

Fetal Outcome in Umbilical Cord Prolapse in Jos, Nigeria.

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Abstract

Background: Cord prolapse is one of the obstetric emergencies in labour, posing a life-threatening emergency for the fetus. Timely delivery at detection with a live fetus is the hallmark of good clinical management to reduce the high perinatal morbidity and mortality in the fetus.

Objective: To determine the incidence of cord prolapse, predisposing factors and fetal outcome of the cases of cord prolapse managed in the Jos University Teaching Hospital (JUTH).

Study Design: A review of the fetal outcome of thirty-five (35) cases of cord prolapse managed at the JUTH, Jos, Nigeria from January 1999 to December 2003.

Results: There were 12,536 deliveries with 35 cases of cord prolapse, giving an incidence of 0.28%, or 1 in 358 deliveries. The highest incidence occurred in women aged 30-34 years. Cord prolapse was seen to be mainly a problem of multiparous women, 96.8%. Prematurity was the highest contributing factor 12 (30.0%), followed by twin pregnancy 9 (22.5%). About 57% of the babies were dead on presentation to the hospital, mainly from patients booked outside JUTH. One baby with severe birth asphyxia died in the early neonatal period. Perinatal mortality was 629 per 1,000 deliveries.

Conclusion: The perinatal mortality in the cases of cord prolapse is still high. Most fetal deaths were from patients that booked outside the hospital, presenting with intrauterine fetal death. The un-booked patient with cord prolapse is most likely to present with an intrauterine fetal death.

Key Words: Cord prolapse, Fetal outcome, Labour

Introduction

Cord prolapse is the presence of a loop of umbilical cord below the presenting part with ruptured membranes^{1,2}. After the rupture of the fetal membranes, the fetal umbilical cord may prolapse through the cervix and remain in the vagina or be seen at the vaginal introitus. Because the cord carries oxygenated blood from the placenta to the fetus, any obstruction by way of prolapse, compression, extreme torsion or knotting will compromise fetal survival. The cord is usually compressed in this circumstance by the hard fetal head or the shoulders against the pelvic brim, or when strong uterine contractions force the presenting part into the pelvis.

The incidence of cord prolapse has been quoted as being about 1 in 161-714 deliveries^{3,4}, or about 0.14-0.62% of all pregnancies². Predisposing factors may include one of the following conditions: - un-engaged presenting part, malpresentation, prematurity, multiple pregnancy and polyhydramnios⁵. A cord is more likely to prolapse when it is un-usually long, or is inserted into the lower edge of a minor degree placenta praevia⁶.

The Perinatal mortality rate associated with umbilical cord prolapse has fallen over the past 50 years from 375 per 1000 in 1924 to about 0.2% of births today⁷. Other workers have also recorded a perinatal mortality rate ranging between 36 and 345 per 1000 deliveries³. This reduction has been attributed to changes in obstetric practice with increased use of elective caesarean section for non-cephalic or non-engaged presenting parts of the

fetus⁷, and the more rapid and frequent use of caesarean section once cord prolapse is diagnosed⁸. Immediate delivery of the fetus is required in all cases of cord prolapse where the fetus is still alive; where the cord is still pulsating and fetal heart sounds are heard. With full cervical dilatation and a low head, vacuum or forceps delivery may be performed. Caesarean section is however preferred when the fetus is alive, and the cervix is not favourable for immediate vaginal delivery, the presenting part is high or there are other compounding factors that make vaginal delivery not feasible in the shortest possible time. The most dangerous complication of cord prolapse is fetal hypoxia resulting from cord compression. Cord prolapse therefore poses a threat to the continued survival of the fetus in-utero. Fetal death is imminent if delivery is not effected within the shortest time.

We present our experience with cord prolapse in Jos University Teaching Hospital, the associated factors, the perinatal outcome, and recommend early referral of patients at risk to the hospital if we are to reduce this ugly trend.

Subjects and Methods

This was a retrospective observational study. The records of all patients that were diagnosed as cord

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prolapse during labour and subsequently delivered in the Jos University Teaching Hospital between the 1st of January 1999 and 31st of December 2003, a 5 year study period were retrieved and analyzed. Data on the booking status, maternal age and parity, fetal outcome were collected. The data collected were analyzed using the Epi-Info 2002 version of the software. Frequency tables were generated and tests of association between variables carried out.

Results

During the 5-year period of review, a total of 12,536 deliveries were taken in the hospital, and 35 patients had cord prolapse, giving an incidence rate of 0.28% or 1 in 358 deliveries. The booking status of the patients demonstrated that 42.9% and 2.9% were booked elsewhere and un-booked respectively. The maternal age range was range 22 - 39 years with a mean of 29.31 years, Table I. The parity of the mothers ranged from 1-10 with a mean of 4.6. Multiparous women constituted up to 94.3% of the cases of cord prolapse in the study, and when compared with the primigravidae, was found to be statistically significant (p value=0.000291). Grandmultiparous women (parity 5 and above) made up

51.4% of women that had cord prolapse. The mode of delivery was caesarean section in 57.1% of the cases, while 22.9% were allowed spontaneous vaginal delivery. Breech extraction was the mode of delivery in 14.3% and destructive operation in 5.7%.

Table II showed that the gestational age of the fetuses at the time of cord prolapse range from 25-42 weeks with a mean of 36.84 weeks. Perinatal mortality rate was 62.9%. Fresh stillbirth was recorded in 20 (57.1%), severe asphyxia in 4 (11.4%), moderate asphyxia in 5 (14.3%) and no asphyxia in 6 (17.2%). Fetal weight of babies that had cord prolapse showed a range from 1100-4400 grammes, and a mean of 2610 grammes (SD \pm 235). Fourty percent (40%) of the babies were of low birth weight. The cord length of the babies with cord prolapse ranged from 35-72 cm, with a mean of 57.66 cm (SD \pm 6.58).

Table III showed that the commonest associated factor with cord prolapse was prematurity in 12 (30%). Twin pregnancy was a factor in 9 (22.5%), and footling breech in 4 (10.0%). There was no known associated factor in 30.0% of the cases.

Table 1:
Clinical Profiles of Mothers with Cord Prolapse

Variable	Number of Patients (%)
Booking status	
Booked in JUTH	19 (54.2)
Booked Elsewhere	15 (42.9)
Un-booked	1 (2.9)
Maternal age in years	
20 - 24	5 (14.3)
25 - 29	12 (34.3)
30 - 34	13 (37.1)
35 - 39	5 (14.3)
Maternal parity	
1	2 (5.7)*
2 - 4	15 (42.9)*
\geq 5	18 (51.4)
(* Chi square = 13.13; p value < 0.05 and significant)	
Mode of delivery	
Emergency Caesarean Section	20 (57.1)
Spontaneous Vaginal Delivery	8 (22.9)
Breech Extraction	5 (14.3)
Destructive operation	2 (5.7)

Table 2:
Fetal Outcome of the Cases of Cord Prolapse

Variable	Number of Babies (%)
Gestational age at Delivery in weeks	
<37	12 (34.3)
37 - 42	22 (65.7)
>42	0 (0.0)
Fetal condition	
Fresh Stillbirth (Apgar 0)	20 (57.1)
Severe Asphyxia (Apgar 1-3)	4 (11.4)
Moderate Asphyxia (Apgar 4-5)	5 (14.3)
Mild Asphyxia (Apgar 6-7)	0 (0.0)
No Asphyxia (Apgar 8-10)	6 (17.2)
Fetal Weight in grammes	
\leq 1500	2 (5.7)
1501 - 2500	12 (34.3)
2501 - 3999	20 (57.1)
\geq 4000	1 (2.9)
Umbilical cord Length in cm	
31 - 40	1 (2.9)
41 - 50	4 (11.4)
51 - 60	17 (48.6)
61 - 70	11 (31.4)
71 - 80	2 (5.7)

Discussion

Umbilical cord prolapse continues to be associated with poor perinatal outcome in our setting, with a very high perinatal morbidity and mortality. Patients with umbilical cord prolapse can expect good neonatal outcome if intervention is prompt^{9,10}. Umbilical cord prolapse, however, is one of the many causes of fresh stillbirths and perinatal deaths particularly among those delivered with severe birth asphyxia. Perinatal mortality from cord prolapse ranges worldwide from 20-60%¹¹. The perinatal mortality was found to be as high as 629 per 1000 deliveries in this study. This figure is higher than the upper margin of the figure reported. This is much higher than the reported perinatal mortality in the same institution of 82/1000 deliveries¹²; and 23.3 per 100 deliveries in Maiduguri¹³.

The incidence of cord prolapse worldwide varies from 1 in 161 to 1 in 714 deliveries^{3,4,11}. In this study, we had an incidence of 0.28% or 1 in 358 deliveries, which was higher than a similar study in Kaduna, Nigeria with 0.19% or 1 in 526 deliveries¹⁴; but lower than a study in Ile-Ife with an incidence of 0.4% or 1 in 240 deliveries¹⁵. The rates are lower where early diagnosis is made in labour and prompt delivery is effected, and higher where facilities are not available for immediate delivery or when the patients come late with the fetus already dead. Of the 19 patients that booked for antenatal care in JUTH, 31.4% had cord prolapse while in labour, and timely emergency caesarean section resulted in live babies. Five (14.3%) of them had twin pregnancies and had caesarean section even when the cord had stopped pulsating, with resulting fresh stillbirth in the first twin. Only three of the patients booked with us presented with cord prolapse and intrauterine fetal death; and all were allowed vaginal delivery. All cases that were **not** booked with JUTH presented with cord prolapse, absent cord pulsation and no fetal heart sounds. They had been referred to JUTH with the diagnosis of cord prolapse in labour. The diagnosis of cord prolapse was confirmed, and in addition, there was intrauterine fetal death. They therefore had fresh stillbirths and very poor perinatal outcome. Cord prolapse occurring outside a hospital setting has a higher perinatal mortality rate¹⁶.

Cord prolapse is associated with all factors that maintain the presenting part of the fetus high above the pelvis¹. Prematurity, for example, allows some space between the fetus and the pelvis and may be associated with cord prolapse. This study identified prematurity as the highest contributing factor in 12 (30%), followed by twin pregnancy in 9 (22.5%) and breech presentation in 6 (15%) cases. Other conditions that favour the occurrence of cord prolapse are those that interfere with the close application of the presenting part to the lower uterine segment. Studies have also confirmed that

multiparity, un-engaged presenting part from cephalocephalic disproportion, prematurity, breech presentation and multiple pregnancies are major contributing factors to cord prolapse^{4,17}. Sudden rupture of the membranes can also lead to cord prolapse¹. The contribution of artificial rupture of the membranes to cord prolapse was not documented in this study, and therefore not discussed here. It is however advised that speculum examination must be performed following the rupture of membranes in all cases of abnormal presentation, un-engaged fetal head and in premature labour. In addition, amniotomy should only be performed when the fetal vertex is well applied to the cervix².

Undue length of the cord has also been advanced as a predisposing factor to cord prolapse^{11,17}. The umbilical cord varies in length worldwide with an average of about 50-60 cm at term. The average length of the cord for Nigerian babies has been documented as 57.48 cm⁵. Undue length of the cord was not supported as an associated factor in this study, as the average cord length in the study population was 57.66 cm. This was within the normal range in Nigerian babies. Parity as a causative factor plays a relatively un-important part¹⁷. This study however showed that cord prolapse was almost predominantly a condition of the multiparous woman. Multiparous women (parity of 2 and above) were responsible for 94.3% of all the cases of cord prolapse, and this was statistically significant compared with the nullipara ($p < 0.05$). This may be because the nullipara had a rigid anterior abdominal wall that discouraged the occurrence of mal-presentation, unstable lie or an un-engaged head in labour. Grandmultiparous women (parity of 5 and above) accounted for up to 51.4% of the cases of cord prolapse in the study. Other studies have also found multiparous patients to be 60% more likely to experience umbilical cord prolapse¹⁶.

Ultrasound scanning has been proposed as an adjunct to the diagnosis of cord presentation where this is suspected¹⁸. This poses a challenge to our ultrasound scanners, particularly in women with predisposing

Table 3:
Factors Associated With Cord Prolapse

Variable/Factor	Number of Patients (%)
Prematurity	12 (30.0)
Twin Pregnancy	9 (22.5)
Footling breech	4 (10.0)
Complete Breech	2 (5.0)
Transverse Lie	1 (2.5)
No factor Found	12 (30.0)

factors for cord prolapse. A heightened index of suspicion and an attempt to look for cord presentation may assist with the diagnosis in a woman having a scan at term or in labour, and therefore help in the prevention of cord prolapse. Prevention of umbilical cord prolapse is difficult in this part of the country where majority of the cases occur outside the hospital and only present when the fetus is already dead. We therefore advise proper and adequate antenatal care, the use of ultrasound to rule out cord presentation in patients at risk, supervised hospital delivery particularly for women at risk, and early resort to caesarean section where the fetus

is still alive.

Prompt pelvic examination should be performed as soon as the membranes rupture in labour, or a sterile speculum examination in premature rupture of the membranes, to rule out cord prolapse. Fetal hearth rate should be checked continuously after amniotomy for fetal status. Health care providers in other maternities ought to refer patients with predisposing factors to cord prolapse early in labour for hospital delivery, and these women must oblige to go to referral facility early in labour.

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