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Factors associated to mortality in neonatal intestinal obstructions at Kamenge Teaching Hospital (Burundi).

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Abstract

Objective:

To determine the epidemiological profile and the factors of mortality of neonatal intestinal obstructions at Kamenge Teaching Hospital.

Patients and methods:

It was a retrospective, descriptive and analytical study carried out at Kamenge University Hospital over a period of 5 years, from January 1, 2015 to December 31, 2019. All newborns operated for neonatal occlusion were included. The Epi Info software was used, and the data analyzed with a significance level of 5%.

Results:

During the period of our study, the NIOs had constituted a hospital frequency of 1.11%. Out of 38 records of operated occluded infants, IUU was precocious in 29 infants (76.32%) with an overall average age of 6.8 +/- 5.1 days. Male predominance with sex ratio of 1.7. A case of digestive malformation (10%) diagnosed in antenatal. 27 out of 38 cases had consulted between 1 and 7 days with an average consultation time of 3.51 +/- 2.88 days. An average PEC time of 30h. A specific mortality rate of 31.58%. No significant relationship between age of the newborn and death (p = 0.058). There is a significant relationship between etiology and death (p = 0.000); prematurity influences death (p = 0.002), birth weight (p = 0.000) and waiting time for surgical management and death (p = 0.000).

Conclusion:

Factors such as the cause of neonatal intestinal obstructions, prematurity, low birth weight, delay in consultation and the long period of surgical management influence mortality in our environment.

Keywords: NIOs; Factors; Mortality; Burundi

Introduction:

Neonatal intestinal obstructions (NIOs) are defined as those with clinical expression early or before the 28th day of life [1]. They are frequent among congenital malformations and occupy the 3rd place after cerebral and cardiac malformations [2]. Their frequency remains very variable in the literature [3].

Whatever the etiology, the prognosis remains poor in countries with limited resources, with mortality around 20 to 70% due to lack of effective control of the factors of poor prognosis [4, 5].

The lack of specific data on neonatal intestinal obstructions (NIOs) in Burundi prompted us to do this work at the University Teaching Hospital of Kamenge with the aim of determining the epidemiological aspects and analyzing the predictors of mortality.

Material and methods:

This is a retrospective study on the NIOs operated at the UTH of Kamenge over a period of 5 years from January 1, 2015 to December 31, 2019.

Were included in our study, all newborns operated for NIO during the period considered. Those operated for NIO with non-usable files were excluded.

To collect the data, we developed a data collection sheet corresponding to each

patient's file and the information was collected from the medical files of patients operated on for neonatal intestinal obstruction, registers of major interventions and operational reports; registers of incoming and outgoing Departments of Anesthesia-Resuscitation, General Surgery and Neonatology.

An input mask was created on the Epi info software version 7.2.3.1 in order to constitute a database of data collected from the study sample. The data thus compiled, were analyzed and processed.

Subsequently, we verified the possible correlations between the different variables in relation to the predictors of mortality from NIOs using the crosstabs of the $\chi 2$ tests; a very infinitely small probability of $\chi 2$ (p) has been rounded off to 0 by default and the significance threshold has been considered at 5%.

Finally, an analysis by comparison of several means was made to check whether these means would be significantly different according to the modalities of the independent variables. The variables studied are frequency, age, sex, provenance, parity of the mother, monitoring of pregnancy, gestational age, etiologies and evolutionary.

Results:

During the period of our study, out of a total of 3,875 newborns hospitalized, we recorded 43 cases of IUU, representing a hospital frequency of 1.11%. Thirty-eight (38) files met our inclusion criteria. INNO was early in 29 newborns (76.32%) with an overall average age of 6.8 +/- 5.1 days with extremes of 1 and 24 days. The male prevalence was observed with a sex ratio of 1.7. The majority of our patients, or 65.79%, were referred by first aid structures and without medical ambulances. We noted that 30 out of 38 newborns (78.95%) were from multiparous mothers with a fetal ultrasound completion rate of 26.32% (10 cases out of 38) despite a rate of 60.53% more than 3 CPNs. A digestive malformation was suspected in a fetus (2.63%).

In our study; 89.47% (34/38) came from a full-term pregnancy. Prematurity was noted in four newborns, or 10.53% of cases. The average weight of our newborns at birth was 2844.7 +/- 575.9 g, with extremes of 2000g and 4000g. The birth weight lower than 2500 g was noted in 10 cases (26.32%).

In our study, 27 NN (71.05%) had consulted between 1 and 7 days and; 10.53% before 24 hours. The average consultation time was 3.51 +/- 2.88 days. The majority of our patients, or 52.63% of the cases, had been operated on after 24 hours. The average time for surgical PEC is 30h with extremes of 2h and 6 days.

The hospital stays varied between 2h and 30 days, with an average duration of 8.5 days. Sixteen out of 38 patients, or 42.11% of the cases, remained in hospital between 6 and 10 days. Death occurred in 12 out of 38 patients, or 31.58% of the cases. The following table analyzes the different mortality factors in our series using statistical tests.

Analyzed factors	**Total cases**	**Survival**	**Death**	**X^2 (p)**
Age in Days		**(%)**	**(%)**	**3,571 (0,058)**
0-7	29	19 (65,52)	10 (34,48)	
8-28	9	7(77,78)	2(22,22)	
Etiology				**274,59(0,000)**
Duodenal atresia	**4**	**2(50)**	**2(50)**	
Small bowel atresia	**5**	**1(20)**	**4(80)**	
	18	**16(88,89)**	**2(11,11)**	
	2	**0(0)**	**2(100)**	
ARM	**9**	**7(77,78)**	**2(22,22)**	**9,22(0,002)**
Intestinal malrotation	**4**	**2(50)**	**2(50)**	
Hirschsprung disease	**34**	**24(70,59)**	**10(29,41)**	**54,8(0)**
Gestational age in weeks	**10**	**3(30)**	**7(70)**	
<37	**28**	**28(82,1)**	**5(17,9)**	
>37	**15**	**11(73,33)**	**4(26,67)**	**40,94(0)**
Birth weight in gram	**20**	**14(70)**	**6(30)**	
<2500	**3**	**1(33,33)**	**2(66,67)**	
>2500				
Time to treatment in Hour				
<24				
24-72				
>72				

Table: Analysis of predictor factors of mortality, KTH, 2020

There is no statistically significant relationship between the age of the NN and death (p = 0.058). There is a statistically significant relationship between etiology and death (p = 0.000). Gestational age statistically influences death (p = 0.002). Mortality is strongly influenced by birth weight (p = 0.000). There is a statistically significant relationship between the waiting time for surgical management and death (p = 0.000).

Discussion:

During the period of our study, the NIOs had constituted a hospital frequency of 1.11%. Our results are close to those of other African authors. Indeed, Hounkpe, in Benin, found a frequency of 4.1%; Chirdan in Nigeria, noted a frequency of 1.8 and Mouafo records a hospital frequency of 0.86% [4, 5, 6].

The predominance of the D0-D7 age group observed in our study is consistent with the data in the literature [7, 8, 9] and the same is true for the male sex highlighted by Cantagrel [10] without specific explanation. The mean age of diagnosis was 6.8 +/- 5.1 days. Western literature gives a different opinion on the age of onset and diagnosis of these neonatal obstructions [11, 12]. In fact, the average age of diagnosis hovers around 1 day. This difference is explained by the lack of prenatal diagnosis in developing countries and the lack of sufficient technical and human platform [1]. The antenatal diagnosis of digestive malformations was only suspected in 2, 63% (1 in 38 cases) while in the West the diagnosis is antenatal [13, 14].

The majority of our patients, or 65.79%, were referred by first aid structures and without medical ambulances. This observation was made by Mouafo in Cameroon where more than half of their patients came from first category structures and without medical transport [6].

In our series, 30 newborns, or 78.95% of cases were from multiparous mothers. According to the literature, the risk of occurrence of NIOs is even higher than the parity is advanced [15]. In the literature, a third of newborns with an NIO are premature [16, 17]. In our study, prematurity strongly influenced mortality (p = 0.000). The problem of their care in our poor services is an explanation. Indeed, in developed countries, prematurity is no longer a factor of poor prognosis [11, 15]. Thus, in developing countries, prematurity is still one of the causes of high neonatal mortality and therefore constitutes a factor of poor prognosis. We should, at the UTH, tends towards others are now.

In our study, the average birth weight (of our patients was 2,844.7 grams. This average weight influenced mortality in our series. Indeed, out of the 10 cases having born with a weight of less than 2500g, 7 died (p = 0.000). Birth weight is not implicated as a risk factor for the occurrence of NIOs but can influence the prognosis [4, 5, 14].

In our study, 27 of our patients, or 71.05% of cases, had consulted between 1 and 7 days with an average consultation time of 3.51 + or - 2.88 days. It is comparable to those found in the African series which varies between 4 and 8 days [1, 4, 18, 19, 20]. This average consultation time slightly lower than the 7.6 days of Aguemon, in Abidjan, [21], the 9.1 days of Takongmo, in Yaoundé, [1] and the 7.9 days of Mouafo in Caméroun [6].

In our study, the primary cause of NIOs was anorectal malformations and mortality was more recorded for malrotations and small bowel atresia. According to the statistical analysis of our series, the etiology strongly influenced death (p = 0.000). Mouafo notes in his study that HD being the leading cause of neonatal obstruction, it is understandable that it is also the leading cause of death [6]. In our work, HD was the second and least fatal cause of NIO.

Therapeutically, the average time for surgical treatment of 30 hours with extremes of 2 hours to 6 days. African literature speaks of the delay of 2.3 days on average, testifying to the weakness of the purchasing power of populations and thus contributing to the worsening of the prognosis of these occluded newborns [1, 6]. In our study, the treatment delay seems reasonable because of the free care at this age. However, newborns who received late care were more lethal (p = 0.000).

Conclusion:

Factors such as prematurity, low birth weight, time to surgical treatment and etiology significantly influenced the prognosis of these NIOs in our study.

Thus, improving the prognosis of neonatal intestinal obstructions requires early diagnosis and management.

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