

INCIDENCE AND OUTCOME OF UMBILICAL CORD PROLAPSE: EXPERIENCE IN A TERTIARY HEALTH FACILITY SOUTHEASTERN NIGERIA.

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ABSTRACT

BACKGROUND: Umbilical cord prolapse is a rare obstetric emergency with adverse perinatal outcomes. The incidence has been on the decline, hence necessitating the need for periodic evaluation in order to document its contribution to perinatal indices. We sought to determine the incidence, predisposing factors and fetal outcome of umbilical cord prolapse.

METHODS: This was a retrospective descriptive study carried out in Federal Medical Centre (FMC), Umuahia over a 5-year period from January 1, 2009 to December 31, 2013. Data was analyzed using WinPepi version 11.65. Statistical analysis was done using Chi-squared test with level of significance set at $P < 0.05$.

RESULTS: The incidence of umbilical cord prolapse was 0.3%. The mean age was 31.8 ± 5.1 years. Multiparous women constituted 80% of those diagnosed with the condition while 84% of the women were unbooked. Although multiple risk factors were noted in the parturient, multiparity ranked highest (80%) while artificial rupture of membrane contributed the least (4%). Most (84%) of the women were delivered by emergency cesarean section. The perinatal mortality rate was 12%.

CONCLUSION: Umbilical cord prolapse remains a high risk condition to the fetus. Therefore, early presentation to the health care facility in the event of membrane rupture may improve its outcome.

RUNNING TITLE: Outcome of umbilical cord prolapse

KEYWORDS: Cord prolapse, fetal outcome, perinatal mortality, Umuahia

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INTRODUCTION

Umbilical cord prolapse is an obstetric emergency which describes the presence of the fetal umbilical cord below the presenting part with the membrane ruptured.^{1,2} Factors that prevent the close application of the presenting part to the lower uterine segment and/or the pelvic brim predispose to this condition.^{3,4} These factors are largely unmodifiable, and include high presenting part, abnormal lie and presentation, prematurity, multiple gestation, polyhydramnios, and low-lying placenta.^{1,3} Expedient delivery is the management of choice in situations where the fetus is still alive.⁵ This could be via category 1

caesarean section in early first stage of labour or by assisted vaginal delivery when the cervix is fully dilated with favourable station.³ However with fetal demise, labour may be allowed to progress if there is no contraindication, while for pregnancies remote from term, conservative management has been reported.⁶ The main pathophysiology of fetal demise in this condition is by cord compression and asphyxia. Measures to relieve the occlusion of the cord vessels before emergency abdominal delivery are manual elevation of the fetal presenting part, exaggerated Sim's position, steep Trendelenburg, knee chest position and Vago's maneuver which involves filling the bladder with 500 to 700 ml of normal saline.^{3,6}

Cord prolapse is a rare obstetric complication with an overall incidence of 0.1% to 0.6%,^{1-3,7} however, the perinatal mortality could be high with documented rate of 50%.⁸ For cephalic

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presentation and extended breech the incidence is 0.5% while for flexed breech and transverse lie, the incidence is 15% and 25%, respectively.¹ Recently the incidence and perinatal complications have been on the decline as a result of early resort to cesarean section for non-cephalic presenting fetuses and improvement in neonatal care.¹ Rate of 2-3% has been presently noted for malpresentations because of early recourse to caesarean delivery before membrane rupture.⁹ Better intrapartum care may explain the downward trend in the perinatal mortality rate associated with cord prolapse from 375 per 1,000 deliveries in 1924 to about 0.2% in the preceding few decades.¹

This changing trend has necessitated the study of this important obstetric condition to determine the incidence, predisposing factors as well as its outcome in our facility where it has not been previously investigated.

METHODS

This was a retrospective descriptive study which was done in Federal Medical Centre (FMC), Umuahia. FMC Umuahia is a tertiary hospital with 450 beds and it is located in Abia state, Southeastern Nigeria. The hospital receives referrals from neighboring communities and other Southeastern states. This study was carried out over a 5-year period from January 1, 2009 to December 31, 2013. Data of parturient diagnosed with umbilical cord prolapse during this period were collected from the records in the labor ward, maternity theater, and from patients' folders in the medical records department.

Trained research assistants entered the data into a proforma. Information extracted included age, parity, booking status, location where prolapse occurred, fetal presentation, number of fetuses, route of delivery, gestational age at delivery, birth weight, Apgar score at the fifth minute. Ethical approval was obtained from the Health Research Ethics Committee.

Statistical analysis

Analysis of data was carried out using WinPepi version 11.65.¹⁰ Results were presented in tables and figures as mean and percentages. Statistical significance was calculated using Chi-squared test with level of significance set at $P < 0.05$.

RESULTS

There were eight thousand two hundred and eighty nine (8289) deliveries within the study period out of which twenty five (25) were complicated by cord prolapse. The incidence of umbilical cord prolapse was 1 in 332 births (0.3%). The mean age was 31.8 ± 5.1 years. Table 1 shows the demographic characteristics of the parturient. The modal age group was 30-39 years. Multiparous women constituted 80% (20) of those diagnosed with the condition. Eighty four percent (21) of the women were unbooked, and in 80% (20) of the women the condition occurred prior to admission. Unbooked status was found to have statistical significant association with cord prolapse ($X^2 = 52.967$; $df = 1$; $P < 0.001$).

Table 1: Demographic characteristics of parturient with cord prolapse

Parameter	Frequency	Percentage (%)
Age (years)		
20-29	8	32
30-39	16	64
40 and above	1	4
Parity		
Nullipara	5	20
Multipara	20	80
Booking status*		
Booked	4	16
Unbooked	21	84
Location where it occurred		
In our facility	5	20
Outside our facility	20	80

* $X^2 = 52.967$; $df = 1$; $P < 0.001$

Table 2 shows predisposing factors associated with cord prolapse. Although multiple risk factors were noted in the parturient, multiparity ranked highest with 80% (20), this was followed by malpresentation in 32% (8) with the commonest form of malpresentation being breech which was noted in 24% (6) of the women. Artificial rupture of membrane contributed only 4% (1) to the risk factors noted.

Table 2: Predisposing factors for cord prolapse

Variable	Frequency †	Percentage (%)
Multiparity	20	80
Malpresentation		
Breech presentation	6	24
Transverse lie	2	8
Unengaged fetal head	6	24
Preterm birth	6	24
Multiple gestation	3	12
Artificial rupture of membrane	1	4

†Some patients had multiple risk factors

Figure 1 depicts the mode of delivery. Eighty four percent (21) of the women were delivered by emergency cesarean section.

Figure 1: Mode of delivery

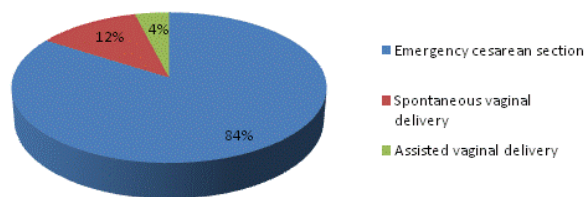


Table 3 shows the perinatal outcome of the fetuses managed. Sixty percent (15) of the babies had good Apgar score at the 5th minute. Seventy six percent (19) of the deliveries occurred at term while 68% (17) of the babies weighed 2.5 kg and above at delivery. The perinatal mortality rate was 12% (3).

Table 3: Perinatal outcome

Parameters	Frequency	Percentage (%)
Apgar score at the 5th minute		
< 7	10	40
= 7	15	60
Gestational age at delivery		
< 37 weeks	6	24
= 37 weeks	19	76
Birth weight		
<2.5 kg	8	32
= 2.5 kg	17	68

DISCUSSION

In this study, the incidence of umbilical cord prolapse was 0.3%. This was comparable with the incidence of 0.46% documented in a similar tertiary hospital in southeastern Nigeria,¹¹ and it is within the global range of incidence of 0.1% to 0.6%.¹⁻³ This has further confirmed the rarity of this obstetric condition.

The mean age of the parturient was 31.8 ± 5.1 years which was similar to that obtained in the study by Kahana et al,⁴ and this represents the reproductive age group. The preponderance of multiparous women (80%) in this study which was also noted in other studies,^{11,12} may be explained by the usually delayed engagement of the fetal head in most multiparas, which may result in the cord slipping down through the cervix in case of rupture of the fetal membranes.¹³ Eighty four percent of the women were unbooked and this was comparable

to a study where 75% of the women had no prenatal care.¹⁴ Furthermore unbooked status was found to be significantly associated with cord prolapse as it was also noted by Onwuhafua et al.¹³ In 80% of the women the prolapse occurred prior to admission which was comparable to the study by Umar et al where almost all the cases occurred before admission.¹ This may represent the subset of women in whom rupture of fetal membranes occurred prior to the onset of labor pain, because those that had labor pain before the rupture of membranes would naturally have presented to the health facility early.

Fetal malpresentation is consistently associated with a high risk of umbilical cord prolapse. In this study, non-cephalic presentation was noted in 32% of the women and breech presentation was the most commonly (24%) diagnosed non-cephalic presentation in those with this condition. This was similar to a study carried out by Sangwan et al where malpresentation was documented in 30.2% of the women with breech presentation being the commonest malpresentation noted.¹⁵ This percentage represents the few women in modern obstetrics that would present in labor with undetected fetal malpresentation.¹⁶ In malpresentation, the lower uterine segment is relatively free thereby accommodating the umbilical cord which may subsequently prolapse in the event of membrane rupture.^{1,4}

Artificial rupture of fetal membrane contributed only 4% unlike the 40.4% in the study by Nana et al.¹⁷ This high percentage of iatrogenic cord prolapse documented by Nana et al may buttress the fact that amniotomy prior to engagement of the fetal presenting part predisposes to cord prolapse which they highlighted.¹⁷ Ultrasonography in early labor or color doppler in high-risk women prior to amniotomy at a high station has been proposed to help reduce the incidence of iatrogenic cord prolapse.¹⁶ However in low resource settings this may not be technically feasible. Furthermore prenatal diagnosis of funic presentation by ultrasonography has limited success because it is poorly predictive of intrapartum cord presentation or prolapse.¹⁶ The relatively low frequency of cord prolapse following amniotomy that was noted in our study may be due to the routine practice of excluding cord presentation

during vaginal examination in all parturient prior to carrying out artificial rupture of membranes.

Most (84%) of the women were delivered by emergency caesarean section which was also the case in the study by Mutihir et al were most of the women had abdominal delivery.¹⁸ Immediate abdominal delivery in the first stage of labor has been shown to improve perinatal outcome.¹⁸ This immediate recourse to caesarean section may have accounted for the relative improvement in the fifth minute Apgar scores of 60% of the patients. The uncorrected perinatal mortality rate for this condition was 12%. This was lower than the 45.2% noted by Umar et al,¹ but it was higher than 3.9% documented by Uygur et al in Turkey,¹² and 8.3% by Kahana et al in Israel.⁴ This relatively high perinatal mortality corroborates the fact that umbilical cord prolapse poses a significant risk to the baby. Also with most of the incident occurring prior to admission from this study, the outcome is further complicated as the duration of cord compression or exposure to the relatively harsh external environment may have been present for prolonged period.

CONCLUSION

Umbilical cord prolapse remains a rare but high risk obstetric complication which is significantly associated with unbooked status. Therefore health education, adequate antenatal care, early presentation to the health facility following membrane rupture may reduce the perinatal morbidity and mortality associated with this condition.

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