Original Article
African Journal of Paediatric Surgery
Vol. 4 (1); Jan - Jun 2007

Predictive Factors for Birth Trauma in Southwestern Nigeria

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Abstract

Background: Birth trauma is a significant cause of neonatal morbidity and mortality. This prospective study determined the predictive factors for birth trauma as seen in a Nigerian university teaching hospital.

Patients and Methods: This was a prospective descriptive evaluation of birth trauma at Wesley Guilds Hospital, Ilesa over three years. Semi-structured questionnaire was used to collect data on the age, gender, pattern of presentation, place and mode of delivery, level of birth attendants, and treatment offered. Outcome measures were factors predisposing to birth trauma.

Results: A total of 137 neonatal hospital admissions with birth related complaints were recorded between 10th December, 2002 and 9th December 2005, out of which 119(86.8%) patients had 121 birth injuries (Males: Females= 1.4: 1). The mean age was 6 ± 4.1 (range: 1-31) day. Non skeletal injuries included cephalohaematoma 30(24.8%), genital bruises/abrasion 4(3.3%), subconjuctiva haemorrhage 2(1.7%), subdural haemorrhage 1 (0.8%), nasal necrosis 1(0.8%), Erb`s`palsy 31(25.6%) and Klumpke`s palsy 2(1.7%). Skeletal injuries were mainly bone fractures 50(41.3%) with 2(1.7%) mortality.

Ante natal care/delivery, level of birth attendants, mode of delivery, fetal distress, and emergency caesarian section were among the factors that determined birth trauma.

Conclusions: The prevalence of birth trauma is high in southwestern Nigeria. The predictive factors are easily identifiable in the perinatal period; early recognition could reduce significantly birth trauma.

Key words: Birth Trauma, Predictive factors, Prevalence, Nigeria.

Introduction

Advances in obstetric practice have decreased birth traumas in the last years, although they are still important considerations in neonatal age[1]. Water birth may be associated with potential complications that are not seen with land-based birth[2]. High birth weight was another risk factor for entities such as clavicle fracture and brachial palsy[1].

Cephalhematomas, which are believed to be a result of operative delivery, can also occur in utero and antepartum. The adjusted risks of neonatal complications were significantly higher in the vacuum extractor group for cephalhematomas and scalp abrasions[3]. B brachial plexus injury is associated with several non-predictable or preventable risk factors[4]. Instrumental vaginal deliveries have been associated with higher risks of brachial plexus injuries. Direct cervical compression of the fetal neck by forceps in procedures involving rotations of the presentation may result in brachial plexus injuries[5].

Fetal macrosomia remains a difficult obstetrical problem associated with significant maternal, perinatal and neonatal consequences.

In Nigeria, the predictive factors and prevalence of birth injuries has not been evaluated. This study aimed to provide a basis for predicting preventable birth injuries in a tertiary health facility in Southwestern Nigeria.

Patients and Methods

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This study was conducted at Wesley Guilds Hospital (WGH) Ilesa, Osun state, Nigeria. The hospital is a referral center for Ondo State, Ekiti State, Osun State, and parts of Kogi and Kwara States, in Western Nigeria. This is a prospective hospital based study of birth injured patients. Ethical clearance was received from the hospital research and ethical committee. An informed consent was obtained from the parents of each baby before they were enrolled; permission was granted to take their clinical photographs without hiding the patients' identity. The study period extended from 10th December, 2002 to 9th December, 2005. The babies were recruited at the Children Emergency Unit, Orthopaedic Clinic, postnatal and neonatal wards.

Information obtained included the age, sex, antenatal care, mothers' parity, pregnancy maturity, pregnancy category, place of delivery, level of birth attendants, method of delivery, pattern of birth injury and treatment offered using semi-structured questionnaire administered by the leading author. Delivery that involved vacuum, forceps and emergency cesarean section were grouped as 'urgent' .While elective cesarean and spontaneous vaginal deliveries as 'non urgent' delivery.

Normal babies from labour ward and post natal clinic with age, sex and similar variables including the pregnancy maturity, mode of delivery, place of delivery and maternal age were matched as control group. Each of the patients at presentation was clinically examined by a senior registrar and a consultant orthopaedic surgeon. The babies born after primary or secondary infertility and high risk pregnancy were grouped as babies born after delayed/high risk pregnancy. Cerebral palsy of non trauma origin and maternal injury at birth were excluded. Macrosomia was defined as birth weight (>4.5kg). All the patients had a plain radiography.

Data were analyzed using statistic package for social sciences (SPSS) version 11.0 for windows. Test of significance was calculated by the use of Analysis of variance (ANOVA). Student t-test was used for comparison of means. Multivariate analysis was carried out to determine the relationship between variables and determine the correlation between the birth outcome and other variables using logistic regression analysis. The p-value was considered significant at $p<0.05$, at 95% confidence interval.

Results

A total of 137 neonatal hospital admissions were recorded with birth related complaints, out of which 119(86.8%) patients had 121birth injuries. Sixty- nine (58%) were males and 50(42%) were females (Males: Females= 1.4:1). The mean age at presentation was 6 ± 4.1 (range: 1-31) day. The mean birth weight was 2.65 ± 1.02kg (range: 1.96-4.6kg).

Ninety-six (80.7%) birth trauma patients came from outside the teaching hospital while 23 (19.3%) patients were delivered at WGH. A total of 2177 live birth deliveries were recorded in the teaching hospitals, 23(1.1%) of whom had birth injuries. Most of the babies were delivered at health centers and general hospitals. Forty (33.6%) patients with birth injury were recognized at birth by birth attendants.

There were 71 (58.7%) non skeletal injuries which included cephalohaematoma 30 (24.8%), genital bruises/abrasion 4(3.3%), subconjuctiva haemorrhage 2(1.7%), nasal avulsion/ necrosis 1 (0.8%), subdural haemorrhage 1(0.8%), Erb`s palsy 31(25.6%) and Klumpke`s palsy 2(1.7%). The patient in figure 1 was delivered at a private clinic with forceps assisted instrumentation. The skeletal injuries were essentially bone fractures 50(41.3%). The affected bones included clavicle 23, femur 12, humerus 11, and radius/ulna 4. One patient had clavicle fracture and Erb's palsy. Twin pregnancies ($p=0.03$), breech presentations ($p=0.001$), prematurity ($p=0.0001$) and osteogenesis imperfecta, were associated with the occurrence of a skeletal fractures.

Figure 1 shows a 6 day old baby with multiple birth injuries (nasal septal fracture/ dislocation with necrosis and subconjuctiva haemorrhage) from forceps delivery. Orthopaedic birth fracture was

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Table 1: Birth Trauma Related to Mode of Delivery

Birth Injury	SVD-EPI	SVD+EPI	Caesarian Section	Ventoux	Forceps	SBD	BREXTR	ABD	Total
Cephalohematoma	2	7	6	13	4				30
Subdural Haemorrhage				1					1
Penile Shaft Abrasion/Bruises							1	3	4
Subconjuctiva Haemorrhage					2				2
Nasal Avulsion/Necrosis					1				1
Erb's Palsy	2		3	4	5	3	6	8	31
Klumpke Palsy				1				1	2
Femoral Fracture						1	3	5	12
Humeral Fracture		7	1		1	1	1		11
Radius/Ulna Fracture	1	2					1		4
Clavicle Fracture	2	14	1	2	3		1		23
Total (%)	5 (4.1%)	30 (24.8%)	14 (11.6%)	21 (17.4%)	16 (13.2%)	5 (4.1%)	13 (10.7%)	17 (14.1%)	121 (100%)

N.B: SVD-EPI = Spontaneous Vaginal Delivery without Episiotomy
SVD+EPI = Spontaneous Vaginal Delivery with Episiotomy
SBD = Spontaneous Breech Delivery
BREXTR = Breech Extraction
ABD = Assisted Breech Delivery

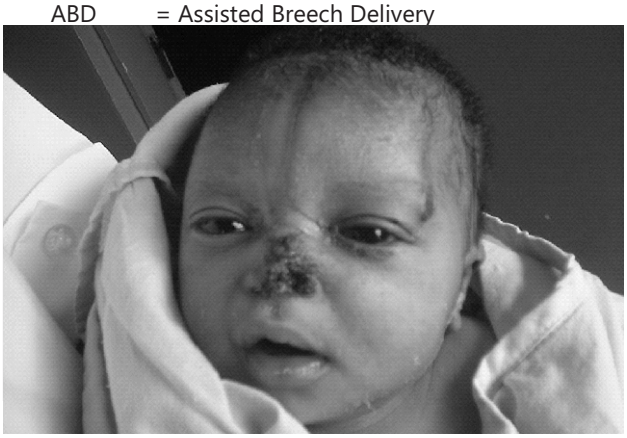


Fig 1: 6-day Old Baby. Post Forceps Delivery



Fig 3a: 14-day old Male delivered at a private clinic with a left Clavicle Fracture.

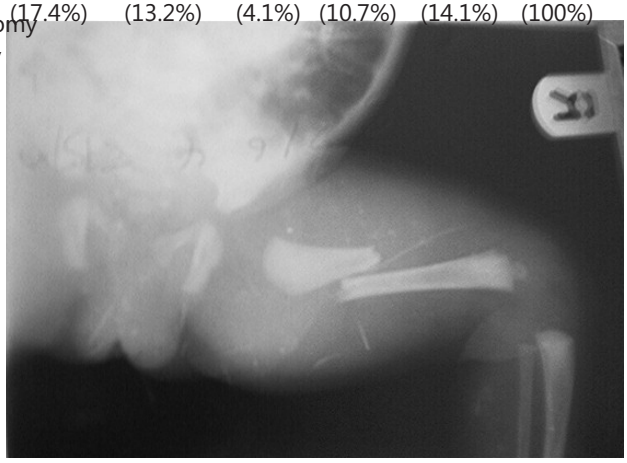


Fig 2: 2-day Old Twins. 1st Baby with R-Femur Fracture

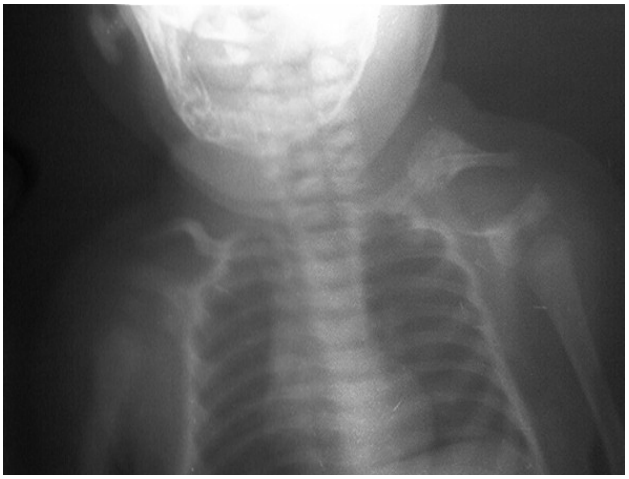


Fig 3b: 14-day old Male delivered at a private clinic with fractured left clavicle.

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Table 2: Predictive Factors for Birth Trauma

Factors	Variables (Nos)	%	P Value
Gender			P=0.660
	Female (50)	42.0	
	Male (69)	58.0	
Pattern of Brith Trauma			P=0.725
	Skeletal Injury (50)	46.9	
	Non-skeletal injury (71)	53.1	
Antenatal Care (ANC)			P=0.0001
	Yes (95)	79.8	
	No (24)	20.2	
Parity			P=0.090
	Primigravida (47)	39.5	
	Parity >2(72)	60.5	
Pregnancy Maturity			P=0.001
	Preterm (28)	23.5	
	Term/Postdates (91)	76.5	
Pregnancy Category			P=0.001
	Normal Singleton (92)	77.3	
	Multiple Prenancy (91)	22.7	
Place of Delivery			P=0.0001
	Outside Teaching Hospital (92)	80.7	
	Inside Teaching Hospital (23)	19.3	
Level of Birth Attendants			P=0.0001
	Below Senior Registrar (106)	89.1	
	Senior Registrar/Consultant (13)	10.9	
Mode of Delivery			P=0.001
	Assisted Delivery (89)	74.8	
	Un-assisted Delivery (30)	25.2	
SVD			P=0.0001
	With Episiotomy (30)	85.7	
	Without Episiotomy (5)	14.3	

detected mostly during the first 3 days of neonatal life (46/53) with a range of 30minutes to 26days.Figure2 shows 2day old twins 1st baby delivered at a health centre with fractured right femur following a breech delivery. The second twin baby was a stillbirth.

Table 1 shows birth trauma related to the mode of delivery. Figure 3A/3B shows 13 day old baby and X-Ray of left clavicle fracture.

Neonates with fracture were significantly heavier at birth than those without (3564g vs. 3283 g, p <0.001), and had a lower mean head-to-abdominal circumference ratio (0.93 vs. 1.08, p <0.001), also the mothers with previous history of giving birth to a macrosomia.

In Table 2, when babies born without trauma were compared with the birth injured ,the place of ante natal care/delivery, pregnancy maturity, level of birth attendants and mode of delivery were related to birth trauma.

The other factors included fetal distress, electricity outage, emergency caesarian section, multiple pregnancy and precious baby. More injuries occurred in those delivered under 'urgent' than 'non-urgent' situations (p=0.02). The rate of intracranial hemorrhage is higher among infants delivered by vacuum extraction, forceps, or cesarean section during labor than among infants delivered spontaneously, but not higher among infants delivered by elective cesarean section. Nasal septal fracture/dislocation and ocular injuries was associated with multiple birth injuries. Instrument marks, bruising, ocular and nasal trauma related to childbirth was associated with forceps deliveries, whereas there was a greater incidence of cephalohematomas and caput and molding in the neonates delivered with vacuum. Brachial plexus injury occur more in neonates of primiparous women and fetal macrosomia.

There were two mortalities (1.7%) which were not directly related to birth injury. The causes of death were severe congenital heart disease and a preterm admitted with Neonatal tetanus.

Discussion

The main finding in this study was that lack of antenatal care, macrosomia, abnormal presentations, and operative vaginal deliveries significantly increased the risk of birth nerve injuries. These babies had higher incidences of meconium stained liquor and intrapartum asphyxia. Parity of the mother, gestational age and sex of the baby did not significantly cause nerve injuries. Assisted breech delivery, forceps, Caesarean section and ventoux deliveries are predictive factors for birth trauma.

Spontaneous unilateral or bilateral orbital hemorrhage is uncommon in an otherwise healthy newborn without apparent history of birth trauma[6].

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Birth trauma could result from forceful traction applied by inexperienced birth attendants to the neonate during delivery, or when forceps are applied wrongly to deliver the baby.

In this study the mode of delivery, method of assisted delivery and the urgency of the delivery were the important variables in predicting factor for cranial birth injuries[7]. Cranial birth injuries in term babies are well recognized. The common risk factor for intracranial hemorrhage is abnormal labour; neonates delivered by forceps have more facial injuries, whereas neonates delivered by vacuum have more cephalohematomas[8].

Intracranial haemorrhage in term neonates often results from asphyxia, birth trauma, blood dyscrasia, or vascular malformation but it may occur without any obvious underlying cause. Spontaneous superficial parenchyma and leptomeningeal haemorrhage do occur in otherwise healthy term neonates[9]. The haemorrhage was associated with instrumental delivery in this study as in others[10]. In this study, the haemorrhage was small and resolved spontaneously within the first month of life. This led us to suggest that local trauma (contusion or venous compression or occlusion) was the cause of these haemorrhages.

Fracture of the clavicle in neonates tended to be associated with neonatal somatometric characteristics and difficult deliveries[11]. Claviclar fracture was found following vaginal births with episiotomy, shoulder dystocia and instrumental delivery. Erb's palsy and cephalo-haematoma were the associated morbidities. Femoral fractures at birth are taught to be extremely rare, although it occurred fairly more common in this study than was previously reported[12]. It was associated with prematurity, difficult delivery and inexperience of birth attendant.

External cephalic vertex presentation is safer than breech presentation, although it still could be associated with femoral fracture[12]. It has been documented that vaginal delivery rather than delivery by cesarean, of "normal" term breech fetus by primiparous woman, is associated significantly with increased neonatal morbidity and mortality[13], suggesting that these patients might best be delivered by cesarean to avoid these adverse outcomes.

Facteurs Prophétiques Du Traumatisme De La Naissance Au Sud-ouest Du Nigeria

Resume:

Arrière-plan: Le traumatisme de la naissance est une cause considérable de morbidité et de mortalité néo-natales. Cette étude prospective a déterminé les facteurs prophétiques du traumatisme tel qu'il se manifeste dans un centre hospitalo-Universitaire Nigérian. ***Malades et méthodes:*** Il s'agit d'une évaluation prospective et descriptive du traumatisme de la naissance s'étant produit à l'Hôpital Wesley Guilds à Ilesa au cours de trois ans. Un questionnaire semi-structuré a été utilisé pour rassembler les données sur l'âge, le genre, le mode de présentation, le lieu et le mode d'accouchement, le niveau des auxiliaires de la naissance, et le traitement prodigué. Les indications obtenues étaient des facteurs qui prédisposent au traumatisme de la naissance. ***Résultats:*** Du 10 décembre 2002 au 9 décembre 2005, nous avons enregistré 137 enfants atteints d'un traumatisme lié à la naissance, parmi lesquels 119 malades avaient 121 blessures liées à l'accouchement (garçons : filles = 1,4 :1). L'âge moyen était de 6 ± 4,1 jours (gamme: 1-31). Les blessures non squelettiques comprenaient le céphalohématome chez 30 malades (24,8%), des contusions/écorchures génitales chez 4 malades (3,3%), l'hémorragie subconjuctiva chez 2 malades (1,7%), l'hémorragie subdurale chez un malade (0,8%). Un malade était atteint de la nécrose nasale (0,8%), 31 de la paralysie d'Erb (25,6%) et deux de la paralysie de Klumpke (1.7%). Les blessures squelettiques étaient principalement des fractures osseuses chez 50 malades (41,3%) entraînant deux décès (1,7%). Parmi les facteurs déterminant le traumatisme de la naissance, on note les soins prénatals, le niveau des auxiliaires de la naissance, le mode d'accouchement, la détresse fœtale et la césarienne d'urgence. ***Conclusion:*** Il y a une incidence élevée du traumatisme de la naissance au sud-ouest du Nigeria. Les facteurs prophétiques sont facilement identifiables dans la période périnatale; l'identification précoce pourrait réduire considérablement le traumatisme de la naissance. ***Mots-clés:*** Traumatisme de la naissance, facteurs prophétiques, prédominance, Nigeria

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