Original Article

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Evaluation of Clinical Diagnosis of Fetal Distress and Perinatal Outcome in a Low Resource Nigerian Setting

Obstetrics and Gynaecology Section

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ABSTRACT

Introduction: Fetal distress has been shown to contribute to the increasing caesarean section rate. There has been controversy on the usefulness of clinical diagnosis of fetal distress using only the intermittent counting of the fetal heart rate and/or passage of meconium-stained liquor.

Aim: To evaluate the clinical diagnosis of fetal distress and the perinatal outcome.

Materials and Methods: This was a retrospective study in which the case records of the patients, who were diagnosed of fetal distress at Federal Teaching Hospital, Abakaliki, Nigeria, from January 1, 2008 to December 31, 2014, were collated. The statistical analysis was done using the Statistical Package for Social Sciences version 17 software (SPSS Inc., Chicago IL,USA).

Results: Out of the 15,640 deliveries carried out within the study period, 3,761 (24.05%) deliveries were through caesarean section. A total of 326 (8.9%) of the 3,761 caesarean sections were due to fetal distress within the study period. More so, a total of 227 (70.9%) babies were born with ≥ 7 Apgar score at the 1st minute of delivery. The perinatal mortality rate was 31.25 per 1000 deliveries. Though birth asphyxia was recorded more on babies of mothers that had fresh meconium-stained liquor and whose decision-intervention interval was more than 30 minutes when compared with those without any of the two conditions, there was no statistical significant difference between them.

Conclusion: The clinical diagnosis of fetal distress is accurate in 29.1% of the cases. However, it has led to an unnecessary caesarean section in the remaining 70.9% of the parturients. In order to reduce this high trend of unnecessary caesarean sections due to clinical diagnosis of fetal distress in this environment, antepartum fetal assessment with non-stress test or biophysical profile and intrapartum use of continuous electronic fetal monitoring should be used to confirm or refute the fetal distress before any surgical intervention. Fetal blood sampling and fetal pulse oximetry should be performed in event of non- re-assuring or abnormal cardiotocography.

Keywords: Apgar score, Intrapartum fetal monitoring, Nigeria, Poor setting

INTRODUCTION

Caesarean section is one of the commonly performed procedures globally [1]. The caesarean section rate in Nigeria ranges between 18.5% and 35.9% [2-6]. This is higher than the upper limit of 15% recommended by the World Health Organization (WHO) [7]. When compared with vaginal delivery, caesarean section is associated with higher morbidity and mortality [8,9]. There are reports of the global increase in caesarean section rate over the years. The reasons adduced to this increase in developing countries comprise specialist and referral nature of the hospital, unbooked status of most of the patients, increasing use of fetal heart rate abnormality alone as a measure of fetal distress, over diagnosis of cephalo-pelvic disproportion by junior doctors and use of caesarean section for patients with previous caesarean section [8-10]. This increased caesarean section rate has become worrisome especially in our environment where there is high aversion to the procedure [11,12].

Fetal distress stimulates the concern of the obstetrician about the fetal condition and necessitates immediate intervention like caesarean section or instrumental vaginal delivery in order to prevent fetal death [13]. In most centres in sub-Saharan Africa, intra-partum assessment of fetal condition is based on intermittent counting of the fetal heart rate (FHR) and checking for the presence of meconium-stained liquor with the assumption that an abnormal FHR pattern, especially in the presence of meconium -stained liquor, signifies fetal hypoxia and acidosis. Some studies in developing countries have positively supported this method as a way of identifying significant proportion of fetuses with early neonatal acidaemia and low Apgar score at one minute. These studies attempted to validate the use of clinical diagnosis of fetal distress in selecting fetuses that require expedited delivery in poor settings [14,15]. However, this notion is sometimes misleading and has resulted in many unnecessary obstetric interventions [16]. Besides, this policy of operative delivery for every patient with clinically diagnosed fetal distress has been questioned because not all the delivered neonates show evidence of significant antecedent intrauterine hypoxia [15,17]. When compared with the developed world, caesarean section is associated with higher maternal morbidity and mortality in resource-poor settings like the study centre [18-20]. Therefore these unnecessary interventions may increase maternal morbidity and mortality in our environment. More so, due to high poverty rate, aversion to caesarean section and poor health-seeking behaviour in this environment, this high caesarean section rate due to the clinically diagnosed fetal distress as currently practiced, may predispose these women to subsequent delivery without skilled birth attendant with the associated maternal and perinatal consequences.

It is against this background that this study was designed to assess the accuracy of clinical diagnosis of fetal distress in a low resource setting.

AIM

The study was aimed at evaluating the clinical diagnosis of fetal distress and the perinatal outcome.

MATERIALS AND METHODS

Abakaliki is the capital of Ebonyi State. Ebonyi State has an estimated population of 4.3 million according to the 2006 national census. It

occupies a land mass of 5,935 square kilometres. About 75% of the population of Ebonyi state dwells in the rural areas with farming as the major occupation [21]. Federal Teaching Hospital, Abakaliki is the only tertiary hospital in Ebonyi State. It gets referrals from Ebonyi State and neighbouring states of Enugu, Abia, Imo, Cross River and Benue. This was a retrospective study in which the case records of the patients who were diagnosed of fetal distress from January 1, 2008 to December 31, 2014 were collated. Usually, every baby that is delivered through caesarean section at the study centre is handed over to the neonatal team for resuscitation and determination of the Apgar score. This neonatal team is usually headed by at least the senior registrar on call. A proforma was used to collate information on the socio-demographic characteristics of the women, parity, booking status, fetal heart rate necessitating the diagnosis, decision intervention interval, mode of delivery, type of anaesthesia used and perinatal outcome. For the purpose of this study, fetal distress was confirmed when the 1st minute Apgar score was less than 7.

STATISTICAL ANALYSIS

The statistical analysis was done using the Statistical Package for Social Sciences version 17 software (SPSS Inc., Chicago IL, USA). The chi-square test was used to analyse the discrete variables. The p-value ≤ 0.05 was considered to be statistically significant.

RESULTS

Out of the 15,640 deliveries carried out within the study period, 3,761 deliveries were through caesarean section thereby giving the caesarean section rate as 24.05%. More so, a total of 326 caesarean sections were due to fetal distress within the study period. Therefore fetal distress accounted for 8.9% of caesarean sections performed at the study centre. However, a total of 320 case files were retrieved thereby giving the retrieval rate of 98.2%. All the patients with fetal distress were delivered through caesarean section. All of the pregnant women were at term with the mean gestational age at 39±2 weeks. [Table/Fig-1] shows the socio-demographic characteristics of the patients. Majority of them were between 25 and 29 years, married, urban dwellers, had at least secondary education, unemployed and booked. The parity and maternal characteristics necessitating the diagnosis of fetal distress and intervention is shown in [Table/Fig-2]. Approximately half of the pregnant women were nulliparous and an equal proportion of these women had fetal tachycardia and bradycardia. About a tenth (43) of the women had the history of passage of fresh meconium-stained liquor in addition to the fetal

Socio-demographic variables	Frequency(N=320)	%
Age (Years)		
< 20	15	4.7
20-24	70	21.9
25-29	149	46.6
30-34	56	17.5
35-39	30	9.4
Marital status		
Married	307	95.9
Single	13	4.1
Residence		
Urban	225	70.3
Rural	95	29.7
Educational qualification		
No formal education	27	8.4
Primary	60	18.8
Secondary	150	46.9
Tertiary	83	25.9
Occupational distribution		
Unemployed	139	43.4
Teaching	30	9.4
Civil service	45	14.1
Artisans	56	17.5
Trading	27	8.4
Professionals*	23	7.2
Booking status		
Booked	250	78.1
Unbooked	70	21.9

[Table/Fig-1]: The socio-demograhic characteristics of the patients.
*=Doctors, Lawyers, Engineers, Nurses, Bankers.

Characteristics	Frequency(N=320)	%
Parity		
0	168	52.5
1	45	14.1
2-4	90	28.1
>5	17	2.2
Fetal heart rate (beats per minute)		
< 120 (bradycardia)	163	50.1
>160 (Tachycardia)	157	49.9
Fresh meconium stained liquor		
Yes	43	13.4
No	277	86.6
Cervical dilatation (centimetres)		
3-5	198	61.9
6-8	122	38.1
Decision intervention interval (minutes)		
≤30	31	9.7
>30- 60	81	25.3
60-120	150	46.9
>120	58	18.1
Type of anaesthesia used.		
Spinal	270	84.4
General	50	15.6

[Table/Fig-2]: The parity and maternal characteristics necessitating the diagnosis and intervention.

Characteristics	Frequency (N=320)	%
1st minute Apgar score		
0-3	15	4.7
4-6	78	24.4
≥7	227	70.9
5th minute Apgar score		
0-3	12	3.8
4-6	17	5.3
≥7	291	90.9
10th minute Apgar score		
0-3	10	3.1
4-6	11	3.4
≥7	299	93.4
Neonatal Intensive Care Unit (NICU) admission.		
Yes	15	4.7
No	305	95.3
Neonatal death		
Yes	10	3.1
No	310	96.9

[Table/Fig-3]: The perinatal outcome.
Perinatal mortality rate =31.25 per 1000 deliveries

	1st minute <7	Apgar score ≥7	X^2	p-value
Fresh meconium stained liquor				
Yes	17	26	2.088	0.15
No	76	201		
Decision intervention interval				
≤30 minutes	7	24	0.395	0.53
>30 minutes	86	203		

[Table/Fig-4]: The influence of the fresh meconium-stained liquor and decision-intervention interval on 1st minute Apgar score.

heart rate abnormality. Majority of the patients were delivered after 30 minutes of taking the decision for caesarean section and under spinal anaesthesia. [Table/Fig-3] contains the perinatal outcome. A total of 227(70.9%) babies were born with ≥ 7 Apgar score at the 1st minute of delivery. The proportion of the babies with ≥ 7 Apgar score increased from 70.9% at the 1st minute to 93.4% at the 10th minute. A total of 15(4.7%) of the neonates were admitted at the neonatal intensive care unit and 10(3.1%) of the babies had perinatal death. Therefore the perinatal mortality rate was 31.25 per 1000 deliveries. The influence of the fresh meconium-stained liquor and decision-intervention interval on 1st minute Apgar score is contained in [Table/Fig-4]. Though it appears that birth asphyxia is recorded more on babies of mothers that had fresh meconium-stained liquor and whose decision-intervention interval was more than 30 minutes when compared with those without fresh meconium-stained liquor and whose decision-intervention interval was ≤ 30 minutes, there was no statistical significant difference between them.

DISCUSSION

The majority (70.9%) of the babies who were delivered with Apgar scores of at least 7 despite the clinical diagnosis of fetal distress in this study is higher than the previous reports in Nigeria and Kenya [13-15]. This implies that the clinical diagnosis of fetal distress using only fetal heart rate measurement as reported in this study is causing a lot of unnecessary caesarean sections with its higher obstetric consequences. Similarly, lack of significant association between fresh meconium stained liquor and fetal distress in this study is supported by the previous report by Wong and his co-authors [22]. However this is contrary to the report from the case-control study by Desai et al., in which there was a strong association between meconium stained liquor and fetal distress [23]. In view of this controversy, the diagnosis of fetal distress using history of passage of fresh meconium stained liquor is not yet conclusive.

The lack of statistical significant difference on perinatal outcome between the parturients who were delivered within 30 minutes and those delivered after 30 minutes of taking the decision was similar to the previous reports in Nigeria, United Kingdom and India [24-27]. This has further doubted the practicabililty and possible beneficial effect on the perinatal outcome, when the decision-delivery interval is within 30 minutes as was recommended by the American College of Obstetricians and Gynaecologists (ACOG) [28]. The 9.7% of the parturients who were delivered within 30 minutes of taking the decision in this study showed a gradual improvement when compared with 0% and 5.7% previously reported in Enugu and Benin respectively [24,25]. This is however much less than approximately 40% of the parturients who were delivered within 30 minutes of taking the decision in the United Kingdom [27]. The reasons adduced for these delays in resource poor settings such as the study centre, were anaesthetic delays and delays in sourcing the essential materials for the surgery [24]. The increment on the proportion of the neonates's Apgar scores of ≥7 from 70.9% at 1st minute to 93.4% at 10th minute in this study, showed an improvement in the newborn care services in the study centre. This may be because of the hospital policy in which every baby delivered through caesarean section is handed over to the neonatal team for resuscitation and stabilization. The perinatal mortality rate of 31.25 per 1000 deliveries recorded in this study is less than 39.7 per 1000 deliveries previously reported in Nnewi [15].

The caesarean section rate of 24.05% recorded in this study was within the range previously reported in Nigeria [2-6]. The 8.9% of the parturients who had caesarean section due to fetal distress in this study is similar to 10.4% and 11.7% previously reported in Abakaliki and Nnewi respectively [15,29]. Surprisingly, about half (52.5%) of these pregnant women, who had caesarean section due to fetal distress, were nulliparous women. In an environment with high aversion to caesarean section and poor health seeking behaviour, the future obstetric career of this group of women may be in jeopardy as some of them may avoid skilled birth attendant in their subsequent deliveries with its dire consequences. With previous caesarean section being the commonest indication for caesarean section in this environment [29], these unnecessary caesarean sections due to clinical diagnosis of fetal distress, may predispose these women to caesarean sections in their subsequent deliveries. Some of these parturients may also develop other complications from the procedure.

In order to reduce the high trend of unnecessary caesarean sections due to clinical diagnosis of fetal distress in this environment, antepartum fetal surveillance using the non-stress test or fetal biophysical profile should be used especially in high risk cases like positive history of stillbirth, intrauterine growth restriction, oligohydramnios or polyhydramnios, multiple pregnancy, Rhesus isoimmunisation, hypertension, diabetes mellitus and other chronic diseases, decreased fetal movements, post-term pregnancy and advanced maternal age [30,31]. This will objectively ascertain the cases of antepartum fetal distress when compared with only intermittent fetal heart rate auscultation. For the intrapartum fetal surveillance, continuous electronic fetal monitoring, despite its limitations [32], should be used to confirm or refute the fetal distress before any surgical intervention. Fetal blood sampling and fetal pulse oximetry should be performed in event of non- re-assuring or abnormal cardiotocography. This may further help reduce the increasing caesarean section rate due to the clinical diagnosis of fetal distress. This study is limited by its retrospective design.

CONCLUSION

The clinical diagnosis of fetal distress is accurate in about a third (29.1%) of the cases. However, it has led to an unnecessary caesarean section in the remaining two-third (70.9%) of the parturients. A randomized control trial is needed in this subject matter in order to objectively support or refute the findings from this study.

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