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Research Article

Clinical and Virological Profile of Hospitalized Bronchiolitis Patients During the COVID-19 Pandemic: A Uni-Centric Algerian Study

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Abstract

Background: Bronchiolitis is a real public health problem. Quarantine and anti-COVID-19 protection measurements have reduced the incidence of bronchiolitis during the year 2020. Unfortunately, this was shortly lived. Through this work, we attempt to describe the characteristics of the 2021 bronchiolitis epidemic, particularly from the clinical and paraclinical aspects during the period of 01/09/2021 to 31/12/2021.

Methods: It is a prospective, descriptive, analytical study of hospitalized patients. Nasopharyngeal swabs were taken for virological study by real-time PCR. Statistical data analysis was performed using SPSS software, version 26.0.

Results: 1508 bronchiolitis cases were seen in the paediatric emergency department, 86 of them were hospitalised, which corresponds to 5% of hospitalisations. The average age was 3 months. A notion of contagion was found in 78.2% of the patients. The notion of a COVID-19 infection was found in 30% of the child's family circle. The incubation period for more than half of the patients hospitalised was 2 to 5 days, and dyspnoea, cyanosis and cough were the three signs that motivated parents to come to the ER. The signs of severity presented by our patients according to their frequency were: cyanosis, marked respiratory chest retractions and nasal flaring.

On the virological aspect, 100% of our sampled patients presented an RSV infection in 1/3 presented a co-infection RSV with another virus, 0 case of SARS-CoV-2 was detected in our study.

In terms of management, all our patients received nasal desobstructions with saline. 92% of hospitalised patients received oxygen therapy. More than half of our patients required 4 to 10 days of oxygen therapy. All infants recuperated in 5-10 days without sequels. There was only one death due to acute suffocating pneumothorax.

Conclusion: Our study highlights the temporal relation between the negligence of anti-covid measurements such as hand sanitizing, use of facemasks and the isolation of infected individuals and the recurrence of bronchiolitis during the 4th quarter of 2021.

Keywords: Bronchiolitis; RSV; SARS-CoV-2; Infant; Algeria

Introduction

Bronchiolitis is a real public health problem. Quarantine and anti-COVID protection measurements have reduced the incidence of bronchiolitis during the year 2020. Unfortunately, this was shorty lived, as the bronchiolitis epidemic started at the beginning of the autumn 2021 season.

Objective

To describe the clinical, paraclinical and virological characteristics of the 2021 bronchiolitis epidemic after the 3rd wave caused by the DELTA variant of the COVID-19 pandemic.

Inclusion criteria

All hospitalizations during the period from 01/09/2021 to 31/12/2021, for which the diagnosis of bronchiolitis as the main pathology was retained.

Methods

It is a prospective, descriptive study with an analytical aim on the patients hospitalized during the period from 01/09/2021 to 31/12/2021. Nasopharyngeal swab samples for virological study were taken the day after the admission of the child and rapidly sent in a sterile bottle at 4°C the same day to the microbiology laboratory of the Pasteur Institute of Algiers. The etiological diagnosis of viral infections was carried out by real-time PCR. Statistical data analysis was performed using SPSS software, version 26.0.

For the descriptive analysis, the qualitative variables are presented

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in absolute numbers and percentages, the quantitative variables in means, median and standard deviations.

Results

During the period 01/09/2021 to 31/12/2021, 19060 patients were received in the emergency room, of which 1508 were bronchiolitis patients, 86 of them were hospitalized, which corresponds to 5% of hospitalizations. 92.7% of the patients presented at least one sign of gravity justifying hospitalization according to the Algerian national recommendations of bronchiolitis management, in addition, 7.3% were hospitalized following the existence of risk factors without sign of gravity. A slight male predominance was noted with a sex ratio of 1.11. The average age was 3 months, with a minimum age of 11 days and a maximum age of 24 months. 47.3% had no specific pathological history. 7.3% were followed up for heart disease. A notion of infection was found in 78.2% of the patients, in 2/3 of the cases, it was the mother who was at the origin of the infection.

The notion of a COVID-19 infection was noted in 30% of the child's family members or surroundings. The incubation period in more than half of the hospitalized patients was 2 to 5 days and in 20% 6 to 10 days. Dyspnea, cyanosis and cough were the three signs that motivated parents to come to the ER, whereas fever was a concern in only 19.1% of cases.

More than half of the patients who required hospitalization at our level had a mild physical condition, 5 patients had an altered physical condition on arrival, 2 of whom required transfer to intensive care. More than half of the bronchiolitis patients admitted to our level were apyretic, however 34.6% were febrile (>38.5°) of which 70% had a positive infectious result. Half of the patients hospitalized for bronchiolitis had crackle lung sounds at auscultation. 37% had polymorphic rales and 12.7% had sibilant rales. The signs of severity presented by our patients according to their frequency were: cyanosis, marked respiratory chest retractions and nasal flaring, 2 patients had presented a disturbed neurological examination. Radiologically, 8 patients presented a complication shown on the chest X-ray, 7 of which had atelectasis, and only 1 had a total left pneumothorax. In addition, 7% of the patients had a secondary pulmonary superinfection. 69.1% of patients had a CRP of less than 48 mg/l.

In terms of virology, 100% of our sampled patients presented an

Table 1: Viruses identified by real-time PCR.

VRS	Corona E229 + VRS	Rhinovirus + VRS	Adénovirus	SARS-CoV-2
61.50%	19.20%	19.20%	0%	0%

RSV infection in 1/3 of them had a co-infection of RSV with another virus. We note that RSV bronchiolitis required a hospital stay of 6 to 10 days in 50% of cases. RSV + Coronavirus 229E bronchiolitis required hospitalisation for more than 6 days in 80% of cases. RSV + Rhinovirus bronchiolitis required hospitalisation for less than 5 days in 50% of cases. In addition, no SARS-CoV-2 infection was detected in our study (Figure 1, Table 1).

For the management based essentially on the Algerian national recommendations for the management of bronchiolitis of 2021, all our patients received nasal desobstructions with saline solution, 20.8% benefited from nasopharyngeal suctioning in association. 92% of hospitalized patients received oxygen therapy. 1 patient was put on an artificial respirator. More than half of our patients required 4 to 10 days of oxygen therapy and a hospital stay of 5 to 1 day (Figure 2).

Discussion

The particularity of our study is that it was conducted in the middle of the COVID-19 pandemic. The absence of SARS-CoV-2 cases during our study confirms that classical RSV bronchiolitis has returned after a one-year break.

87% of the patients were infants younger than 3 months of age, 36% of whom were younger than 6 weeks, and 18% were new borns. Over the study period, the hospitalization rate was 5% and the case fatality rate was 1.16%, which appears to be higher than reported in the literature [1,2] and reflects the potential severity of bronchiolitis.

A recent meta-analysis by Nair et al, using data from a systematic review of 26 published studies and 10 population-based studies, reported a case fatality of 0.7% for severe bronchiolitis in children under 1 year of age admitted to hospital for acute lower respiratory infection [1]. A viral infection was identified in almost all cases, and in two-thirds of cases the mother was the source of the infection.

This year's epidemic of bronchiolitis was classic in its clinical presentation, with dyspnea, cyanosis and cough being the most frequent reasons motivating parents to consult in the ER. Bacterial

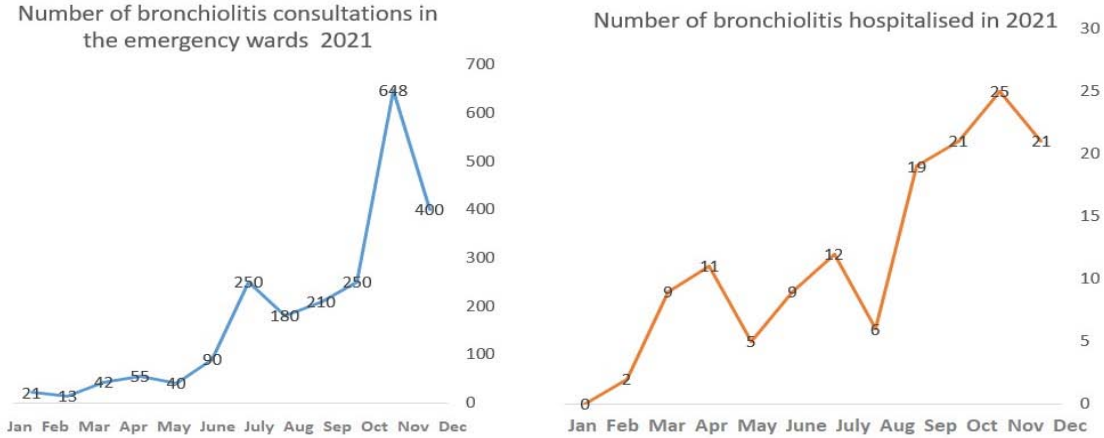

Figure 1: Comparison between the number of consultations and the number of hospitalizations for bronchiolitis.

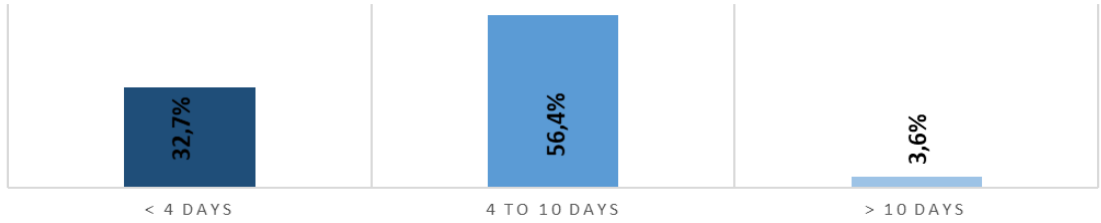

Figure 2: Duration of oxygen therapy.

superinfection was observed in 7% of the patients, a higher rate than reported in the literature (1.2%) [3]. 92.7% of the patients presented at least one sign of severity justifying hospitalization according to the Algerian national recommendations for the management of bronchiolitis, and 7.3% were hospitalized due to the presence of risk factors without signs of severity.

The virological analysis showed an absence of SARS-CoV-2 cases during the study period with the presence of RSV in all the samples of which 1/3 of the cases were co-infected with Rhinovirus or Corona virus E229. This confirms that the classic RSV bronchiolitis has regained its place. Moreover, no case of adenovirus, metapneumovirus or other was detected.

In terms of therapeutic data based essentially on the Algerian national recommendations for the management of bronchiolitis of 2021, nasal lavage remains the only weapon from which all our patients benefited. In addition, 20% had a nasal aspiration motivated by the importance of nasal congestion, but our study did not show a significant difference in the duration of oxygen therapy, hospitalization and evolution of the disease [4]. The prognosis was good for all our patients except for one infant who died secondarily from acute suffocating pneumothorax.

Our study shows a strong relationship between anti-covid protection measurements and the bronchiolitis epidemic.

This has also been reported by other studies. A Spanish prospective study in Madrid during the 4th quarter of 2020, involving 33 infants admitted for bronchiolitis with a median age of 3 months, found a dramatic decrease in the number of admissions due to bronchiolitis (271 in 2019 versus 33 children in 2020) [5].

Another multicentric study by Juan Manuel Rius-Peris et al, on 16 hospitals with a number of 4643 infants and a median age of 2.4 months during 6 epidemic seasons since 2015, found a 94.1% decrease in admissions during the 6th epidemic and attributed it to the positive impact of non-pharmacological measures of the COVID-19 pandemic: barricades, hand hygiene and mask wearing, on the spread of bronchiolitis [6].

After the COVID-19 restrictions were lifted, Australia had a resurgence of bronchiolitis cases associated with an increase in RSV circulation that began in October 2020 and continued until at least January 2021. This is exactly what we experienced in the previous months in our hospitals [7].

Most of our infants recover in 5 to 10 days without any sequels. Complications do exist, but they are real, unpredictable and sometimes lead to death.

Conclusion

Our study highlights the temporal relation between the negligence of anti-covid measurements such as hand sanitizing, use of face masks and the isolation of infected individuals and the recurrence of bronchiolitis during the 4th quarter of 2021. In the light of these findings, we suggest further specific complementary work aimed specifically at establishing precisely the role of prevention measurements that could limit annual epidemics caused not only by SARS-CoV-2 but by other viruses such as RSV, rhinovirus, metapneumovirus and others.

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