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RESEARCH ARTICLE

Children hospitalized for COVID-19 during the first winter of the pandemic in Buenos Aires, Argentina

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Abstract

Background: *Although there are reports on COVID-19 in pediatrics, the characteristics of the population of each country, its health systems, and how the pandemic was addressed could give the disease distinctive features worldwide. We aimed to describe the characteristics of patients hospitalized for COVID-19 in a tertiary pediatric hospital in the City of Buenos Aires, Argentina.* **Methods:** *We conducted a descriptive study, including all patients hospitalized for COVID-19 from 04/26/2020 to 10/31/2020 in a tertiary pediatric hospital. We described the demographic, clinical, and epidemiological characteristics of the patients.* **Results:** *During the period studied, 578 patients were hospitalized with COVID-19. The median age was 4.2 years, and 83% reported close contact with a confirmed COVID-19 case. Regarding severity, 30.8% were asymptomatic, and 60.4% showed mild, 7.4% moderate, and 1.4% severe symptoms. Among symptomatic patients, fever was the most frequent symptom, followed by sore throat and cough.* **Conclusions:** *We reported 578 cases of children and adolescents hospitalized with COVID-19, of which the majority showed mild or asymptomatic disease.*

Keywords: *Coronavirus infection. COVID-19. Pneumonia. Hospitalization. Children.*

Niños hospitalizados por COVID-19 durante el primer invierno de la pandemia en Buenos Aires, Argentina

Resumen

Introducción: *Si bien existen reportes sobre COVID-19 en pediatría, es posible que las características de la población de cada país, sus sistemas de salud y cómo enfrentaron la pandemia hayan hecho que la enfermedad mostrara rasgos distintivos a escala global. El objetivo de este trabajo es describir las características de los pacientes hospitalizados por COVID-19 en un hospital pediátrico terciario de la ciudad de Buenos Aires, Argentina.* **Métodos:** *Se llevó a cabo un estudio descriptivo que incluyó a todos los pacientes hospitalizados por COVID-19 del 26 de abril al 31 de octubre de 2020 en un hospital pediátrico de tercer nivel. Se describen las características demográficas, clínicas y epidemiológicas de los pacientes.* **Resultados:** *Durante el período estudiado fueron hospitalizados 578 pacientes con COVID-19. La mediana de edad fue de 4.2 años y el 83% reportó antecedentes de contacto cercano con un caso confirmado de COVID-19. En cuanto a la gravedad, el 30.8% fueron asintomáticos y el 60.4% mostraron síntomas leves, el 7.4% moderados y el 1.4% graves. Entre los pacientes sintomáticos, el síntoma más frecuente fue la fiebre, seguida de odinofagia y tos.* **Conclusiones:** *Se reportaron 578 casos de niños y adolescentes hospitalizados con COVID-19, de los cuales la mayoría presentó enfermedad leve o fueron asintomáticos.*

Palabras clave: *Infección por coronavirus. COVID-19. Neumonía. Hospitalización. Niños.*

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Introduction

Although the COVID-19 pandemic has caused hundreds of thousands of deaths worldwide, the current information shows that the disease is less severe in the pediatric population[1,2].

Some studies report that the course of the pandemic could be influenced by each country's characteristics, its health systems, and the way it has dealt with the pandemic[3,4].

Argentina faced the pandemic in a particular way, including one of the longest lockdowns[5] and the mandatory hospitalization of affected children[6]. These characteristics could give a distinctive feature to children hospitalized for this disease in Argentina.

We aimed to describe the characteristics of patients hospitalized for COVID-19 in a pediatric tertiary hospital in the City of Buenos Aires.

Methods

We conducted a retrospective study including all patients hospitalized with COVID-19 in a tertiary pediatric hospital in Buenos Aires, Argentina, from April 26 to October 31, 2020. In addition to patients admitted for COVID-19, all cases requiring hospitalization for other reasons were analyzed. Infection was diagnosed by identification of SARS-CoV-2 in nasopharyngeal secretions by RT-PCR.

The study population included subjects who spontaneously attended our hospital for suspected COVID-19 (symptoms or history of close contacts)[7] and subjects who were identified by active surveillance in impoverished neighborhoods[8]. Of these neighborhoods, those symptomatic subjects with SARS-CoV-2 identified by PCR, those under 2 years of age, or those older than that age who could not complete isolation at home were hospitalized[7]. We also included patients who required hospitalization for another reason and whose SARS-Cov-2 infection was identified on admission.

In all cases, we registered demographic characteristics, such as sex, age, place of residence (including whether they lived in an impoverished neighborhood[9]), the onset of symptoms on admission, close contact with a confirmed COVID-19 case, presence of any comorbidity, and duration of hospital stay.

Disease severity was established according to Dong et al.[10]; patients with SARS-CoV-2-related multisystem inflammatory syndrome (MIS-C) were considered severe/critical.

The results of laboratory tests (hemoglobin, differential WBC count, platelets, C-reactive protein, and erythrocyte sedimentation rate) were also recorded.

The Ethics Committee of the institution approved the study.

Statistical analysis

Categorical variables were described by proportions with 95% confidence intervals (95%CI) and continuous variables by the mean and standard deviation or median and interquartile range (IQR), according to the distribution (Kolmogorov-Smirnov test). For the analysis, the IBM SSPS Statistics 20.0 software was used.

Results

During the period studied, 578 children and adolescents were hospitalized for COVID-19. Some characteristics of 191 of these patients were mentioned in a preliminary report at the beginning of the pandemic[9]. Here, we described the characteristics of all patients hospitalized for COVID-19 during the entire cold season (May-October), including laboratory data.

The number of hospitalizations ranged from 2 to 42 per week (median = 30.5; IQR: 21.7-35.7) (Figure 1). The median age was 4.2 years (IQR: 0.7-11.2), and 54.5% of the patients were male. A total of 67.3% were residents within the hospital's jurisdiction (City of Buenos Aires), and, of these, 23.1% lived in a low-income neighborhood.

Also, 83% had a history of close contact with a confirmed case of COVID-19. The onset of symptoms before admission was one day (IQR: 1-3), and 35.3% had a previous or concomitant diagnosis of another disease, with asthma being the most frequent (n = 49) (Table 1).

Disease severity was assessed, and the following results were observed: 30.8% were considered asymptomatic, 60.4% mild, 7.4% moderate, and 1.4% severe. Of the six severe cases, only one required assisted ventilation, and two had SARS-CoV-2-related MIS-C. Other six MIS-C cases were admitted to the hospital, but SARS-CoV-2 tests were negative at that time. In addition, the most frequent initial symptom was fever, followed by sore throat and cough (Table 2).

Regarding laboratory tests results, we found that 9.4% showed lymphopenia (differential lymphocyte count < 20%) and 23.8% had elevated C-reactive protein values (C-reactive protein > 10 mg/dL) in 100% of severe cases and 10% among asymptomatic

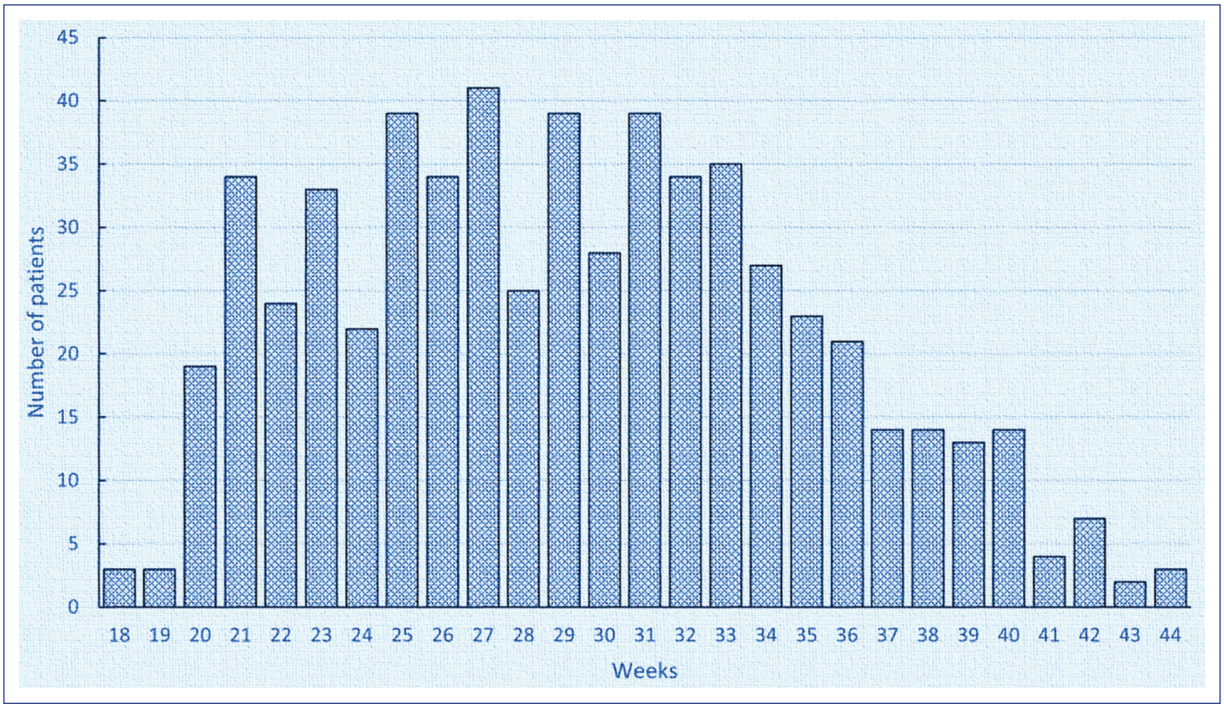

Figure 1. Pediatric hospitalizations for COVID-19 according to the epidemiological weeks.

cases (Table 3). The median length of stay was 6 days (IQR: 2.2-9).

At the time of this report, only one COVID-19 patient died of causes other than the disease, as he had been in end-of-life care for more than a month before infection. All patients were discharged without complications (with phone follow-up), except those whose comorbidity prevented this.

Patients with MIS-C were treated according to local guidelines (including assisted ventilation, systemic corticosteroids, and vasoactive drugs, when necessary)[11]. According to local guidelines, patients received supportive measures and no disease-specific or experimental treatments[12]. When appropriate, patients also received treatment for their comorbidities.

Discussion

The present study reinforces the idea that the manifestations of COVID-19 in pediatrics, in general, are mild. It also supports some characteristics of the disease observed in Argentina, suggested by our group in a previous report[13].

Although the age structure (for example, Argentina has twice as many children under 15 years of age as Italy, the first Western country affected by the pandemic) and the social behavior of the different populations may influence the differences observed[14,15], how local health authorities dealt with the pandemic has generated some particular features in our patients: Buenos Aires reported more pediatric cases than other countries, and we found a higher proportion of asymptomatic patients and with mild symptomatology among those hospitalized.

The City of Buenos Aires adopted a test-and-trace policy. This program was carried out more strongly in poor neighborhoods with a younger population[8]. Mandatory hospitalization of still asymptomatic infants was also established[6,7]. Furthermore, asymptomatic children and adolescents who were unable to comply with out-of-hospital isolation at home were hospitalized during the isolation period[16].

Up to October 31, 2020, the City of Buenos Aires reported 147,363 cases of COVID-19, of which 12.1% were children and adolescents[17]. This proportion was substantially higher than initially reported in China (2.1 %)[18] and Italy[19], but closer to that most recently reported in the United States (9%)[20].

We found a high proportion of asymptomatic patients (30.8%), higher than that reported by Götzinger et al. in Europe in 582 children with SARS-CoV-2 infection (16%)[21]. Despite this high number of asymptomatic children, the

Table 1. Comorbidities in pediatric patients hospitalized for COVID-19 (n = 204/578)

Disease	n
Asthma	49
Surgical conditions (appendicitis, testicular torsion, hernias)	12
Seizures	11
Non-progressive chronic encephalopathy	11
Genetic disorders	9
Tumors	8
Tuberculosis	8
Other infections (otitis, cellulitis, hepatitis)	8
Urinary tract infection	7
Obesity	5
Diabetes mellitus	5
Thrombocytopenic purpura	5
Chronic kidney disease	5
Chronic lung disease/ Bronchopulmonary dysplasia	4
Congenital heart disease	3
Hemolytic-uremic syndrome	2
Hematologic disease (spherocytosis, hemophilia)	2
Human immunodeficiency virus	2
Other	48

Table 2. Initial symptoms of patients hospitalized for COVID-19 (n = 400)

Symptom	n	%
Fever	207	51.7
Sore throat	49	12.2
Cough	40	10
Rhinorrhea	39	9.7
Headache	37	9.2
Diarrhea/vomiting	35	8.7
Dyspnea	17	4.2
Abdominal pain	15	3.7
Loss of smell	13	3.2
Rash	6	1.5
Loss of taste	3	0.7

Table 3. Laboratory results of children hospitalized for COVID-19

	Mean	SD
Hemoglobin (mg/dL)	12.5	1.4
White blood cells count (/mL)	8,062	3,889
Differential lymphocyte count (%)	49	20
Neutrophil differential count (%)	39	20
Platelet count (/mL)	289,544	106,073
Erythrocyte sedimentation rate (mm/h)	13	12
C-reactive protein (mg/dL)	14	38

proportion of those with any comorbidity (35.3%) was similar to other series[22,23]. Our findings are probably related to the test-and-trace and institutional isolation policies adopted by the local health authorities.

As reported[24], we also found a higher proportion of subjects with comorbidities among patients with moderate and severe symptomatology than those with mild disease or asymptomatic. However, this result should be assessed with caution due to our series's low proportion of patients with moderate and severe disease (8.8%).

We found only 7.4% of moderate and 1.4% severe cases. Dong et al. in China reported 5.9% severe and critical cases[10], and Tagarro et al. in Spain reported that 9.7% of the cases in this series were severe[25]. Although a report from the United States showed that 32% of hospitalized pediatric patients with COVID-19 were admitted to a PICU, the limited mean length of stay (2 days) and the limited proportion of subjects requiring assisted ventilation (5.8%) suggest that the admission criteria in this series were broader[23].

The cases of MIS-C (multisystem inflammatory syndrome associated with COVID-19 in children) appeared 4 to 6 weeks after reaching a significant number of cases in our city, as described for the development of this complication[26].

Finally, we found that 83% of our patients had close contact with infected people, supporting the idea that children are usually infected from adults[27].

Our report has limitations that should be mentioned. On the one hand, long-term follow-up of our patients was not carried out, which would have allowed us to identify cases that can be considered "long COVID," although the presence of this condition in children seems to be very infrequent[28]. On the other hand, this study only presents data from a single-center, although

it is probably the public institution that has hospitalized the most pediatric patients with COVID-19 in our country. Moreover, the inclusion of single-center data shows that in winter with no respiratory syncytial virus (RSV)-related hospitalizations, the number of patients hospitalized for COVID-19 is approximately the same as those admitted for RSV disease each year[29], regardless of whether this is related to non-pharmaceutical interventions used to control the pandemic[30].

In this study, 578 cases of children and adolescents hospitalized for COVID-19 in Argentina were reported. The majority presented mild or asymptomatic disease, supporting the idea that the management of pediatric patients with COVID-19 represents more of an organizational challenge than a specific clinical task[31].

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author has this document.

Conflicts of interest

The authors declare no conflict of interest.

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