

Neonatal Surgical Emergencies in Gabriel Touré Teaching Hospital in Bamako: Epidemiological and Clinical Aspects

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Abstract

Neonatal surgical emergencies are common causes of neonatal morbidity and mortality. The aim of the study was to access epidemiological, clinical and prognostic characteristics of newborns hospitalized for surgical emergencies.

Material and Methods: We conducted a one-year prospective study from January 1st, 2016 to December 31st, 2016 in the neonatology service in the Pediatric Department of Gabriel Touré Teaching Hospital in Bamako, the capital city of Mali. All neonates from 0 to 28 days hospitalized for a surgical emergency were included.

Results: One hundred and fourteen cases of surgical emergencies were recorded, i.e. 3% of hospitalizations. The average maternal age was 24 years old. Sex ratio was 1.1. The average consultation time was 7.5 days. In 55% of cases, newborns were premature. The antenatal diagnosis was made in 7 patients. Congenital malformation pathology accounted for 92.98% of ailments. Digestive diseases predominated with 72.9%. These were mainly omphalocele (17.5%), anorectal malformations (13.2%), and laparochisis (12.3%). Hirshprung's disease was found in two newborns (1.8%). Surgery was performed in 59 neonates (51.8%). The per and postoperative lethality was 55.26%. The overall case fatality rate was 49.1%. The most lethal pathology was laparoshisis (100%). Factors associated with mortality were maternal instruction level ($p = 0.00$), vaginal delivery ($p = 0.01$), and laparoshisis ($p = 0.000$).

Conclusion: A real policy by the health authorities to reduce mortality related to neonatal surgical pathologies is needed.

Keywords: Newborn; Surgical emergencies; Mortality

Introduction

Neonatal surgical emergencies are common causes of neonatal morbidity and mortality [1]. Neonatal surgical pathologies are abnormal structures or functions that manifest themselves from birth to the end of the first month of life and require urgent surgical treatment [1,2]. It is most often a surgical emergency involving the vital and / or functional prognosis. While in the industrialized countries, life expectancy has improved as a result of antenatal diagnosis, in developing countries there are several difficulties in managing it [2,3]. In Africa, they would motivate about 10% of surgical procedures in the various pediatric surgery departments [3,4]. Neonatal surgical emergencies accounted for 19.8% of admissions to the Pediatric Surgery Department of the University Hospital Center of Yopougon in Abidjan, Côte d'Ivoire [5] and 12.8% of those in the Pediatric Surgery Department of National Lamordè Hospital in Niamey, Niger [6]. In some settings, neonates are cared for in general surgery departments. This is the case in Bukavu in the Democratic Republic of Congo, where the surgical pathology of the newborn represents 1.31% of the surgical one [7]. In Bamako, Mali, the neonatology and pediatric surgery departments, the last level of national reference structures, provide synergistic care for neonatal surgical conditions. Until then, no study had examined the problem of surgical diseases of the newborn admitted to the neonatology service. The aim of the study was to access epidemiological and clinical characteristics of newborns hospitalized for surgical emergencies.

Patients and Method

We conducted a one-year prospective study from January 1st, 2016 to December 31st, 2016 in the neonatology service in the Pediatric Department of Gabriel Touré Teaching Hospital in Bamako, the capital city of Mali. It provides care to newborn referred from the city of Bamako and its neighboring areas. The service receives all neonatal emergencies including surgical ones.

The management of newborns with surgical pathologies is multidisciplinary. Surgical management is provided by pediatric surgeons and pre- and postoperative surgery by neonatologists. All neonates from 0 to 28 days hospitalized for a surgical emergency were included. Non-life-threatening conditions that have been postponed to surgery as well as cardiac malformations have not been included. The parameters studied were: age, sex, origin, birth weight, consultation time, types of surgical pathology, consultation time, operating time, mortality, causes of death and factors

associated with the death. The data were collected on a standardized survey form. The data capture and analysis were done on SPSS version 20. For the analysis of prognostic factors, the Chi-square and Fisher tests were used with a significance level of less than 5%.

Results

During the study period, 3766 patients were hospitalized in the neonatology department. Among them, 114 patients (3%) presented surgical pathology. The average maternal age was 24 years old. Mothers were housewives and school dropouts 75% and 65.8% respectively. Primigravida and primiparous were respectively 62.3% and 34.2% of cases. Vaginal birth was the main mode of delivery (81.6%). Sex ratio was 1.1. Fifty-nine (59) newborns were admitted during the first 24 hours of life (51.8%). The average consultation time was 7.5 days. The average birth weight was 3000 g. In 55% of cases, newborns were premature. The antenatal diagnosis was made in 7 patients (6%). The main socio-demographic characteristics and pre and per-natal antecedents are summarized in Table 1.

Variable	Frequency (n=114)	Percent
Maternal age		
14-18 years old	25	21.9
31-47 years old	17	15
Level of education of the mother		
Unschooling	75	65.8
Schooled	39	34.2
Gesture and parity		
Primigravida	71	62.3
Primipare	39	34.2
Delivery route		
Vaginal	93	81.6
Caesarean section	21	18.4
Birth weight		
Hypotrophe	48	42
Eutrophic	61	53.5
Sex		
Male	62	54.00%
Female	52	46.00%

Table 1: Socio-demographic characteristics and pre- and per-natal antecedents.

Congenital malformation pathology accounted for 92.98% of ailments. Digestive diseases predominated with 72.9%. These were mainly omphalocele (17.5%), anorectal malformations (13.2%), and laparochisis (12.3%). Hirshprung's disease was found in two newborns (1.8%). A case of hypertrophic stenosis of the pylorus and a case of atresia of the esophagus have been observed. Bowel obstruction motivated hospitalization in 2.6% of cases. Peritonitis was found in the same proportions (2.6%). Ulcerative necrotizing enterocolitis was diagnosed in two neonates (1.8%). Myelomeningocele accounted for 13.2% of ailments. Sacrococcygeal teratoma was found in two neonates. Encephalocele was found in 1.8% of newborns. Abnormalities of the urogenital tract accounted for 0.9% of surgical pathologies. The main pathologies found are summarized in Table 2.

Variable	Frequency (n=114)	Percent
Digestive diseases		
Omphalocele	20	17.5
Gastroschisis	14	12.3
Imperforate anal	15	13.2
Atresia of the esophagus	1	0.9
Bowel obstruction	3	2.6
Peritonitis	3	2.6
Ulcerative necrotizing entérocolitis	2	1.8
Neurological pathologies		
Myelomeningocele	15	13.2
Hydrocephalus	6	5.3
Encephalocele	2	1.8
Sacrococcygeal teratoma	2	1.8
Other conditions		
Valve of the posterior urethra	1	0.9
Cleft lip and palate	5	4.4

Table 2: Main surgical pathologies.

Surgery was performed in 59 neonates (51.8%). Sixty-seven-point three percent (67.3%) of the digestive disorders were operated on, followed by abnormalities of the vertebral column (29.1%) and those of the head (9.1%). The intervention was made within 24 hours in 34 newborns or 58.6% of cases. The per and postoperative lethality was 55.26%. The overall case fatality rate was

49.1%. The most lethal pathology was laparochisis (100%). Factors associated with mortality were maternal instruction level ($p = 0.00$), vaginal delivery ($p = 0.01$), and laparochisis ($p = 0.000$). Table 3 presents factors associated with mortality.

Studied factor	Frequency		P-value
	Death	Live	
Sex			
Male	31	32	0.98
Female	25	26	
Schooling of the mother			
Yes	25	14	0.02
No	31	44	
Delivery route			
Low way	40	53	0.01
Caesarean section	16	5	
Low birth weight			
Yes	24	24	0.87
No	32	34	
Type of pathology			
Gastroschisis	14	0	0
Omphalocele	8	12	
Imperforate anal	2	13	
Myelomeningocèle	3	12	

Table 3: Analysis of factors associated with mortality.

Discussion

Our study included all neonates from 0 to 28 days hospitalized for surgical pathology in the neonatal department during the study period. The frequency of surgical pathologies in the department was 3%. This frequency probably does not reflect in the population. Indeed, in general, with visible malformative pathologies, the use of conventional care is not systematic and some of them are unknown at birth. Our frequency is close to that of Youl H [8] in Burkina Faso and Yadav P et al. [9] in Egypt who found 2.9% and 2.8% respectively. In other African series, neonatal surgical pathology accounted for 9.7% to 61% of admissions to pediatric surgery [5,10]. Studies in Africa [7,11-13] and Indian and British series [14-17] had annual incidences higher than ours ranging respectively from 11 to 25 and 60 to 301 new-born each year. The demographic characteristics of the populations and the specificities of the pediatric surgery services that cover them vary and determine the hospital impact [6]. In

our study, male newborns are the most affected. This predominance is also found in the study of Kokoé [Error! Reference source not found.] in Côte d'Ivoire and by other authors [10,12,19-21]. By contrast, in the Youl H series [8] in Burkina Faso, the female sex was predominant. There is no clear consensus regarding the predominance of a gender.

Although more than half of the newborns were admitted before the first 24 hours of life, the average consultation time in our study was 7.5 days. The delay in referral and late recourse to care are also mentioned by Yadav P [9] in Egypt and Youl H [8]. Congenital pathologies are the main neonatal surgical emergencies. They represented 92.98% in our series and 57% in the study of Omid AAM et al. [8].

Congenital surgical conditions should be prenatal diagnosed so that delivery takes place in a specialized resuscitation and neonatal surgery center [3]. Early endovaginal ultrasound examination, between the 12th and 14th week of amenorrhea, allows to detect the severe pathology of the fetus, such as abnormalities of the nervous system and the anterior abdominal wall [22]. In the third trimester, the ultrasound allows to specify the vitality of the digestive loops for a laparoschisis and the size and the contents of an omphalocele [22]. Antenatal diagnosis remains a handicap in developing countries. In our study, it could be performed in 7 newborns (6.1%). In some studies, such as Ndour O [12] and Ralahy MF [23], no antenatal diagnosis has been made. The development of antenatal diagnosis has led to a reduction in the time taken to treat omphaloceles in Western countries, the United States and Europe [2].

In these countries, it is currently a benign pathology with a survival rate of 97% [2]. The pathologies of the digestive tract are the main neonatal surgical emergencies. In our series they accounted for 72.9% of cases. Their frequency ranged from 41.8% to 82% in most studies [5,11,13,21,23,24]. The digestive pathologies led to high mortality, linked to the difficulties of neonatal resuscitation and anesthesia due to the lack of qualified personnel in particularly neonatal pediatric anesthesia [3,4]. The neonates who underwent surgery were 59 out of 114 or 51.8% and the operative time was less than 24 hours for 34 cases or 58.6%. In the Ndour O et al study, the mean operative time was 4 hours with extremes ranging from 2 hours to 7 days [12]. All our patients could not benefit from the surgery. This was due to the difficulties related to the delay of diagnosis and the limited financial means of the parents in the absence of a

subsidy system or free support for emergencies in general.

In our study, the death rate was 49.1%, the main factors associated with mortality were maternal instruction level ($p = 0.00$), vaginal delivery ($p = 0.01$), and laparoschisis ($p = 0.000$). Our case-fatality rate is lower than that of Ndour O in Senegal [12] and Hounnou GM in Benin [19], which found respectively 68% and 50.6%. All these authors justify the high mortality rate by: the fragility of the newborns, the diagnosis which is not made during the prenatal period, the absence of a specific neonatal resuscitation unit, the delay of consultation, the fact that the newborn is seen while it already presents some complications, the supply of drugs which is left to the sole responsibility of the parents and a mode of evacuation of the defective new-borns. These facts meet exactly the reality of home. The morbidity and mortality factors identified in various studies were: births at home or in rural health facilities, prematurity and low birth weight, damage to the digestive system, unsafe transportation, problems nutritional complications, anesthetic complications and the presence of multiple congenital anomalies [13,16,24]. For Ouedraogo I et al, prematurity, the existence of associated malformations and low birth weight are risk factors for mortality [25]. In the Ndour O et al study, 53% of the newborns who died had a low birth weight [12]. Hounnou GM [19] have made the same observation and agree that low birth weight is a factor of poor prognosis. According to Osifo OD, 1/3 of newborns with a malformation are premature [13].

The management of neonates with surgical pathologies must be multidisciplinary. In the West neonatal mortality has significantly decreased thanks to the progress of resuscitation and parenteral nutrition [3,4]. Advances in diagnostic techniques and perioperative care have greatly improved the therapeutic outcomes of neonatal surgery. Nevertheless, there are disparities in the results of neonatal surgery between high-income countries and those with average income and low income [2]. The difficulties of neonatal resuscitation and the limits of anesthesia of premature infants were responsible for 33% of deaths [2]. In Nigeria, Amen EA et al were able to achieve a reduction in the neonatal mortality rate by improving the technical plateau [13,26].

Conclusion

As in most countries in Africa, surgical emergencies place a heavy strain on newborn survival. Indeed, the lethality that is attributable to it remains very high. A real policy by the health authorities to reduce mortality related to neonatal surgical pathologies is needed. The

latter should promote prenatal diagnosis, the training of qualified personnel, the improvement of the technical platform and the accessibility of the populations to care.

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