Neonatal and Pediatric Medicine

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Abstract

Introduction: Hospital-acquired infections in neonatology are a major security problem. We aimed to analyze the evolution of nosocomial infections and their epidemiological aspects in neonatal medicine unit of Angondje Teaching Hospital.

Patients and methods: retrospective and descriptive study, we included newborns hospitalized for more than 48 h from December 2012 to December 2016.

Results: We admitted 727 newborns in hospital during the study period, 521 have been included, and 134 developed a nosocomial infection, a prevalence of 25.7% of cases. In the end, 103 newborns have constituted our study population. The average age was 33.6 weeks, the sex ratio 1.96. The preterm rate was 79.6 percent. The average weight was 2088.4 g. The reason for hospitalization was prematurity in 46.3%, followed by neonatal infection in 21.1%. Tachycardia associated with hypotonia and apnea, was the main sign of discovery in respectively 56.3% and 39.8%. The average delay between appearance of the signs and hospitalization was 07 days. The average of C-reactive protein was 86.64 mg/dl. Thrombocytopenia was most observed disorder on cell blood count. Escherichia coli was the VLJQL¿FDQW EDFWHULD IRXQG WKH EORRG FXOWXUH XULQHV DQDO\VLV DQG FXOV culture. Imipenem was the most used antibiotics in the management of nosocomial infection in 44.7% of cases. The mortality rate was 23.3%.

Conclusion: The high rate of nosocomial infection and neonatal mortality urge the implementation of effective methods against this scourge in our neonatology unit.

Keywords: Nosocomial infection; Neonatal; Epidemiology; Antimicrobial resistance; CHUA; Gabon

Introduction

Nosocomial infections (NIs) are a scourge that a ect hundreds of millions of people worldwide despite the lower incidence of these infections in developed countries (5 to 10%) [1]. In developing countries, there is little scienti c data on this pathology, resulting in a largely underestimated incidence [2]. According to the WHO, the risk of contacting a nosocomial infection is 2 to 20 times higher in these countries than in developed countries with a percentage of a ected patients sometimes greater than 25% [1]. In Africa in 2011, the hospital-infectionsrangtedfrom 2.25% to 4.8% ande is- highsta inservice-ts ucth s, thesourricl ward (with nr incidence of5.7%s.)Tj 6 Tw 0 -1.2 2 TD to45.8% [3].-

Patients and Methods

is is a retrospective and descriptive study based on the le carried out in the neonatology unit of CHUA, a level III institution, with a capacity of 9 places.

e study population consisted in newborns admitted in hospital between December 2012 and December 2016. We included in this study all patients admitted to hospital for at least 48 hours with a complete medical record and presenting with a clinical infectious syndrome. secondarily acquired biological, absent at the time of admission or

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Received April 05, 2018; Accepted April 17, 2019; Published April 24, 2019

Citation: Kuissi KE, Minto'o RS, Mimbila M, Medza ER, Koumba MR, et al. (2019) Epidemiological Aspects and Evolution of Nosocomial Infection in the Neonatology Unit of Angondje Teaching Hospital. Neonat Pediatr Med 5: 182.

occurring secondarily a er an initial infection treated. ey must have bene ted from an infectious assessment including at least a blood count (NFS), a C Reactive Protein (CRP) and a bacteriological research.

Data collection

Information collected from patient records was collected on a standardized data collection form. e main data evaluated were:

- Anamnestic and anthropometric data,
- Clinical signs at admission and at the time of suspicion of INN,
- e biological assessment carried out at the time of the suspicion of INN,
- e duration of the umbilical vein catheter.
- ATB treatment at admission and at the time of suspicion of INN,
- e evolution.

Data analysis

e data were analyzed with the Microso ACCESS so ware. Tables were made on the Microso Word so ware.

Results

During the study period, 727 newborns were admitted to hospital. Among them, 206 had less than 48 hours in hospital, 521 were included and 134 of them developed a nosocomial infection, a prevalence of 25.7%. e study population consisted of 103 newborns due to the exclusion of 31 (23.1%) unexploitable records.

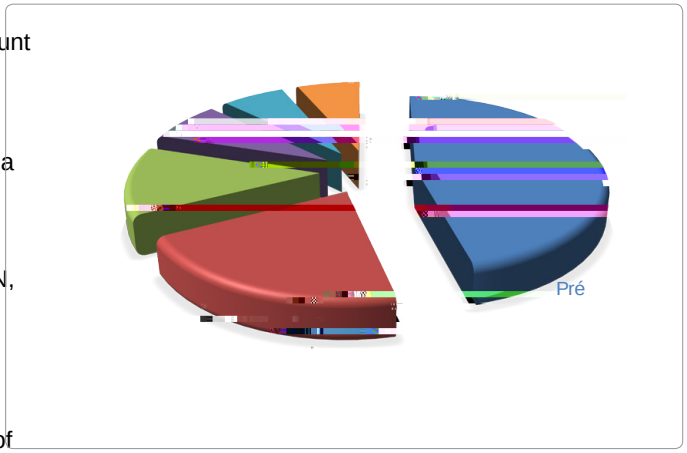
General characteristics of the sample

- e study population consisted of 68 (66%) boys and 35 (34%) girls, a sex ratio of 1.96.
- e average age was 33.6 SA with extremes ranging from 26 SA+4 days to 42 SA+3 days. e rate of premature newborns (less than 37 weeks) was 79.6% (n=82). Of these, 54.9% (n=45) had less than 33 weeks.
- e average weight was 2088.4 g with extremes ranging from 800 to 6690 g. Newborns with less than 2500 g accounted for 73.7% (n=76), of which 44.7% (n=34) had less than 1500 g.
- e time between birth and hospitalization was less than 24 hours in 72.8% of newborns (n=75). More than half (70.6% n=53) came from our maternity ward.
- e reason for hospitalization was mainly prematurity in 46.3%, followed by neonatal infection in 21.1% and neonatal asphyxia in 12.6% (Figure 1).
- e umbilical vein catheter was placed in 80.6% (n=83) of neonates, with an average duration of 6 days and extremes ranging from 3 to 12 days. Of these, 38.5% (n=32) had an umbilical vein catheter lifetime greater than 5 days.

Nosocomial infection

Signs of discovery: e temperature was normal in 62.2% of cases. Tachycardia was the most observed sign of discovery. It was associated with hypotonia and apnea in 56.3% and 39.8% respectively (Table 1).

e time of appearance of the signs: e average time to onset of nosocomial infection versus hospitalization was 07 days with extremes of 4 days to 19 days.



Biology report

1. e Cell Blood Count (CBC): rombocytopenia was the most recovered parameter in the NFS with a rate of 69.5% (Figure 2).

2. e CRP: CRP was positive in all patients, with an average of 86.64 mg/dL and extremes ranging from 24 to 471.25 mg/L. Of these, 27.2% (n=28) had a CRP greater than or equal to 90 mg/dl.

Bacteriology

Blood culture: e blood culture was performed in 68.9% (n=71), it was positive in 60.5% (n=43) of newborns. Escherichia coli (E. coli) was the most recovered organism with 24% of cases, including 3 broad-spectrum beta-lactamase E. coli (BSBL). In the Staphylococcus aureus group, 2 were resistant to methicillin (MRSA) (Table 2).

Lumbar puncture:

exclusion of nearly 23.1% of the eligible cases due to incomplete information, was the main limitation of this study. It can be explained by the retrospective design of the study which does not provide information all the inclusion criteria. But this fact does not a ect the substantive of the results obtained.

Prevalence

Nosocomial infection (NID) is de ned as an infection acquired in a health care facility that was neither incubated nor present at the time of admission. e delay between admission and the start of infection should be 48-72 hours for bacterial infections and depending on the incubation period it may be longer in viral infections [7]. A diagnostic problem arises in neonatal medicine generally. Indeed, it is di cult to di erentiate between an early-occurring NIN and a late-onset maternal-fetal infection [6,8]. is di culty creates a signi cant bias on the epidemiological data of this condition in the neonatal period

In biological parameters, leukopenia less than 5000/mm³, hyperleukocytosis greater than 25000/mm³, thrombocytopenia at 100000/mm³ and elevation of in ammation proteins (PCT or CRP) were suggestive of NNI [16]. ese fact corroborate with the ndings in our study. Hemodynamic and respiratory signs were the most observed clinical signs, as well as thrombocytopenia. A positive blood culture associated with clinical and biological changes constitute the elements of the diagnosis of certainty [6]. It is well established that the rate of documentation of bacteraemia in neonatology is low, most o en of the order of 45% in the developed countries [17]. One of the reasons is the insu cient blood volume to inject in the blood culture asks (1 ml) [6]. As a result, even though some authors require bacteriological documentation of infections, most surveillance networks adopt de nitions that are simply based on clinical and biological criteria [5].

In developing countries in general, Gabon in particular, it is rather the insu cient and o en defective technical platform that makes it di cult to isolate the germs. In our study, the search for germs is quite insu cient, because the blood culture was carried out in only 68.9%, the CBEU in 10.7% and the culture of UVO in 61.2%. is low rate of identi cation of germs is justi ed by the frequent lack of materials in the laboratory (blood culture asks, culture media, etc.). Most o en, this search for germs is largely a er the administration of antibiotic because the rapid evolution of sepsis requires a rapid start and without delay of antibiotic therapy. We can therefore nd here the justi cation for the high number of negative results in our study.

e infection site was in the majority of cases blood (septicemia) and accounts for 45 to 55% of severe NNI, followed by pulmonary involvement which usually complicates an invasive ventilation [7,8]. In our study, sepsis was observed in 60.5% of cases. It was also predominantly observed in 31.4% of cases at Ibn Rochd UHC in Casablanca [15], 89% in Marrakech and in 76% of cases in Tlemcen, Algeria [5,16].

In developing countries, the most observed group of organisms is the group of Gram-negative bacilli (BGN) [6]. In our study it is also this group that is the most observed, dominated by *E. coli*, some of which were producers of broad-spectrum beta-lactamases in the blood, cerebrospinal uid, urine or umbilical vein catheter. is observation is also made at Yopougon University Hospital in Abidjan, Casablanca, Marrakech [16]. In Madagascar, it is rather the Gram-

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