

# Maternal complications of the caesarean: analysis of 117 cases at the maternity of university hospital Yopougon in Abidjan (Cote d'Ivoire)

## Summary

**Objectives:** To specify the various complications of caesarean section and the risk factors associated with these complications.

**Method:** This was a retrospective cross-sectional and descriptive study that took place over a period of 5 years (1st January 2012-31 December 2016) at Yopougon University Hospital (Abidjan Ivory Coast) in the Gynecology Department - Obstetrics. The study population consisted of 117 cases (post caesarean complications) from 8,081 caesareans of this period.

**Results:** The mean age of the patients was 27.94 years (extreme 13-42 years). Caesarean section complications were predominantly in primiparous women (64.96%), 28 years of average age, evacuated from peripheral maternity (75.2%) with long-term disordered membranes (79.5%), and having a fetal pelvic disproportion (39.31%). Postoperative complications are marked by parietal suppurations (37.6%) or postoperative endometritis, with a maximum hospital's delay stay of 26 days

**Conclusion:** Although it is possible to reduce morbidity and materno-fetal mortality, caesarean section presents with mostly infectious complications.

**Keywords:** Caesarean section, maternal complication, wall infection

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**Abbreviations:** VOC, vaso-occlusive crisis; SCD, sickle cell disease; FPD, Foeto-pelvic disproportion; RPH retro-placental, hematoma; AFD, acute fetal distress

## Introduction

Caesarean section (C-section) is the most common obstetric surgical operation. Since 1985, the international health community has estimated that the ideal (C-section) rate is between 10% and 15%. Since then, cesarean delivery has on the rise in all countries.<sup>1,2</sup> This increase has an impact on public health; even if this intervention is currently popularized and fast. C-section rates have risen dramatically over the last 3 decades in western countries. For example, in the United States, this rate rose from 8.8% in 1970 to 24.7% in 1988. According to the European Perinatal Health Report,<sup>2,3</sup> the rate varied between 14% to 37,8% in 2004. In Australia, the prevalence was from 20% in 1993 to 29% in 2004. In South America, Brazil and Chile, the rates were respectively 40% and 42% of births.<sup>2-4</sup>

C-section has improved the perinatal mortality rate. Anesthesia and surgery have become safer, but the risk of death associated with cesarean section remains seven times higher than normal delivery.<sup>4</sup> Similarly, maternal morbidity is also higher after c-section than normal delivery.<sup>5</sup> The surgical technique has also evolved in recent years towards a reduction of morbidity and mortality like the technique of Misgav-Ladach described by Stark based on the principle of minimal surgical gesture.<sup>4,6,7</sup> Despite progress, c-section complications remain numerous and varied, including surgical site infection, puerperal sepsis, hemorrhage and blood transfusion, anesthesia, pulmonary embolism, intraoperative trauma, and short-term fetal damage.<sup>7,8</sup>

C-section is aimed at reducing maternal and fetal morbidity and mortality. In our low-income countries, sometimes with high birth rates, information on its prevalence and complications is needed for health care providers, the public for offer good clinical practice guidelines, which are the aim of our study. Specifically:

- Establishing the epidemiological profile of patients with post-caesarean complications
- Determining the prevalence of these complications
- Specifying risk factors for different types of complications.

## Methods

### Study design

A cross-sectional retrospective descriptive and analytical study from January 1<sup>st</sup>, 2012 to December 31<sup>st</sup>, 2016 for a period of 5 years was conducted at the gynecology and obstetrics department of a teaching hospital of Yopougon-Abidjan with his maternity which is a national referral center. It is located in the largest municipality in the economic capital Abidjan's district. It has three inpatient units, including two for the management of pathological pregnancies and post partum period. It has three surgical rooms including two emergency rooms and one for scheduled interventions. Caesareans are performed by senior specialist doctors or doctors in the 7<sup>th</sup> and 8<sup>th</sup> semester of a degree course in gynecology and obstetrics. The universal standards of asepsis are compliant. The pfannenstiell or Misgav-ladach techniques are the most performed.

## Population

Patients who have undergone an emergency or programmed caesarean section regardless of the term of pregnancy and who has a postoperative complication were included. Patients who underwent a caesarean section at another health center, but whose complications have been taken care of in our center and those whose caesarean section was performed for non-obstetric emergency, (appendicitis, and peritonitis) have not been selected. According to the selection criteria and the study period we finally enrolled 117 medical records of caesarean section (Figure 1).

## Data collection and analysis

The data were collected from the patient's medical records, operating report and birth registry. The variables were studied: sociodemographic parameters (age, occupation, level of education ...), type of caesarean section (scheduled and urgent) and Caesarean section indications, rupture of the membranes and the duration of the labour delivery (long labour delivery corresponding to more than 12hours), maternal complications of caesarean section (per and post Caesarean section) and the length of hospital stay.

The EPI-INFO version 3.5 software was used for data analysis. Quantitative data were described by mean and standard deviation. Fisher and Pearson's Chi-square test with a significance level of 5% (0.05) was used for the comparison of proportions.

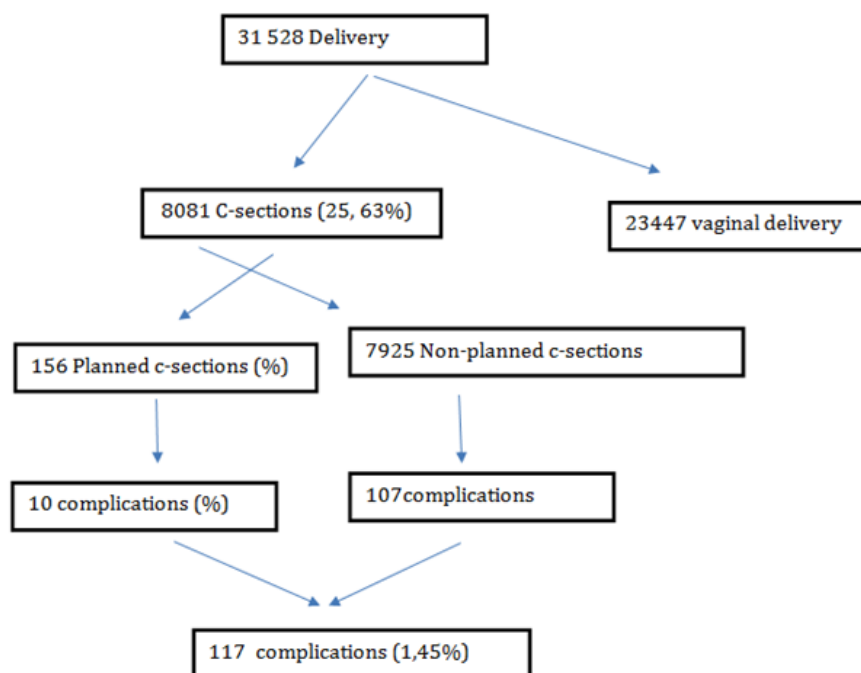


Figure 1 Sampling procedure.

## Results

General and socio-demographic features are reported in Table 1. The average age was  $28 \pm 3.7$ , aged 12-42 years. They are mostly unemployed (43.6%), with a low level of education (67.5%) and medical evacuation around (75.2%). These having already done a long labour of delivery ( $\geq 12$ h) with ruptured membranes (79.5%). Postoperative complications were dominated by parietal suppuration and transit disorders (Table 2). The Figure 2 reports an infection of wall with cutaneous necrosis and desertion of the pelvic fascia.

Table 3 allows for the analysis of indications and complications, as well as the relative risk of the most observed complications associated with admission mode (evacuation), length of labour delivery, type of caesarean (emergency) but not significantly. Thus, the length of the labour delivery with rupture membranes increases the risk of parietal suppuration by 2.26 and bowel disturbances and intestinal discomfort by emergency caesarean section by 2.30. C-section for pathological pelvic bone and the disproportion between foetus and pelvic bone increase the risk of parietal suppurations and bowel disturbances by approximately twice.

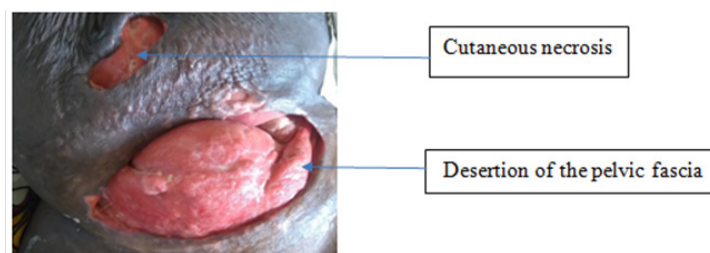


Figure 2 Wall infection.

**Table 1** Distribution of 117 patients done a Cesarean section according to their sociodemographic and general characteristics

	Number (n)	Proportion (%)
<b>Age [years]</b>		
[12-20]	20	17,1
[21-30ans]	54	46,1
[31-40ans]	37	30,7
<b>Profession</b>		
Housewife (without fixed income)	97	82,91
Salariées (fixed income)	14	11,96
Student	6	05,13
<b>Educational level</b>		
Aucun/Primaire	79	67,52
Secondary/high	38	32,48
<b>Parity</b>		
1-2	76	64,96
≥3	41	35,04
<b>Mode of admission</b>		
Evacuation sanitaire	88	75,2
<b>Childbirth labour</b>		
<12h	24	20,50
≥12h	93	79,5
<b>Complications</b>		
Emergency ceasarean	107	91,5
Elective ceasarean section	10	08,5
<b>Type of anesthesia</b>		
Spinal anesthesia	106	90,6
General anesthesia	11	09,4

**Table 2** Distribution of 117 patients done a Cesarean section according to the type and the period of complications

Complications	Number	Percent
<b>Per operating</b>		
Digestive wound	1	0,9
Bleeding	10	8,5
<b>Postoperating</b>		
Endometritis	21	17,9
Anaemia	16	13,7
Transit disorder	26	22,2
Wall Suppuration	44	37,6
Acute peritonitis	9	7,7
Thromboembolic complications	1	0,9
Total	117	100,0

**Table 3** Comparative board of the main operating complications according to the indications and the found risk factors

	Endometritis			Wall suppuration			Intestinal transit disorder			Acute peritonitis		
	n (%)	OR (IC 95%)	Valeur p	n (%)	OR (IC 95%)	Valeur p	n (%)	OR (IC 95%)	Valeur p	n(%)	OR (IC 95%)	Valeur p
<b>Indications</b>												
Abnormal Basin	0 (0)	0 (0-2,89)	0,5896	3 (50,00)	1,71 (0,22-13,29)	0,6708	2 (33,33)	1,81 (0,15-13,46)	0,6134	1 (16,67)	2,58 (0,05-27,34)	0,3882
VOC/SCD*	1 (50,00)	4,75 (0,06-376,64)	0,3280	0 (0)	0 (0-3,20)	0,5267	0 (0)	0 (0-6,86)	0,9999			
FPD*	6 (12,00)	0,47 (0,14-1,43)	0,1475	19 (38,00)	1,03 (0,45-2,34)	0,9395	13 (26,00)	1,46 (0,55-3,84)	0,3958	6 (12,00)	2,91 (0,58-18,75)	0,1682
RPH*	0 (0)	0 (0-5,99)	0,9999	0 (0)	0 (0-2,11)	0,2900	0 (0)	0 (0-4,54)	0,9999			
Dystocic présentation	4 (28,57)	2,02 (0,41-8,07)	0,2753	5 (35,71)	0,91 (0,22-3,29)	0,8762	3 (21,43)	0,95 (0,16-4,02)	0,9999			
AFD*	10 (23,81)	1,82 (0,62-5,25)	0,2164	17 (40,48)	1,21 (0,51-2,81)	0,6316	8 (19,05)	0,75 (0,25-2,05)	0,5365	2 (4,76)	0,49 (0,05-2,74)	0,4862
<b>Risk factors</b>												
Evacuated	11 (12,50)	0,27 (0,09-0,84)	0,0075	35 (39,77)	1,47 (0,56-4,17)	0,399	8 (9,09)	2,78 (0,35-100)	0,4482	21 (23,86)	1,56 (0,48-5,56)	0,4569
Childbirth long duration (≥12h)	17 (18,28)	1,12 (0,31-5,07)	0,999	33 (35,48)	0,65 (0,24-1,80)	0,3507	9 (9,68)	-- (0,64--)	0,2007	23 (24,73)	2,30 (0,60-13,05)	0,2743
Emergency caesarean	18 (16,82)	2,12 (0,32-10,36)	0,3826	42 (39,25)	2,26 (0,48-25)	0,3161	9 (8,41)	0 (0-0,22)	0,999	23 (21,50)	1,57 (0,24-7,53)	0,6903

## Discussion

### General and socio-demographic features

The prevalence of c-section in relation to the number of births in our study was 25.63% and is dominated by c-section during labour delivery. In Africa, rates vary from one hospital to another and from one country to another. A recent study in 2016 in Abidjan reported 37.8% over a period of 11 years.<sup>8,9</sup> In Senegal, N'Gom and Cissé in 2004 had a rate of 25.1%, while when J Dupont in Cameroon noted a rate of 19.74% over a period of 6 months in a cohort study on early complications of caesarean section.<sup>9,10</sup> C-section rates observed in Europe in the Americas ranged from 15.5% to 35.6%. In France in Besançon in 2012 the rate was 15.5%,<sup>2,3,6</sup> in Bourgogne in 2002 the regional rate of cesarean term was 17,5%.

In low income countries, there is a significant correlation between c-section rates and maternity level, with level 3 maternities being referral centers, having neonatology services.<sup>11</sup> The complication rate was 1.45%. In Morocco in 2013, c-section complicated ranged from 3.1% to 13.3%. The analysis of the biological indicators of follow-up showed that the risk of a woman presenting a complication by delivering by caesarean is three times more than the control (Chi-square = 881.21, Yule-Q = 0.52, Odds Ratio, IC at 95%: 2.9 - 3.37).<sup>12</sup> In 2004 in Senegal N'Gom and Cissé C T<sup>9</sup> observed that c-sections had a global fatality of 0.8%; morbidity was 10.5% of cases with 64.3% post-operative infection.<sup>9</sup>

The age of our patients was between 12 and 48 years old with an average age of 27.94 years. This average age is comparable to that of Schauburger<sup>13</sup> who found 26.7 years; Dupont and Cissé also observed an age under 29 years. On average, the mothers were 29.9 years old (± 5.5) and primiparous in 2014 in France, according to Flocc in Lyon.<sup>14</sup> These were often primiparous and rarely pauciparous.<sup>9</sup> Our patients

were mostly from disadvantaged social background, coming from rural or semi-urban areas with little or no education in 67.5% of cases. They exerted 82.91% in the non-official sector. This low educational and socioeconomic level may make it difficult to understand risk factors and expose them to complications. Medical evacuations are from areas in often adverse conditions. Most of them with emergency surgeon were evacuated (75.2%), sometimes with a length of labour delivery more than 12 hours. The method of admission is strongly related to the occurrence of complications. According to N'Gom, almost half of the patients had non-medical evacuation in 44.9%, which was an additional risk factor for the occurrence of complications.<sup>9,10</sup>

### Clinical determinants of caesarean section

Maternal morbidity is high after caesarean delivery during labour compared to planned caesarean section.<sup>5,4</sup> Emergency c-sections for acute foetal distress (AFD) and foetal and pelvic bone (FPD) disproportion were the most sources of complications. Renate<sup>15</sup> reported 16.3% of complications after planned cesarean versus 24.4% in non-planned. The risk also increases with the level of dilation of the cervix. The pfannenstiell or Misgav-ladach technique is the most widely used and less complicated.<sup>1,4</sup> Moreover, our indications are similar on those of Cissé whose main ones are also 18.9% for AFD and 34.9% for FPD.<sup>9</sup> The frequent enclosure of the fetal head was associated with the risk of enlargement of segmental incisions, intraoperative haemorrhages followed sometimes by postoperative anemia, or delays in resumption of bowel functions. Placental abruption is also a provider of postoperative anemia. Hemorrhage risk factors during c-section are: uterine atony, prolonged labour, iterative caesarean section, Placenta previa, chorioamnionitis, previous history of postpartum hemorrhage, general anesthesia and obesity.<sup>16,17</sup>

Infectious complications are more common in our study population. They are marked by parietal suppurations and endometritis.

Surgical site infection, wound infection and endometriosis are the main causes of prolonged hospital stay and a burden on the health care system. Gelaw A in Ethiopia studied from 2013 to 2016 the extent of infection of the surgical site carrying 384 cesarean sections. The parietal infection was 6.8%. The independent risk factors identified for surgical site infections were the duration of labor AOR = 3.48; 95% CI (1.25, 9.68), rupture of the membrane before cesarean section AOR = 3.667; 95% CI (1.13, 11.96) and median longitudinal incision (AOR = 5.733, 95% CI (2.05, 16.00)).<sup>17</sup> Surgical site infections complicate a significant number of cesarean sections: 2 to 7% will have deep infections and 2 to 16% will develop endometritis according to a Kawakita study in the US in 2017.<sup>18</sup>

Many risk factors for surgical site infection have been described. These include maternal factors (smoking, limited prenatal care, obesity, use of corticosteroids, nulliparity, twin pregnancy and previous cesarean section), intrapartum and operative factors (chorioamnionitis, Premature rupture of membranes, prolonged rupture of membranes, prolonged labour, extended incision, thickness of subcutaneous tissue > 3cm, subcutaneous hematoma, lack of prophylaxis antibiotic, emergency delivery and excessive blood loss).<sup>15,17-22</sup>

In summary, our study reveals that risk c-sections were patients, those which came mostly from outlying hospitals (sometimes more than fifty kilometers), emergency cesarean sections after a long period of labour, rupture membranes more than 6 hours, often with chorioamnionitis, the presence of amniotic fluid into the abdominal cavity often led to infections and bowel disorders.

Caesarean section is an usual procedure that seems ordinary, but complicating, hence the guidelines made by P. Lopes and E. Misbert in editorial in terms of "Dix commandements de la césarienne".<sup>23</sup>

## Conclusion

Caesarean section is common in the delivery room. With improved safety of caesareans, more women choose to have an operative delivery. However, caesarean section complications should not be overlooked because of its high morbidity compared with caesarean section. We must therefore be certain that the decision to perform a caesarean section is the right choice for the mother and her future pregnancies.

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## Conflicts of interest

The author declares that they do not have any conflicts of interest.

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