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Respiratory Complications of Measles in the Pediatric Ward of the Regional Hospital of Kindia/Guinea

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Abstract

Introduction: Measles is a highly contagious infectious disease caused by the measles virus belonging to the morbillivirus genus, the measles morbillivirus species and the Paramyxoviridae families. The aim was to study respiratory complications due to measles in children aged 1 to 15 in the pediatric ward of the Kindia regional hospital. **Materials and Methods:** A transversal descriptive study was carried out in the pediatrics department of the Kindia Regional Hospital from October 1, 2019, to March 31, 2020, on children aged 1 to 15 years hospitalized for measles with respiratory complications. **Results:** 53 cases of measles were recorded, *i.e.* 11.71% of hospital pathologies including 32 cases of respiratory complications, *i.e.* 60.38% with an M/F sex ratio of 1.66, male predominance of 62.5%, and a mean age of 4.10 ± 2.8 years. The outcome was favorable in 90.62% of our patients. The mortality was 9.38% with an average hospital stay of 6.8 ± 3.04 days. **Conclusion:** The respiratory complication of measles is a serious pathology due to the risk of mortality that it can cause, a consultation followed by rapid treatment can contribute to a reduction in complications and a faster cure.

Keywords

Measles, Respiratory Complication, Child, Kindia

1. Introduction

Measles is a highly contagious infectious disease caused by the measles virus, which belongs to the Morbillivirus genus and the Paramyxoviridae family [1].

Respiratory complications of measles refer to acute respiratory infections of the lung tissue caused by the measles virus itself or other viruses and bacteria. Conventional classifications define clinical entities such as purulent rhinitis, pharyngitis, bronchitis, bronchiolitis, and pneumonias [2].

Measles remains a major public health problem despite intense efforts to eradicate it [3].

Vaccination coverage worldwide with one dose of vaccine (MCV1) has remained at 85% since 2010, and vaccination coverage worldwide with two doses of vaccine (MCV2) was only 67% in 2017. However, vaccination coverage (MCV1 + MCV2) needs to be ≥95% to consider measles eradication [4].

According to the 2018 Demographic and Health Survey (DHS), measles vaccination coverage in Guinea was 40% nationally and 21.1% in the Kindia region [5].

According to the World Health Organization (WHO), measles-related deaths have increased by 50% worldwide between 2016 and 2019, reaching 207,500 deaths in 2019 [6].

In Guinea, according to the National Agency for Health Security (ANSS), a total of 7545 cases were reported during the year 2017, and 1,792 cases, including 13 deaths, were reported from week 1 to week 40 of the year 2018 [7].

In Kindia, no recent study has been conducted on respiratory complications of measles.

The objective of this study is to investigate respiratory complications due to measles among children aged 1 to 15 years in the pediatric department of the regional hospital of Kindia.

2. Methods

A cross-sectional and descriptive study was conducted in the pediatric department of the regional hospital of Kindia from October 1, 2019, to March 31, 2020, including children aged 1 to 15 years who presented with fever, maculopapular rashes associated with respiratory symptoms such as coughing and signs of respiratory distress, and for whom parental consent was obtained.

For each included case, sociodemographic characteristics (age, gender, origin, parents' educational level), medical history, vaccination status, clinical data, and therapeutic information (treatment, follow-up, outcome) were collected. We considered a polypnea when the respiratory rate was accelerated in relation to the age of the child.

The signs were represented by intercostal indrawing, flaring of the nostrils and xiphoid funnel.

The data was collected using medical records, consultation and hospitalization registers of patients, and a survey form specifically designed for this purpose. Data entry and analysis were performed using Epi Info 7 software.

3. Results

A total of 53 cases of measles admitted to the pediatric department of the re-

gional hospital of Kindia were collected. This percentage represents 39.62% of hospital diseases, and 32 cases (60.38%) had a respiratory complication of measles.

The main reasons for consultation present in all patients were fever, skin rash, cough, and runny nose (Table 1).

The most common clinical manifestations related to measles were generalized maculopapular rash (100%): (Figure 1), fever (100%), rhinitis (68.75%), oral ulcers (56.25%), and conjunctivitis (37.50%).

Table 1. Sociodemographic characteristics of measles children with respiratory complications.

Sociodemographic characteristics	Effective (N = 32)	Percentage
Gender*		
Male	20	62.5
Female	12	37.5
Age range (year)**		
1 - 5	22	68.75
6 - 10	6	18.75
11 - 15	4	12.5
Origin		
Rural	21	65.62
Urban	11	34.38
Vaccination status		
Vaccinated	9	28.13
Not vaccinated	19	59.37
Unknown	4	12.5

* Sex-ratio: 1.66. ** Middle age: 4.10 ± 2.8 ans.

Figure 1. Patient X, 12 months old, hospitalized in the pediatric department of the regional hospital of Kindia for complicated measles with acute bronchiolitis.

Images A, B, and C show the generalized maculopapular skin rash of measles in the patient.

Images D and E show the characteristic palmoplantar involvement of measles.

Vaccination status: Up to date with the different vaccinations appropriate for her age, including the first dose of measles vaccine taken at 9 months of age (Table 2 and Table 3).

All our patients received antibiotic therapy, antipyretics, vitamin A, and nutritional support.

The outcome was favorable in 29 (90.62%) of our patients. However, three cases of death were recorded. The average length of hospital stay was 6.8 ± 3.04 days, with a range of 2 to 19 days.

4. Discussion

The results of the study allowed for the investigation of respiratory complications due to measles in children aged 1 to 15 years in the pediatric department of the regional hospital of Kindia.

Table 2. Main clinical manifestations of children with measles in the pediatric department of the regional hospital of Kindia from October 1, 2019, to March 31, 2020.

Clinical manifestations	Workforce (N = 32)	Percentage
Signs of respiratory distress		
Polypnea	23	71.85
Struggle sign	20	62.50
$SpO_2 < 90\%$	15	46.87
Signs of struggle + wheezing	10	31.25
Auscultatory signs		
Crackles	19	59.37
Tubal murmur	19	59.37
Vesicular murmur muted	19	59.37
Sibilant rattles	13	40.63
Snoring rales	8	25.00

Table 3. The main respiratory complications of children during measles.

Respiratory complications	Number (N = 32)	Percentage
Pneumonia	19	59.37
Bronchitis	8	25.00
Bronchiolitis	5	15.63
Total	**32**	**100**

The study was limited by the insufficient technical platform, the low socioeconomic level of the parents preventing them from performing additional examinations such as chest radiography. Moreover, the results are not representative of the entire population, as they were conducted on children hospitalized in one facility. It represents cases of complicated measles with respiratory involvement in children aged 0 to 15 years admitted to the only pediatric hospital department in the region.

The frequency of measles found in our study is comparable to that reported by other authors [8] [9].

The age group most represented in our study was the 1 to 5-year-old range. Our result is comparable to that of many authors from Africa and elsewhere who have observed that in developing countries, measles primarily affects children under 5 years old. This age group is characterized by a gradual decrease in maternal protective antibodies, making children vulnerable to infections, thus explaining this predominance in our study [8] [10] [11].

The distribution of cases by gender in our study shows a significant male predominance of 62.5%. This result is similar to that found by Mafigiri R *et al.* in Uganda in 2015 [10]. This result could be explained by the fact that young boys are generally more mobile and turbulent than girls, exposing them to a higher risk of infection.

During our study, it was observed that the measles vaccination coverage rate was 28.13%, while in the Kindia region in 2018 it was 21.1% and on a national level it was 40%. However, the vaccination coverage (MCV1 + MCV2) should be equal to or greater than 95% to consider measles eradication [4] [5]. This result could be explained firstly by the lack of awareness and parents' lack of knowledge about the importance of vaccinating children, as well as the weakening of the strategy in certain areas and the poor storage of vaccines resulting in a breakdown of the cold chain due to lack of electricity.

The most common reasons for consultation in the study were fever, maculopapular skin rash, cough, and runny nose. They were present in all of our patients. Husada D *et al.* in their study conducted in Indonesia in 2019 also noted the same reasons in all of their patients [12]. This could be explained by the fact that the virus has a tropism for the respiratory epithelium, and our results align with the clinical picture of measles outlined by the WHO.

Among the physical signs related to respiratory involvement, we most frequently encountered tachypnea at 71.85%, followed by signs of respiratory distress at 62.50%.

Auscultatory signs were dominated by crackles, tubular breath sounds, and decreased breath sounds, all accounting for 59.37%.

Our results are higher than those of Tinsa F *et al.* in Tunisia in 2009, which indicated that tachypnea and signs of respiratory distress represented 30.8% and 23.1% respectively of respiratory distress signs. These authors also reported the same auscultatory signs at proportions lower than our results. These results could be explained by the fact that these signs are typical of respiratory involve-

ment [13].

The treatment for measles is not specific, but symptomatic treatment can prevent certain complications. Additionally, it is recommended to administer vitamin A at the time of diagnosis to improve prognosis. All of our patients were given antibiotics, antipyretics, and received vitamin A supplementation [9].

We observed a favorable outcome in the majority of our patients, with 3 cases of death (9.38%) and an average hospitalization duration of 6.8 days. Our result is comparable to that reported by Rasamoely KE *et al.* in Madagascar in 2019 and to those of Catroux M *et al.* in their study conducted in France in 2018. This could be explained by the implementation of adequate patient management upon admission and the mobilization of necessary therapeutic resources for a favorable outcome [8] [14].

5. Conclusions

These cases of measles complicated by respiratory involvement, hospitalized in the pediatric department at the regional hospital of Kindia, have allowed us to observe the sociodemographic, clinical, and therapeutic aspects of patients affected in the region.

Understanding these clinical forms will help better adapt the management of measles in children. The impact of insufficient vaccination coverage is reflected in the occurrence of epidemic outbreaks. Optimization of case management needs to be strengthened, particularly at the community level. Continuous medical education for healthcare personnel, targeting both public and private sectors, would be an asset for optimal treatment of measles in children, highlighting the essential role of vitamin A supplementation.

Conflicts of Interest

The authors declare no conflicts of interest.

Contributions of the Authors

All authors contributed to the design, analysis, interpretation of data, revision, and final approval of the version to be published. All authors have read and approved the final version of the manuscript.

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