

The Fate of Newborns Delivered through Cesarean Section at Brazzaville University Hospital

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Abstract

Objectives: To assess the fate of newborns born by emergency Cesarean section during the early neonatal period at the University Hospital Centre (UHC) in Brazzaville, with a view to improving neonatal prognosis. **Patients and methods:** This was a descriptive and cross-sectional analytical study of exposed and unexposed type, which took place from 24 March 2018 to 24 May 2018. All cases of newborns born by Cesarean section were included. Children born by extreme emergency and urgent Cesarean section were considered as exposed, and the others not exposed. The variables studied were the epidemiological characteristics of the mothers, the history of pregnancy and its management, anthropometric data on the newborn, the state of the child at birth and monitoring up to the seventh day. The test for comparing the proportions of target groups related to the child's condition was used. **Results:** The mothers were aged 20 to 29 years (extreme 16 to 44 years); 32 of them (22.5%) had a scarred uterus; 29 pregnant women (20.4%) had a pathology associated with pregnancy. The distance travelled to consult was between 5 and 10 Km (63 cases or 44.3%). Emergency Caesarean sections were performed in 110 patients (77.5%) and scheduled Caesarean sections in 32 pregnant women (22.5%). Localoregional anaesthesia by spinal anaesthesia predominated (78.9%), by the association Bipivancaine + Fentanyl (69 cases or 48.6%) whose practitioner was often the nurse anaesthetist (131 cases or 92.3%). No accidents have occurred intraoperatively. At birth we noticed: 4.2% stillbirth, 19.7% bad, requiring resuscitation of at least 5 minutes for 16 newborns (57.1%). 26 newborns (18.3%) required care in the Neonatology Department. Early neonatal morbidity was dominated by respiratory distress

(10 cases or 38.5%), early neonatal infection (5 cases or 19.1%) and a lethality rate of 19.2%. **Conclusion:** The future of the newborn, born by emergency Cesarean section is mixed; emergency control can improve the situation.

Keywords

Newborns, Emergency Cesarean Sections, Congo

1. Introduction

Emergency Cesarean section includes extreme emergency Cesarean section (There is a vital risk to the mother and/or child); emergency Cesarean section (There is a risk to the mother and/or child not immediately vital); and Cesarean section decided during labour in a context that requires rapid extraction but without endangering the mother [1].

The Cesarean section performs the artificial delivery after opening the uterus surgically. It is performed abdominis after coeliotomy [2].

In Africa, neonatal post-Cesarean mortality remains high. The fate of newborns born by emergency Cesarean section is severe in developing countries [3]. This is the case in Guinea Conakry, where a hospital frequency of 8.52% was found by Diallo in 1998 [4]. In a Senegalese series of 370 newborns born by emergency Cesarean section 53.5% were transferred to neonatology for various reasons: neonatal asphyxia (27.2%); premature infection (5.3%) and low birth weight (4.9%) thus increasing mortality in the first 7 days of life of the child to 7.8%; unlike European countries where rates are lower [3]. It is classic to say that emergency Cesarean section reduces maternal and perinatal mortality. However, emergency Cesarean section involves risks for the child, including anesthetic risk (particularly the use of general anesthesia); surgeon dexterity (risk of trauma to the fetus); indication of the Cesarean section; and logistics of the practice of Cesarean section. On the other hand, little work has evaluated the outcomes of Cesarean sections for the child, particularly in the context of urgency.

In Congo-Brazzaville, an alarm call on the fetal-maternal prognosis of Cesarean sections has already been raised in previous studies [5] [6]: Cesarean section is an innovative surgical procedure with some complications [5]; and one in seven women is without children, but with a uterine scar [6].

The objective of this work is to evaluate the fate of newborns born by emergency Cesarean section during the early neonatal period at the Centre Hospitalier Universitaire (CHU) in Brazzaville, with a view to improving neonatal prognosis.

2. Patients and Methods

This is a descriptive and transversal analytical study of exposed and unexposed type, which took place from 24 March 2018 to 24 May 2018, *i.e.* for a period of

three months, in the Obstetrics and Neonatology services of the University Hospital of Brazzaville.

This was to include all cases of newborns born by Cesarean section. Children born by extreme emergency and urgent Cesarean section [1], were considered as the exposed and others as the unexposed. Newborns born by Caesarean section in another health facility and referred to the University Hospital for management of a post-Caesarean complication were excluded.

We selected a non-probability sample, of convenience, electing all cases for this period.

The variables studied were the socio-demographic characteristics of the mothers (age, profession,) the maternal background (gestational age, parity, notion of scarring uterus); prenatal contacts (number of consultations, end of pregnancy, pathologies associated with pregnancy); Caesarean section indication, operator qualification, type of incision, duration of procedure, type of anesthesia, anesthesiologist qualification, medication, incidents and accidents, blood loss, anthropometric data of the newborn, state of the child at birth and monitoring until the seventh day, by interviewing mothers coming to postoperative dressings. Early neonatal morbidity having required a transfer of children to the neonatal department, morbid conditions and number of deaths have been recorded.

Apart from the scheduled Caesarean sections, the rest of the performed Caesarean sections were considered to be the urgent Caesarean sections.

The data were analyzed using Stata software, version 1.4. We used the test to compare the proportions of target groups related to the child's condition: the Z statistic.

Either the number of "exposed children" for a sample E_1 of size N_1 and n_1 the number of observations verifying the same property for a sample E_2 considerable N_2 (Table 1).

Our sample size was 142 pregnant women, of whom 44 received an extreme emergency Cesarean section (exposed group) and 98 were the other indication types (unexposed):

The statistics Z follows a normal distribution when the quantities $\frac{N_i \cdot (n_1 + n_2)}{(N_1 + N_2)}$ and $N_i \cdot \left[1 - \frac{(n_1 + n_2)}{(N_1 + N_2)} \right]$ are greater than 5, with $i = 1, 2$.

This test was also developed by considering that: the observations are mutually independent, the probability p_1 to own the property is the same for all observations in the sample E_1 the probability p_2 to own the property is the same for all observations in the sample E_2 the number of employees N_1 and N_2 are quite large and, p_1 and p_2 are not too close to 0 or 1.

3. Results

Mothers were 32 years old with extremes from 16 to 44 years old; seventy-two (50.7%) were unemployed; 32 (22.6%) were found to have a notion of scarring

Table 1. Principles of risk factors in the test for comparing the proportions of target groups related to the child's condition.

Group II Good condition	Total	Total poor condition	Group I
Presentations	n_1	$N_1 - n_1$	N_1
Not exposed	n_2	$N_2 - n_2$	N_2
Total	$n_1 + n_2$	$(N_1 - n_1) + (N_2 - n_2)$	$N_1 + N_2$

uterus; 92 (92 cases or 64.8%) were poor; 116 (81.7%) had effective prenatal contacts; during these contacts, 29 (20.4%) had a pathology associated with pregnancy that was treated. The distance travelled to consult the Brazzaville University Hospital for pregnant women coming on their own or referred from a peripheral centre was less than 5 Km (62 cases or 43.7%) and between 5 and 10 Km (63 cases or 44.3%).there was no medical transport.

Table 2 represents the distribution of Caesarean section indications. It shows that emergency Caesarean sections (including extreme emergency Caesarean sections, urgent Caesarean sections and Caesarean sections decided during labour) predominated (110 cases or 77.5%), there were 32 cases (22.5%) of scheduled Caesarean sections. Cesarean sections were performed mainly by doctors specializing in obstetrical gynaecology (124 cases or 87.3%); they were classic Cesarean sections where the Pfannenstiel incision was performed in 115 pregnant women (81%), transverse segmented hysterotomy performed in 138 pregnant women (97.2%).

Spinal anaesthesia used for 112 patients (78.9%). There was a conversion of rachianaesthesia to general anaesthesia due to technical difficulties in one case. The most frequently used anesthetics were Bipivancaine + clonidine chlorydrate (69 cases or 48.6%) or Bipivancaine + Fentanyl + morphine chlorydrate (33 cases or 23.3%). The procedure was performed by the nurse anaesthetist under the supervision of the doctor in 131 cases, or 92.3%, while the anaesthetist-resuscitator intervened alone in only 11 cases (7.7%). No accidents occurred intraoperatively other than the need for blood transfusion in 8 patients (2.8%). There was a uniformity of newborns in both sexes: 70 male (49.3%) and 72 female (50.7%).

Neonatal mortality concerned 6 children (4.2%), 28 newborns (19.7%) had a poor first minute Apgar score (less than or equal to 6) requiring neonatal resuscitation.

Resuscitation ranged from 5 minutes for 16 newborns (57.1%), 6 to 10 minutes for 8 (28.6%) and more than 10 minutes for 4 newborns (14.3%).

Analysis of the anthropometric parameters of newborns shows that 131 newborns (92.3%) had a head circumference of between 32 and 35 centimetres; of which 107 (75.3%) weighed 2500 grams or more; 114 (80.3%) were between 41 and 50 centimetres.

After resuscitation, 26 newborns (18.3%) required care in the Neonatology Department. **Table 3** shows that the diagnoses of newborns admitted to neonatology

Table 2. Caesarean indications.

	N = 142	%
Extreme emergency Caesarean sections		
AFA	26	18.3
Eclampsia	12	8.5
HRP	3	2.1
Placenta praviae	3	2.1
Urgent Caesarean sections		
Unknown shoulder	3	2.1
Pre-breakdown syndrome	1	0.7
Caesarean sections decided during labour		
DFP	14	9.9
Stationary expansion	4	2.8
Cervical maturation failure	1	0.7
Uterine test failure	3	2.1
Failure of the working test	2	1.4
Macrosomy	4	2.8
RPM+ seat	4	2.8
Scar uterus	25	17.6
Seat	4	2.8
Sepsis	1	0.7
Programmed Caesarean sections		
AFC	4	2.8
Scar uterus	10	7.1
HTA	14	9.9
Twin pregnancy J1 seat	2	1.4
Previous prolapse treatment	1	0.7
Maternal fever	1	0.7

Table 3. Diagnosis of newborns admitted to neonatology.

	N = 26	%
Perinatal asphyxia	4	15.4
Earlyneonatal infection	5	19.1
Respiratory distress	10	38.5
Anoxo-ischemic encephalopathy	2	7.6
Hypotrophy	1	3.8
Macrosomy	1	3.8
Prematurity	3	11.5

dominated by respiratory distress 10/26 (38.5% des cases), early neonatal infection 5/26 (19.1% of cases) and perinatal asphyxia 4/26 (15.4% of cases). During neonatal care, 5 newborns (19.2%) died.

The morbidity and mortality of children transferred to neonatology has been closely linked to the practice of emergency Cesarean section and the use of general anesthesia (**Table 4**).

4. Discussions

Our study period was only three months, this may constitute a bias in the study, but the number of cases is statistically significant.

Determining the age of mothers is important, as 16-year-old girls were also involved. The problem is that at this age, pregnancy has a risk not only for the mother, but also for her conception product, with low birth weights, prematurity, depressed birth, exposure to higher perinatal morbidity and mortality [7] [8]. Childbirth is a major event in both the physical and psychological aspects of life. It may be a natural birth, most often, but it may also be an increasingly frequent Caesarean section. It is a maternal and/or fetal “rescue” operation. During Caesarean section there is an accumulation of risk: risk related to childbirth and risk related to the operation [9].

Pregnancy surveillance, the mother’s gynaecological and obstetrical history, pre, per and postoperative conditions of Cesarean section may be risk factors

Table 4. Comparison of proportions for children transferred to the service of Neonatology.

Children	Transferred		Total		Z	P-value	
	n	%	n	%			
N	26	18.3	142	100			
Caesarian section					12.9	1.85	0.032
Urgent	12	27.2	44	31			
Non urgent	14	14.3	98	69			
Practitioner							
Obstétrician	4	22.2	18	13	4.5	0.45	0.32
Physician DES	22	17.7	124	87			
Type of anesthesia							
General anesthesia	8	27.6	29	20	11.6	1.44	0.07
Rachianesthesia	18	15.9	113	80			
Duration intervention							
<60 mn	22	18.2	121	85	-0.78	-0.09	0.53
>60 mn	4	19	21	15			
Blood loss							
>500 cc	23	17.9	128	90	-3.46	-0.31	0.6

that may alter the fetal prognosis. Some authors blame low levels of education, extreme ages of mothers, reference, nulliparity, high multiparity and general anaesthesia [10]. The Pfannenstiel incision is common in the department. The transport of patients at referral is not medicalized, making it difficult to objectively assess the fetal-maternal condition before admission.

The anaesthetic most often used during Caesarean sections, even in the emergency context, remains spinal anaesthesia (78.9%). Lidocaine with 2% adrenaline is the reference drug for spinal anaesthesia. Morphine and intrathecal clonidine are reliable adjuvants to advantageously prolong peri-medullary anaesthesia [11].

In our context, anaesthesia in surgical emergencies is often successfully performed by an anaesthesia nurse on the supervision of the anaesthesia resuscitator physician as confirmed by our results.

The distance travelled to consult, the duration of the operation and blood loss did not significantly influence the condition of newborns, despite the fact that Caesarean sections are mainly performed by doctors specializing under the supervision of obstetrician gynaecologists. Another important parameter to consider when performing emergency Caesarean sections is the decision-extraction time. For some authors, this delay is influenced by the passage to the operating room, the type of anaesthesia and the lack of a clear indication to the team. This delay in “extraction decision” can have a significant impact on fetal prognosis in extreme emergency situations [12].

Procedures adapted to the degree of urgency of the Caesarean section according to Lucas’ classification have been put in place allowing the performance of urgent or very urgent Caesarean sections by choosing a simple means of communication to transmit the degree of urgency to all participants: this is the system of red, orange, green colour codes with the objective of decision-birth time (15 minutes for red, 30 minutes for orange code) [13].

Thus, the use of “color codes” was intended to facilitate communication between the multiple protagonists of an emergency Caesarean section and reduce the time required to make a decision—birth. In the event of a Caesarean section in extreme urgency, this use makes it possible to achieve a very short time frame but should not trivialize procedures. Indications must be limited so as not to expose the mother and child to unjustified risks [14]. However, the optimization of the premises has made it possible to improve the rate of Caesarean sections in extreme urgency with an extraction decision time of less than 30 minutes and even 15 minutes by reducing the transfer time to the operating room, with a positive correlation between extraction decision time and PH at the cord and an improvement in neonatal outcome [15]. However, contrary to popular belief, neonatal prognosis is more often dependent on the pathology involved than on the extraction time, the transfer time to the operating room [16]. It appears that the indications for Caesarean sections in our study were dominated by acute fetal asphyxia 18.3%, scarring 17.6%, fetal-pelvic disproportion 9.9%, gestational hypertension and eclampsia 9.9% have an implication with the fate of newborns. 28

newborns had a poor Apgar score at the first minute (19.7%). Resuscitation in the operating room having not been effective (the absence of the neonatal paediatrician in the operating room for the early management of the newborn is the cause), thus 26 out of 28 newborns which required their transfer to the Neonatology department. Stillbirth was reported in 6 cases (4.2%).

In the referral service, 5 out of 26 deaths were recorded. The causes of neonatal mortality and morbidity were dominated by respiratory distress 38.8%, early neonatal infection 19.1% and perinatal asphyxia 15.4%. The risk of transient respiratory distress in newborns extracted by Caesarean section may be explained by the absence of secretion of “stress” substances such as catecholamines and glucocorticoids, which ensure good adaptation to ectopic life, as is the case in low birth [17]. Intestinal bacterial colonization also occurs when the genital tract passes through, allowing the intestine to function optimally. With Cesarean birth there is a risk of developing a food allergy due to the absence of bacterial colonization from birth [17] [18]. Some authors report that emergency Caesarean section, short time to skin incision/delivery and skin incision at T or J Caesarean section are the risk factors for fetal injury [19]. We did not notice any fetal wounds during the Cesarean section. Our assertions reflect results similar to previous work conducted in the same department, namely emergency Caesarean sections are 2.46 times more likely to have maternal complications and 6.03 times more likely to die in the fetus than non-urgent sections. Factors that aggravate maternal and fetal prognosis include: delay between the indication and performance of Cesarean section, evacuated patients, general anesthesia, some indications for Cesarean section such as acute fetal suffering, placenta previa, fetal-pelvic disproportion [20]. However, some authors link perinatal mortality during emergency Caesarean sections to intrapartum obstetric trauma, admission-surgical delay and prematurity [21].

General anaesthesia is a factor in poor neonatal prognosis, as it can lead to hemodynamic maternal complications (hypertensive peaks, tachycardia, hypotension) or respiratory complications (oxygen desaturation, difficult intubations) [22]; it can lead to deleterious effects for the newborn. The occurrence of a complication per and/or postoperatively increases with the color code of the Cesarean section, so it is important to respect their good practice [23].

The gynaecology-obstetrics resident who has acquired surgical skills, a reasonable length of intervention and a hemorrhage of nearly 1000 ml in a parturient without other risk factors, do not constitute neonatal morbidity and mortality severity factors.

On the other hand, admission to neonatology is a marker of the severity of neonatal morbidity [24], however, it must be taken into account that these admissions depend on the practice of clinicians caring for children, the protocols of each institution and the local means of hospitalization.

5. Conclusion

The future of the newborn born by emergency Cesarean section depends on

several factors including the causal pathology, the emergency context and the surgical procedure itself. Only an improvement in the organization of work in the emergency department with adequate conditions for the reception of the newborn child can improve the fetal and maternal prognosis.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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