence the importance of presenting this research.

Keywords: Pneumonia. Atypical. SARS-COV2, Covid 19. Hypoxia. C-reactive protein.

INTRODUCTION

The COVID-19 epidemic became a major global public health event, affecting more than 223 countries and territories worldwide. Globally, more than 775 million cases and 7 million deaths have been reported. [1, 2] Pneumonia is a very common pathology and, in some countries, it is a fatal in-hospital complication as one of the most common. Therefore, atypical pneumonias occur less frequently, but unfortunately this has changed. And something so rare became brutally commonplace. The high mortality rate attributed to pneumonia, including cases of aspiration pneumonia, highlights the need for preventive measures. The Japanese Respiratory Society has developed guidelines to refine the treatment of pneumonia and establish a standard for care. However, multimorbidity in older adults complicates the effectiveness of disease-specific treatment regimens and drug therapies. [3] At the end of November 2019, the first cases of acute respiratory syndrome were reported in people in the city of Wuhan, China. [4] And on March 11, 2020, after 4 months, the World Health Organization determines in its assessment that COVID-19 can be characterized as a pandemic. [5]

Agents called coronaviruses comprise a large family of viruses and are a frequent cause of the common cold, approximately 125 nm, as shown in recent studies using cryo-electron tomography and microscopy. During the study of severe cases (atypical pneumonias), a new coronavirus was identified that had not previously been described as causing disease in humans, whose etiological agent was called SARS-CoV-2, one of the most devastating infectious diseases of this century. [6] Coronaviruses are divided into 4 genera: Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus, so far it is known that alpha and beta coronaviruses infect humans, causing illnesses ranging from the common cold to more serious conditions, such as Middle East respiratory syndrome (MERS-CoV) and severe acute respiratory syndrome (SARS-CoV), which caused thousands of deaths in 2020. [7] Coronavirus virions are spherical with cryoelectronic diameters, their genome is made up of single-stranded RNA, with positive polarity, and with an approximate length of 30,000 ribonucleotides. Four of the HCoV (HCoV 229E, NL63, OC43 and HKU1) are endemic worldwide and account for 10 to 30% of upper respiratory tract infections in adults. [8, 9] Airborne transmission has been shown to likely explain this mass contagious event, through so-called respiratory droplets, which can propel themselves 1.83 meters or more when talking, coughing, or sneezing (up to 5.2 meters have been documented). With infection risk levels of 70-100% after one hour; the risk would have been greatly reduced by using high-filtration respirators. [10] Coronaviruses replicate primarily in the epithelial cells of the lower respiratory tract and to a lesser extent in

the cells of the upper respiratory tract; that is why transmission occurs mainly from patients with recognized disease. [11, 12] In addition, the COVID-19 pandemic led to a massive disruption of access to healthcare and thus passive/active surveillance programs in hospitals and clinics with devastating consequences. [13]

The first case in Mexico was confirmed on February 27, 2020, at the National Institute of Respiratory Diseases. [14] On the other hand, as of February 5, 2021, 105,006,686 global cases have been reported, of which 2,287,129 are deaths, representing 2.17%. [15] Mexico ranks 13th worldwide with confirmed cases and third in terms of confirmed deaths from SARS-CoV-2 worldwide, with a total of 1,899,820 total confirmed cases, 162,922 deaths and 1,461,011 recovered cases, the distribution by sex in confirmed deaths shows a predominance of 63% in men, with a median age of deaths is 64 years. [16, 17] SARS-CoV-2 virus variants have been identified, including alpha, delta, omicron, mixed (Delta and omicron), and Omicron sublines B.1.1.529, sublines BA.1, BA.1.1, or BA.2). [18]

OBJECTIVE

To report the experience of pneumonia by SARS-COV2 in a period of time carried out at the Military Hospital of the Zone "El Vergel" in Mexico City.

METHOD

It is a study with a retrospective, longitudinal, cross-sectional, observational and descriptive design, in the period from May 2020 to October 2020, at the Military Hospital of the "El Vergel" Zone of Mexico City of second level of medical care. All patients admitted for COVID-19 were included with confirmation of the diagnosis for covid 19 was performed by nasopharyngeal PCR for Sars-cov-2; demographic variables, medical history, clinical, laboratory, and radiological data at admission and during hospitalization of patients were compiled in a database from a medical history. Laboratory data and information on the treatment administered were collected up to the time of the data cut-off for the period studied. Strategically, the Mexican Government specifies the diagnosis, in order to have an operational definition of CONAVE for the epidemiological surveillance of the viral respiratory disease for suspected case and confirmed case, with the addition of 2 new operational definitions, the definition of suspected cases did not have any modification. (These operational definitions had the real purpose of compensating for the lack of resources for a reliable diagnosis). [19]

RESULTS

220 patients with SARS-COV2 pneumonia disease are reported. Of which 145 male patients are 66% and 75 female patients representing 34%. Confirmation of the diagnosis for covid 19 was carried out by nasopharyngeal PCR for Sars-cov-2, with 2 deaths, representing 1%. All patients had evidence suggestive of pneumonia. During the month of June 2020, the maximum peak of hospital admissions due to covid 19 was obtained. The clinical picture of patients on admission with COVID-19 pneumonia who presented signs and symptoms in a combined or isolated way, in a non-specific manner, the most frequent being cough, dyspnea in second place and headache in third place. See Table 1.

Hypoxia is the pivotal sign that demonstrates critical ventilation and is therefore a fact that is specified as a severe pneumonia. Baseline O₂ saturation was less than 90% in a total of 177 cases, representing 80.45% of the total population studied, with hypoxia on admission. The

infection by the virus advances suddenly or rapidly and that gives it one more point to be an atypical pneumonia.

Table 1: Signs and Symptoms in Patients on Admission to the "El Vergel" Military Hospital with Covid 19 Pneumonia, In Number and Percentage.

Signs and Symptoms	Number	%
Attack on The General Condition	83	37.72
Cough	141	64.09
Headache	115	52.27
Odynophagia	53	24.09
Dyspnea	133	60.45
Fever	35	15.9
Anosmia	16	7.27
Diarrhoea	17	7.72
Other	104	47.27

The predominant blood and Rh group were O+, the mean age was 52 years, with a range of 18 to 81 years. In this study group, 117 patients are over 50 years old, the majority of whom are the majority. 7.72% of the cases did not have any comorbidity and the rest, which is 92.27%, did have one or more of them. The most frequent morbid factors were: overweight or obesity in 80.9% in the first place, diabetes mellitus in 29.09% and finally arterial hypertension was 26.36%. See table 2.

Table 2: Number and Percentage of Patients with Covid 19 Pneumonia at the "El Vergel" Military Hospital

Factors/Comorbidities	No. Of Patients	Percentage (%)
No	17	07.72
Hypertension	58	26.36
Diabetes Mellitus 2	64	29.09
Hypothyroidism	5	02.27
Cardiopathy	3	01.36
Asthma	4	01.81
Copd	2	0.90
Overweight	180	81.81
Hiv	2	0.90

Patients who are admitted with atypical pneumonia with SARS-CoV-2 are strategically classified for better treatment of covid 19 disease, as mild (3.6%), moderate (15.9%) and severe (80.4%). See table 3.

Table 3: Patients with Covid 19 Pneumonia Classified on Admission to The Military Hospital "El Vergel" in Number and Percentage.

Classification of Pneumonia	Total	Women	Man	Transfers
Lightweight	8/3.63	3/1.36	5/2.27	2/0.90
Moderate	35/15.90	12/5.45	23/10.45	4/1.81
Grave	177/80.45	57/25.90	120/54.54	57/25.90
Total	220	72/32.72	148/62.27	63/28.63

This classification by its clinical presentation allows an effective and efficient response to the admission of patients infected with atypical pneumonia by covid 19 from the beginning. The rate of infected cases is more frequent in men with a severe presentation and transfers to a third level of care confirm this.

Of the 220 patients, 63 (28.63%) were transferred due to clinical deterioration that warranted transfer to the intensive care unit in another health step for administration of high-flow supplemental oxygen, non-invasive mechanical ventilation or invasive mechanical ventilation. Blood gases were available only in all cases, with the predominant pattern in this cohort: uncompensated acute respiratory alkalosis (84/38.18%), followed by chronic uncompensated respiratory alkalosis (32/14.53%), compensated acute respiratory alkalosis (9/4.90%), compensated chronic respiratory alkalosis (8/3.63), mixed disorder (6/2.72%), uncompensated respiratory acidosis (1/0.90%), and compensated respiratory acidosis (1/0.90%). Finally, in chest x-ray, the predominant pattern was in polished glass with 110% of the total population studied, equivalent to 50%, followed by the multilobes pattern with 101 of the total population (45.9%), and 22.27% with an extensive multilobes pattern, defined as unilateral involvement of more than 50% or bilateral involvement of more than 25%. See Table 4.

Table 4: The Findings in The Chest X-Ray, In Number and Percentage of Patients with Covid 19 Pneumonia at the "El Vergel" Military Hospital

Radiological Characteristics	No. Of Patients	Percentage (%)
Pattern on Polished Glass	110	50%
Multilobes Pattern	101	45.90%
Extensive Multilobes Pattern	49	22.27%
Other	63	28.63%

In some patients, chest CT scans were performed, in the need for close monitoring of the evolution of the infectious process of COVID 19 pneumonia.

The average number of days of the infectious clinical picture that resolved in less than 15 days, which was 185 cases representing 84.09%, and the longest time to 15 days was in the rest of the 35 patients, which were 15.90%. Regarding the days of hospital stay, they ranged from 1 to 64 days, with an average of 7 days.

It is practically essential to carry out early, adequate and correct treatment in these patients, which will be expressed in the results of low mortality. In this research, only 2 deaths were reported, with a rate of less than 1%, very infinitely low, than what was reported in the rest of the world.

DISCUSSION

The COVID 19 pandemic became an Armageddon in humanity around the world and in Mexico, one of the preventive programs is the program that can be used as a model to promote more health promotion interventions in any country and the region. This role of the program was highlighted during the COVID-19 pandemic, with voluntary community participation and social responsibilities being essential competencies that this program promotes. [20] The COVID-19 pandemic disrupted healthcare systems around the world. Lessons learned from health

systems' responses to these challenges can help design effective and sustainable strategies for future events, describing four general contingencies: 1/ System overload. 2/ Barriers to decision-making. 3/ Education or training gaps. 4/ Limitations of existing services. [21] On the other hand, governments imposed non-pharmaceutical interventions to more effectively contain the pandemic, the effectiveness of in the United States during the first wave of the pandemic, with three types of prototypical Bayesian hierarchical analysis and efficient results. [22] The risk factors that have been involved in treatment has become a great challenge in the questioning of patients with atypical pneumonia due to COVID 19, where increasing age, the application of mechanical ventilation, having severe pneumonia, having interstitial lung disease and applying prone position were found to be statistically significant factors in mortality. [23] Sociodemographic and comorbidity factors and their associations with body mass index and mortality varied more by date than by region of ICU admission. Obesity is associated with higher mortality among COVID-19 patients, but with lower mortality among patients with respiratory diseases not associated with this infection. [24] In addition, another study in Mexico reports that the presence of asthma decreased the risk of mortality, variables such as age > 60 years, smoking, high blood pressure, diabetes, chronic obstructive pulmonary disease, cardiovascular disease and chronic kidney disease were factors associated with an increase in mortality. The diagnosis of asthma was not associated with mechanical ventilation or admission to the ICU. And in 617,367 participants, mortality was 0.9%, 0.2% required admission to the intensive care unit. [25] On the other hand, the general emotional impact of COVID-19, overweight or obesity, levels of depression, anxiety and living alone must be considered. They were a pattern of factors associated with the consumption of increased alcohol due to emotional disturbance during the pandemic. With the solution of providing nutritional counseling and targeted psychological actions. [26, 27] It should be taken into account that survivors of coronavirus disease in 2019 (COVID-19) present persistent symptoms that constitute what has been called "post-acute COVID-19 syndrome" or the so-called "long COVID-19", however, the specific mechanisms responsible for the pathology are unknown. [28] A correct diagnosis needs to be determined, where the COVID-19 pandemic highlighted the crucial role of diagnostic tests in the management of infectious diseases, in particular through the use of quantitative polymerase chain reaction tests with reverse transcription RT-qPCR, which despite their widespread use, there is still a notable gap in the understanding of fundamental diagnostic metrics, such as sensitivity and specificity, among many scientists and health professionals. [29]

It has been reported that ACE2 co-receptors, neuropilin 2, vimentin, and even sialylated gangliosides may also be responsible for the worsening of the evolution of COVID-19; on the other hand, some others may even play protective roles, this is still being studied. [30] Various investigations are met with findings based primarily on computational and in vitro studies, so more in vivo research and clinical trials are needed to confirm their efficacy and safety in humans; these discoveries such as GB-2, theaflavin, and theaflavin 3-gallate demonstrate significant potential as inhibitors of the ACE2-RBD interaction in Omicron variants, they highlight its therapeutic promise against COVID-19. [31] Treatments of sepsis that target cytokines in humans, including hemoperfusion therapy, steroids, antioxidants, and immunomodulation therapy. This review presents the cytokine physiology shared by humans and horses, as well as historical and updated perspectives on cytokine-directed therapy, focusing on the therapy of COVID 19 pneumonia, in fatal sepsis caused by the virus. [32]

As far as treatment is concerned, the search for adjuvant immunomodulatory therapies has been ongoing since the pandemic outbreak. The addition of cyclosporine showed no difference over a corticosteroid-based treatment in the clinical course of the included patients. Better identification of candidates who will benefit from receiving immunomodulatory drugs in future studies is needed. [33] Cold atmospheric plasma devices generate reactive oxygen and nitrogen species, have antimicrobial and antiviral properties, but also affect the molecular and cellular mechanisms of eukaryotic cells. The use of atmospheric plasma in the oropharynx can make an important contribution to the recovery of patients in intensive care who present with atypical pneumonia. [34] When the health system in Chile was saturated in 2019 due to the SARS-CoV-2 pandemic, a strategy was carried out with the experience of users of the Chilean public health system diagnosed with COVID-19 who performed outpatient care in the Metropolitan Region. A central finding is related to the changes in the lives of the participants during the diagnostic confirmation stage, highlighting the concern, uncertainty and misinformation about care once the result is delivered by technological surveillance, which is essential. [35]

Treatment with nirmatrelvir/ritonavir is a safe and effective oral antiviral drug used for the treatment of mild to moderate COVID-19. Case reports describe a clinical rebound syndrome, in which people experience a relapse of symptoms shortly after successfully completing treatment, with a mean time from onset to rebound being mild and being 11 days and only 6%. [36] Antiviral drugs show significant efficacy in non-severe cases of COVID-19, but there is still a subset of patients with moderate COVID-19 whose pneumonia continues to progress after a full course of treatment. Plasma-activated water possesses anti-SARS-CoV-2 properties, after failure of antiviral treatment; this pilot trial preliminarily confirmed that no adverse reactions were observed. This has yet to be verified by large-scale studies. [37] In the search for other treatment options, node block is a safe, low-risk, minimally invasive, and effective procedure in the treatment of long COVID symptoms. It should be evaluated as an add-on treatment in selected patients. [38] non-COVID-19 community pneumonia cases exposed to antiplatelet agents (acetylsalicylic acid or P2Y₁₂ inhibitors), show a decrease in mortality, in their use and can be studied in patients with SARS-CoV-2. [39] The present study has investigated the in-silico analyses of various flavonoid derivatives, pharmacophore modeling, molecular coupling, molecular dynamics, similarity with drugs and ADME properties. These are luteolin, quercetin, kaempferol and baicalin, which may be useful against SARS β -coronaviruses, as precursors to an effective treatment against this virus. [40] COVID-19 infection remains a serious illness for many people, including immunocompromised people. Nasal sprays offer potential protection against viruses, as the mucociliary function of sodium astodromer nasal spray and was compared with other available nasal sprays: low-pH hydroxypropylmethylcellulose, iota-carrageenan, nitric oxide, and povidone-iodine. Sodium astodromer nasal spray demonstrates acceptable non-clinical efficacy and a safety profile as a barrier nasal spray against respiratory viral infection in the nasal cavity. [41] The immunomodulatory potential of IFN-I in critical COVID-19 pneumonia and the natural compounds that regulate the related signaling pathway remain fully understood. IFN-I may have positive effects in early-stage patients, but may exacerbate infection in severe cases. Regulation of relevant IFN-I targets and signaling pathways is considered a promising treatment strategy for COVID-19. [42] Adipose stem cell-derived extracellular vesicles attenuated SARS-CoV-2 virus replication in Vero E6 cells and reduced body weight and signs of lung injury at infected sites, but is still under investigation. [43] The findings suggest reassessing the need for antibiotics in COVID-19 cases based on clinical assessments, focusing on the presence of bacterial infections rather than empirical

treatment, it is crucial to limit empirical antibiotic use in patients with COVID-19 and to consider antibiotic treatment only when there is clear microbiological evidence or a strong clinical suspicion of bacterial infection. [44, 45] 1,016 records have been identified through a database search and 57 on websites. 188 publications were duplicates, 854 were irrelevant records and finally 31 eligible Clinical Practice Guidelines and expert consensus statements were included, as far as rehabilitation is concerned, 14 guidelines provided information on rehabilitation evaluations that fall into two main categories: clinical examination and functional evaluation. Where the methodological quality and the quality of the reports of most of the included guidelines were quite low. Developers must formulate and publish clinical practice guidelines and expert consensus statements strictly in accordance with the AGREE II standard and the RIGHT checklist. [42] Finally, current systemically administered vaccines protect against severe COVID-19 infection and its post-acute sequelae. However, they do not induce antibodies in mucous secretions in individuals who have not been exposed to SARS-CoV-2. Conversely, in those who previously experienced mucosal infection, systemically administered vaccines can stimulate IgA production. [46] In addition, it has been studied, that the Pfizer vaccine elicited a significantly greater immune response compared to the Sinopharm vaccine after initial vaccination. However, both vaccines demonstrated high levels of protection against infection caused by the Alpha and Delta variants, but their efficacy gradually declined and diverged from each other when it came to the Omicron variants. [17]

CONCLUSION

The COVID-19 pandemic has been the largest unplanned acute overload in the history of the global health system, forcing numerous hospitals to modify spaces and cancel or postpone activities already scheduled and intended for medical care; than by the high incidence and prevalence of patients, who required hospitalization and management in the intensive care unit. These numbers showed the unfortunate but urgent problem of the saturation of the health system in Mexico and evidenced the lack of material and/or human resources in the extreme, the administrative incompetence of the health authorities or decision-makers. Forcing a rationing of resources for diagnosis, treatment, the proper use of supplies or, failing that, of what there is, as well as the competencies of specialized medical personnel, poorly trained paramedics and with little security. Five years after this pandemic and with all the technology, human knowledge in medicine, biochemistry, microbiology, etc. There is no cure or effective treatment, only absurd clinical practice guidelines, because they are based on empirical medicine in the so-called "experts" with more than 1,016 published records. It only manifests itself in the impotence of what current medical practice has become; with results of only death and that of the hope that the patient will survive the infection of the SARS-CoV-2 virus on their own. The above exemplifies the decline of the scientific quality of modern medicine.

Conflict of Interest

The authors declare that they have no conflict of interest.

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