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Determinants of Paediatrician's Presence at Caesarian Section

Determinants de la Presence De Pediatres au Cour de la Cesarienne

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ABSTRACT

BACKGROUND: **Paediatricians are required to attend all Caesarian sections, yet most neonates so delivered do not require complex resuscitations necessitating a paediatrician's presence.**

METHODS: **All Caesarean sections in the University of Benin Teaching Hospital from January to December 2009 were prospectively studied. The socio-demographic characteristics, indication and type of surgery, and the type of anaesthesia were recorded. Neonatal outcome was assessed with Apgar scores at 1 and 5 minutes and the need for a paediatrician determined.**

RESULTS: **There were 431 cases of caesarean section within the period and 326(75.6%) of these had antenatal care. About three-quarters of the patients had emergency caesarean section. Indications for caesarean section were foetal in 19% and maternal in 81%. Subarachnoid block was the main anaesthetic technique 392/431(91.0%). Apgar score in 1min was less than 7 in 172/431(39.9%) and was severe (< 4) in 26/431(6.0%). Lack of ante natal care ($p < 0.05$, RR = 1.3, 95%CI = 1.0 - 1.7), foetal indications ($p < 0.05$, RR = 1.4, 95%CI = 1.1 – 1.8), emergency caesarean section ($p < 0.05$, RR = 1.4, 95%C1 = 1.0 -1.8), general anaesthesia ($p = 0.0056$, RR = 1.6, 95%CI = 1.2 – 2.2) and active resuscitation ($p < 0.05$, RR = 2.5, 95%CI = 2.1 =3.1) were associated with Apgar scores less 7 in 1minute.**

CONCLUSION: **Unbooked status, foetal indication (foetal distress, prematurity, abnormal lie), emergency sections, and general anaesthesia may lead to poor Apgar scores and the need for active resuscitation. These settings justify the paediatrician's presence at Caesarean section. WAJM 2012; 31(1): 24–27.**

Keywords: **Caesarean section, Apgar score, Resuscitation, Paediatrician's presence.**

RÉSUMÉ

CONTEXTE: Les pédiatres sont requis pour assister à toutes les Césariennes, toutefois la plus part des nouveaux nés délivrés par cette voie n'ont pas besoin d'une réanimation complexe nécessitant la présence de pédiatres.

METHODES: Toutes les Césariennes réalisées de Janvier à Décembre 2009 à l'hôpital Universitaire de Benin ont été prospectivement étudiées. Les caractéristiques socio démographiques, les indications, le type de chirurgie et le type d'anesthésie ont été recueillies. Les aspects des nouveaux nés ont aussi été notés avec le score Apgar à 1 et 5 mn et le besoin en pédiatre.

RESULTATS: Il y'avait 431 cas de Césarienne dans la période d'étude et 326 (75.6%) de ces cas avaient bénéficié de visites anté natales. Les trois quarts des patients avaient subi une Césarienne en Urgence. Les indications de la Césarienne étaient fœtales dans 19% des cas et maternelles dans 81% des cas. L'anesthésie péridurale était la principale technique utilisée 392/431 cas (91.0%). Le score Apgar à 1 min était inférieur à 7 dans 172/431 cas (39.9%) et sévère (< 4) dans 26/431 cas (6.0%). L'absence de visites anté natales ($p < 0.05$, RR = 1.3, 95% CI = 1.0–1.7), les indications foetales ($p < 0.05$, RR = 1.4, 95%CI = 1.1– 1.8), la Césarienne en urgence ($p < 0.05$, RR = 1.4, 95%C1 = 1.0–1.8), l'anesthésie générale ($p = 0.0056$, RR = 1.6, 95%CI = 1.2–2.2) et la réanimation active ($p < 0.05$, RR = 2.5, 95%CI = 2.1 =3.1) étaient associés à un score Apgar inférieur à 7 à 1 mn.

CONCLUSION: L'absence de suivi, les indications fœtales, (souffrance foetale, prématurité, présentation anormale), les Césariennes en urgences et l'anesthésie générale peuvent entrainer de mauvais scores Apgar et une nécessité de réanimation. Ces situations justifient la présence de pédiatres en cas de Césarienne. **WAJM 2012; 31 (1): 24–27.**

Mots clés: Césarienne, Score Apgar, Réanimation, Présence d'un pédiatre

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Abbreviations: GA, General anaesthesia; **SD,** Standard deviation.

INTRODUCTION

Hospitals develop their own specific criteria for requiring a paediatrician to be present at a delivery. International guidelines[1–3] advocate that personnel capable of initiating neonatal resuscitation should attend all deliveries. While paediatric attendance at vaginal delivery is selective, the presence of the paediatrician at Caesarean section is considered compulsory as this is seen as a high-risk delivery. This is the practice in tertiary health institutions in Nigeria, and has become the standard of care in most South African hospitals.[4] As the global Caesarean section rate is on the rise,[5] this requirement places extra demand on currently strained peri-natal workforce (obstetricians, midwives, paediatricians, anaesthesiologists). In Nigeria, there are 39 physicians to 100,000 of the population and 160 nurses to 100,000 population,[6] and these figures are lower for paediatricians. At the University of Benin Teaching Hospital, there are four consultant neonatologist, two senior registrars and three registrars. The neonatal bed capacity is 50, with an average of 35 daily admissions. The workforce in the centre seems adequate perhaps because it is a training centre, and it hardly reflects the situation in the peripheral centres. The goal of having a paediatrician at every Caesarean section may remain a challenge in resource-poor nations like Nigeria.

At birth, the newborn needs to transit from the fluid-filled intra-uterine environment in which the placenta functions for gaseous exchange, to an air-filled environment in which the neonate's own cardiopulmonary system has to independently function within minutes of birth for the newborn to survive. This transition is successfully negotiated by 90% of neonates without the need for resuscitation. The remaining 10% of newborns require some form of assistance to begin breathing at birth, and more complex resuscitation measures are needed in only about 1% of newborns.[2,7,8]

There is now a lot of evidence[5, 9–12] that infants delivered by Caeserean section under regional anaesthesia have no greater need for resuscitation than those delivered vaginally. Many hospitals including the University of Benin Teaching Hospital, Benin City, Nigeria, still require a paediatrician to be present at all Caesarean sections. It is pertinent to identify factors that may affect the need for a paediatrician at Caesarean delivery for the purpose of effective management of resources in developing countries. Thus, this study sought to evaluate the factors that may result in poor Apgar score and neonatal resuscitation, and the need for the pediatrician's presence at Caesarean section.

SUBJECTS, MATERIALS AND METHODS

All Caesarean sections at the University of Benin Teaching Hospital were prospectively studied from January to December 2009. All women scheduled for caesarean section and expected to deliver a live neonate were recruited for the study. The socio-demographic characteristics, the type of Caesarean section, indication for surgery, and the technique of anaesthesia were recorded. Neonatal outcome was assessed with Apgar scores at 1 and 5 minutes. Apgar scores were consistently assigned by the paediatrician in attendance at each Caesarean delivery. The method of resuscitation was further evaluated to determine the need for a paediatrician's presence. The need for a pediatrician's presence was assumed in neonates with Apgar scores of < 7, in whom complex resuscitation with bag and mask, or endotracheal intubation may be required to improve the Apgar score at 5 minutes. This is more so in neonates with scores < 4, in whom cardiopulmonary resuscitation and advanced life support may be required. The data analyses were conducted with GraphPad Instat. Continuous variables were summarized using means and standard deviation (SD) and comparisons made using Student's t-test. Dichotomous data were presented as counts and frequencies. The association between categorical variables and neonatal outcome were compared using the Fisher's exact test. In order to determine significant differences the P value was set at < 0.05. All tests were two-side with a type 1 error rate of 5%.

RESULTS

Four hundred and thirty-one women had Caesarean section during the period of study. Table 1 shows that the commonest foetal indication for Caesarean section was foetal distress (76.83), while that for maternal indication was cephalo-pelvic disproportion (28.94).

Table 1: Foetal and Maternal Indications for Caesarean section

Foetal Indication	Number	Percentage %
Foetal distress	63	76.83
Cord prolapse	5	6.09
Preterm labour	5	6.09
Foetal macrosomia	4	4.88
Prmature rupture of membranes	3	3.66
Intrauterine growth retardation	2	2.44
Total	**82**	**100**

Maternal Indication	Number	Percentage %
Cephalo-pelvic disproportion	101	28.94
Previous Caesarean Section	86	24.64
Hypertensive disease in pregnancy	49	14.04
Abnormal positioning	48	13.75
Obstetric haemorrhage	34	9.74
Retroviral disease	7	2.01
Failed induction/ Stimulation of Labour	6	1.72
Post date	4	1.15
Bad obstetric history	4	1.15
Maternal request	4	1.15
Co-existing uterine fibroid	3	0.86
Elderly primip	2	0.57
Maternal diabetes	1	0.29
Total	**349**	**100.0**

Table 2: Sociodemographic Characteristics of Patients

Features	Apgar <7	Apgar >7	p-value
Age (yr)	30.6 ± 5.3	31.3 ± 5.8	0.205
Weight (Kg)	77.8 ± 13.5	80.2 ± 13.5	0.714
Parity			
Nulliparity	41	85	
Multiparity	125	169	
Grandmultiparity	6	5	
Birthweight (kg)	3.2 ± 2.8	3.2 ± 0.7	0.9999
Gestational age (wk)	37.9 ± 2.6	38.5 ± 1.9	0.005

Table 3: Clinical Correlates of Outcomes

Features	Apgar <7	Apgar >7	p-value	CI	RR
Type of Caesarean section					
Emergency					
Elective	13834	18574	0.0415	1.0 1.8	1.4
Booking Status					
Unbooked					
Booked	51121	53206	0.0382	1.0–1.7	1.3
Anaesthetic Technique					
General anaesthesia					
Regional Anaesthesia	24148	15144	0.0056	1.2–2.2	1.6
Indication for CS					
Foetal					
Maternal	42129	40220	0.0176	1.1–1.8	1.4
Resuscitation					
Active resuscitation					
Routine Cleaning/Suctioning	7597	26233	0.0001	2.1–3.1	2.5

CI =Confidence interval; RR = Relative risk

The socio-demographic characteristics of parturients are shown in Table 2. The age, weight and parity were similar in the mothers whose babies had Apgar score less than 7 or greater. Table 3 shows the clinical correlates of outcome. Subarachnoid block was the main anaesthetic technique employed, accounting for 90.95% (392) of the cases, the rest being general anaesthesia 9.05% 39) (GA). The Apgar score was less than 7 at 1 min in 61.53% of neonates delivered by GA compared with 37.75% in those delivered by subarachnoid block. Thus the need for neonatal resuscitation was almost twice with general anaesthesia compared to subarachnoid block ($p<0.05$, RR 1.6, 95% CI 1.2 -2.2).

The indications for Caesarean section were maternal in 80.97% (349) of cases and foetal in 19.03% (82). In neonates whose Caesarean section were indicated by foetal factors, the incidence of a 1-minute Apgar score of less than 7 was 51.81%, compared with 37.75% in those whose indications were maternal. The need for neonatal resuscitation was almost double when indications for Caesarean section are foetal compared with maternal ($P<0.05$, RR 1.4, 95% CI 1.1-1.8). A total of 75.87% (327) of the mothers had antenatal care in the hospital and 24.13% (104) were unbooked. At 1 minute, 37% of neonates delivered to mothers who had antenatal care had Apgar scores less than 7. This incidence was higher in neonates whose mothers did not have antenatal care, in whom it was 49.04%. The need for resuscitation was, thus, higher in neonates delivered by unbooked mothers ($P<0.05$, RR 1.3, 95% CI 1.0-1.7). About 74.9% (323) of the Caesarean sections were emergencies while 25.1% (108) were electives. The incidence of a 1-minute Apgar score less than 7 was 42.72% in emergency Caesarean section deliveries, and 31.48% in elective sections. Neonates delivered by emergency Caesarean sections showed greater need for resuscitation compared with those delivered during elective sections ($P<0.05$, RR 1.4, 95% CI 1.0-1.8). A total of 171 (39.68%) neonates had AS<7. Only 9 (2.1%) neonates in this study, and 9(5.3%) of infants with a 1-minute AS <7 required endotracheal intubation and cardiopulmonary resuscitation. The remaining 162 neonates with AS< 7 in 1minute did well with bag and mask ventilation with supplemental oxygen, with satisfactory Apgar scores in the 5th minute.

DISCUSSION

The need for neonatal resuscitation varies depending on the circumstances of delivery. Routine presence of a paediatrician at every caesarean section is personnel intensive particularly in developing countries and has been questioned elsewhere.[5, 9–11] The results of this study indicate that paediatrician's presence is indicated in defined circumstances especially when the Apgar score is less than 7 in the first minute. The determining factors include foetal indication and urgency of Caesarean section, lack of antenatal care, and when general anaesthesia is used.

About 10% of newborns require some form of assistance to begin breathing at birth, and more complex resuscitation measures (endotracheal intubation and cardiopulmonary resuscitation) are needed in only about 1%.[2,7,8] In this study, 2.1% of neonates delivered by Caesarean section received complex resuscitation. The observed difference between our incidence of complex resuscitation and those in previous studies[2,7,8] may be attributable to the fact that the studies were carried out in the developed world, with much more improved antenatal and foeto-maternal care. Moreover, the reported 1% of neonates requiring complex resuscitation in earlier studies represent the incidence in all newborns, including those delivered vaginally and by Caesarean section, whereas this study only considered neonates delivered by Caesarean section. There is increased requirement for resuscitation in neonates

delivered by Caesarean section compared to neonates delivered vaginally. In addition, three quarters of the deliveries in the current study were emergency sections where there is increased likelihood of resuscitation. Thus, patient selection may have affected our results. Poor Apgar score and increased need for neonatal resuscitation remains an item on most protocols in labour and delivery floors.[1–3] We have found that general anaesthesia, foetal distress, emergency Caesarean section, and mothers who did not have antenatal care are factors that may lead to more complex resuscitation and the need for a paediatrician. In all these settings, there is some risk to the foetus that may manifest as depression in the newborn. However, only 5.3% of neonates with a 1-minute Apgar score <7 required complex resuscitation, while the rest had bag and mask resuscitation. Our study is in agreement with Parsons *et al*[9] and Ng *et al*[13] where the incidences of complex resuscitation were 5%. This is equivalent to the incidence quoted in other studies for spontaneous normal vaginal delivery. It is thus, inferred that a paediatrician need not attend all Caeserean sections as a trained midwife can adequately perform bag and mask resuscitation. A paediatrician, always on the floor, should be called if required as is the case in unattended vaginal deliveries where the neonate is delivered unexpectedly flat. This study confirms the findings in a number of other studies[4,8–11] in which elective Caeserean section, in the absence of risk factors, performed under regional anaesthesia did not confer a higher incidence of low Apgar score compared to vaginal delivery, negating the need for a routine attendance of the paediatric staff.

There are some limitations to the interpretations of the findings of this study. We did not exclude high risk deliveries such as foetal distress, noncephalic presentations and the presence of maternal disease, where neonates most likely would require active resuscitation. However, as noted above, our incidence of complex resuscitation was similar to previous reports. It could be argued that poor Apgar scores and the need for complex resuscitations do not always occur in

Caesarean deliveries where there appear to be clinical risk to the foetus. In addition, the hospital-based population in a tertiary referral centre in this study will be a higher risk group than a wider population based cohort. Nevertheless, this population will be similar to that of many tertiary centers with rising Caesarean section rate that need to allocate staff and resources appropriately.

The identification of the risks for complex neonatal resuscitation underscores the significance of this study.

CONCLISION

Our data showed that predisposing factors to poor Apgar score and complex resuscitation at Caesarean section may be identified preoperatively in many cases. Where these are identified, the paediatrician's presence at Caesarean section is justified. If a trained midwife is available for resuscitation, the time and expense of always requiring a paediatrician at every Caesarean section is wasteful, as it adds cost to patients and hospitals. It is considered unnecessary to always have a paediatrician in attendance at every Caesarean section at this time when cost containment is an important issue in healthcare delivery. At best, the obstetrician should indivi-1dualise care and determine the need for a paediatrician at Caesarean sections as it is for vaginal deliveries.

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