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Severe dengue in pediatrics: 10 cases in Buenos Aires, Argentina

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ABSTRACT

Introduction. In pediatrics, dengue is usually oligosymptomatic; however, severe cases may occur. The objective is to describe severe dengue cases admitted to a pediatric hospital during the 2023-2024 dengue outbreak.

Population and methods. A retrospective descriptive cross-sectional study included all patients with severe dengue.

Results. Of the 205 patients hospitalized for dengue, 10 cases corresponded to severe dengue, of which 5 had no risk factors. The median age was 12 years. Seven patients required intensive care; 6 had transaminase values higher than 1000 U/L, and one patient died. Regarding serotyping, 7 cases corresponded to DEN-2.

Conclusion. Severe dengue in pediatrics can occur with or without comorbidities in all age groups. The most affected target organ was the liver, although encephalitis and myocarditis may occur.

Keywords: *severe dengue; pediatrics.*

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INTRODUCTION

In Argentina, dengue virus circulation in the 2023-2024 season was persistent and characterized by an early seasonal increase and a higher number of cases per week than in previous epidemic seasons.[1] Although dengue is usually considered oligosymptomatic in pediatrics, more florid and severe symptoms may occur.[2]

Severe dengue is defined when any of the following situations occur:

- Severe plasma extravasation is expressed by the presence of hypovolemic shock and/or respiratory distress due to excess fluid accumulating in the lung.
- Severe bleeding.
- Organ involvement: severe hepatitis due to dengue (transaminases higher than 1,000 U/L), encephalitis, or severe involvement of other organs, such as myocarditis.[3]

Regarding the incidence of severe dengue in our region, Pavlicich's study in Paraguay describes a bimodal behavior affecting children under 1 year of age, schoolchildren between 5 and 9 years of age, and young adults.[2]

In Argentina, during the 2023-2024 season, 44 children under 20 years of age died.[1]

OBJECTIVE

To describe the severe cases of pediatric dengue admitted to a hospital in the City of Buenos Aires during the 2023-2024 outbreak.

POPULATION AND METHODS

A retrospective descriptive cross-sectional study of patients under 18 years of age diagnosed with severe dengue admitted to the Hospital General de Niños Pedro de Elizalde (HGNPE) from January 1 to May 15, 2024, was conducted.

Medical records were used as a source of data. Age (in years), requirement of pediatric intensive care unit (PICU), requirement of mechanical ventilation (MV), inotropic drugs or transfusions, and the presence of risk factors were analyzed. The presence of any of the following pre-existing conditions at the time of diagnosis of dengue is considered a risk factor: immunosuppression, chronic respiratory disease, oncohematological diseases, being less than 1-year-old, neurological diseases with motor, neuromaturative, and/or cognitive compromise at or after birth.

Patients with confirmed or probable dengue with signs of severity (profuse bleeding and/or hypovolemic shock and/or target organ involvement) were considered as severe dengue.

The data were entered into a Microsoft Excel™ spreadsheet of Office Professional for XP. The cases were described with Stata® version 8.0 (Stata Statistica, Software. Release 8.0. Collage Station, Tex: Stata Corp; 2003).

The study was approved by the Ethics Committee of the HGNPE (registration 13471).

RESULTS

During the 2023-2024 season, 205 patients were admitted to the hospital with a diagnosis of dengue, of whom 10 patients showed signs of severity (4.9%).

The median age of patients with severe dengue was 12 years (IQR 0.3-14). Three patients were younger than 12 months, one was 7 years old, and six were adolescents.

Half of the patients with severe dengue had risk factors: three patients were younger than 6 months, one patient had an oncologic disease, and another was under treatment with tuberculostatic drugs.

Eight patients presented target organ damage during their evolution (6 with transaminase values higher than 1,000 U/L, 1 with encephalitis, and 1 with myocarditis). Three patients presented massive hemorrhage, of which one had oncologic disease as comorbidity; two young infants had clinical shock without hemorrhage.

During their hospital stay, seven patients required intensive care, mechanical ventilation (n = 5), inotropic drugs (n = 6), and multiple transfusions (n = 3). One patient had to be referred to another healthcare center.

One patient died. The deceased patient was 7 years old and had no associated risk factors. The admission diagnosis was dengue with alarm signs (incoercible vomiting and abdominal pain). During his evolution, he presented shock as a sign of severity and cardiorespiratory arrest less than 24 hours after admission.

QRT-PCR performed diagnostic confirmation in all cases, and serotypes were identified in 9 cases.

Ten samples were sent to the City of Buenos Aires reference laboratory. There were 7 DEN-2 cases and 2 DEN-1 cases (*Table 1*). The serotype identified in the patients who required UTIP was DEN-2. The median number of days of hospitalization in the patients who survived was 10 days: 5 days was the minimum, and 21 days was the maximum (IQR 6-17).

DISCUSSION

Cases of dengue in the season 2023-2024 represented 3.41 times more than what was recorded in the 2022-2023 season and 8.65 times more than that recorded in the same period of the 2019-2020 season.[1] Changes in the magnitude of this disease have implications for its distribution and the affectation of the pediatric population, as occurs in endemic countries, where, due to acquired immunity, there is a transition to the pediatric population and an increase in severe dengue.[4] In this context of an unusual outbreak, it is imperative to pay attention to the behavior of this disease in children and adolescents.

The mechanisms leading to severe disease are not well defined. However, the immune response, host genetic characteristics, and virus variations are the elements that could be involved in the development of severe disease.[2] Severe disease can occur even without risk factors.

Regarding the age of the cases with severe manifestations, we found literature reporting a higher frequency in children under 1 year of age. In the research by Martínez de Cuellar and collaborators on dengue in Paraguay children under 15, a risk factor was found to be age under 1 year for mortality and hospitalization due to dengue.[5]

Likewise, in a study of pediatric cases carried out between 2012 and 2018 in India,[6] a significant difference was observed regarding the frequency of severe dengue in favor of the age group below 1 year compared to all other age groups.

Conversely, secondary infection with a differente dengue serotype from the original infecting virus, was identified as a risk factor for developing severe dengue.[3] This has been contrasted in studies such as that of Aggarwal et al., who found no significant differences in the frequency and severity of severe dengue

Table 1. Patients with severe dengue in pediatrics, Hospital Pedro de Elizalde, 2024

Case (sex)	Age	Risk factor	Clinic	PICU	MV	Inotropic drugs	Transfusions	Hospitalization	Serotype days
1 (F)	1 month	Age	Meningitis	No	No	No	No	10	DEN-2
2 (M)	12 years	No	Hepatitis*	No	No	No	No	5	DEN-1
3 (F)	1 month	Age	Shock	Yes	Yes	Yes	No	5	DEN-2
4 (F)	12 years	Oncohematologic disease	Hepatitis* Pleural effusion	Yes	Yes	Yes	Yes	21	Positive (not typified)
5 (M)	14 years	No	Shock Upper gastrointestinal bleeding Hepatitis*	Yes	Yes	Yes	Yes	18	DEN-2
6 (M)	12 years	No	Shock Upper gastrointestinal bleeding Hepatitis*	Yes	No	Yes	Yes	10	DEN-2
7 (F)	14 years	No	Myocarditis and cardiac tamponade Cardiogenic shock	Yes	Yes	Yes	No	16	DEN-2
8 (F)	17 years	Tuberculosis	Hepatitis	No	No	No	No	7	DEN-1
9 (M)	7 years	No	Warning signs Shock Hepatitis* Death	Yes	Yes	Yes	No	1	DEN-2
10 (F)	4 months	Age	Shock	Yes	No	No	No	7	DEN-2

Hepatitis: transaminase enzymes >1,000 U/L.*

ICU: intensive care unit, MV: mechanical ventilation, F: female, M: male.

between first and second-infection pediatric cases, reporting a severe presentation in 32.5% and 32.7% of the total, respectively.[6] Since dengue is a notifiable disease in the Argentine Integrated Health Information System (SIISA, by its Spanish acronym), no notification of previous episodes was found in the 10 patients reported to the SIISA.

The Sociedad Argentina de Terapia Intensiva mentions that hepatomegaly and a hepatic aminotransferase level ≥1,000 U/L, are warning signs of severe dengue. Dengue should be a differential diagnosis in an endemic region when a patient has a picture compatible with hepatitis. Also, although there are no specific therapeutics available for liver involvement in dengue, hepatotoxic drugs should be discontinued to reduce further liver damage.[7] The liver was the most affected organ in our series, as 6 patients had transaminase values greater than 1000 U/L.

In our description, we observed myocarditis. According to the literature, children with severe dengue may have myocardial dysfunction, clinically evidenced by hepatomegaly and tachycardia unresponsive to fluid infusion. These patients may respond to careful use of inotropic and vasodilator agents after adequate fluid resuscitation. Myocardial dysfunction in dengue is transient, and cardiac function returns to normal.[2]

Concerning dengue meningoencephalitis, according to the literature, in the absence of specific antiviral therapy, treatment of dengue-associated encephalitis is usually supportive and includes antipyretics, adequate hydration, and airway management. It is prudent to rule out dengue as a cause of such presentations in endemic areas and outbreak situations.[7]

In our series, there was dengue meningoencephalitis in one infant.

Shock due to extravasation and/or hemorrhage is a complication; in the pediatric population, this manifestation is more prevalent than in adults.[8,9]

The clinical manifestations of dengue are progressive. There may be no signs of severity at the beginning of the disease, but then the disease may evolve into severe symptoms. Pediatricians should recognize dengue's warning signs and severity, allowing early and timely treatment to reduce morbidity and mortality. ■

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