

## EMERGENCY OBSTETRICS CARE IN A NIGERIAN TERTIARY HOSPITAL: A 20 YEAR REVIEW OF UMBILICAL CORD PROLAPSE

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### ABSTRACT

**Context:** Umbilical cord prolapse is an obstetric emergency associated with high perinatal morbidity and mortality unless prompt delivery by the fastest and safest route is carried out.

**Objectives:** To determine the incidence of umbilical cord prolapse, predisposing factors, and fetal outcome.

**Study design, setting and subjects:** A 20 year retrospective study of all women who presented with umbilical cord prolapse at University of Maiduguri Teaching Hospital, Maiduguri, North-Eastern Nigeria.

**Results:** During the study period there were 27,753 deliveries and 75 women had cord prolapse, giving the incidence of 1 in 370 deliveries (0.27%). Significantly more patients with non vertex presentation, twins and preterm delivery had cord prolapse. The highest occurrence was in those with unengaged presenting part(65.2%), spontaneous rupture of membranes(62.1%) and grandmultiparous women(57.6%). Caesarean section was carried out in 50% of cases, with mean decision-delivery interval of  $77.1 \pm 21.7$  minutes and 28/33(84.9%) of babies delivered within 60 minute had normal Apgar scores. The Knee-chest position was most commonly used method of alleviating cord compression while arrangement for caesarean section was being made. The perinatal mortality was 27.3%.

**Conclusion:** umbilical cord prolapse is a brisk obstetric emergency with high perinatal morbidity and mortality unless prompt delivery is undertaken. Better communication and prompt response to emergency by the theatre team to reduce the decision-delivery interval would improve the perinatal outcome.

**Key Words:** Umbilical cord, grandmultiparous, Apgar, asphyxia, perinatal mortality and perinatal outcome  
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### INTRODUCTION

Prolapse of the umbilical cord is a true obstetric emergency demanding immediate attention and in the presence of a viable fetus necessitates an expeditious delivery. The common denominator for cord prolapse is incomplete fitting of the presenting part into the maternal pelvis at the time of rupture of membranes<sup>1,2</sup>. In overt cord prolapse which is the focus of this study, there is protrusion of the cord in advance of the fetal presenting part, often through the cervical os and into or beyond the vagina<sup>3</sup>. The fetal membranes are invariably ruptured, consequently the cord is visible or palpable on examination. It is life threatening to the fetus since blood flow through the umbilical vessel is usually compromised from compression of the cord between fetal presenting part and the uterus, cervix or pelvic inlet<sup>4</sup>. Pregnancy characteristics that increase the risk of umbilical cord prolapse are generally difficult to avoid but awareness of high risk patients may help to facilitate speedy diagnosis

and delivery if cord prolapse occurs. Abnormal fetal presentation, grandmultiparity, prematurity, preterm delivery, premature rupture of membrane, low birth weight, multiple pregnancy, polyhydramnios and spontaneous rupture of membranes have been linked in various studies with high risk of umbilical cord prolapse<sup>5-10</sup>. Many times, cord prolapse occurs at the time in labour when cervix is not sufficiently dilated for vaginal delivery. In such situations, various manouvres have been advocated to alleviate pressure on the prolapsed cord temporarily until a caesarean section can be safely and expeditiously performed. The genu-pectoral(knee-chest) and high trendelenberg positions<sup>1,11</sup> have been used but these are tiring and irksome for the patient. Some have found that digitally elevating the presenting part as a quicker<sup>12</sup> method while others use funic reduction<sup>13</sup>. Another manouvre involves filling the urinary bladder rapidly with 500-700ml of normal saline<sup>14,15</sup> and when this is combined with tocolytics such as intravenous ritodrine the perinatal mortality is much reduced<sup>14</sup>. This study sets to determine incidence of umbilical cord prolapse, the risk factors and perinatal outcome. Suggestions are made for better outcome.

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## SUBJECTS AND METHODS

A 20 year retrospective study from January 1986 to December 2005, of all women who presented with umbilical cord prolapse to the department of obstetrics and gynaecology of U.M.T.H was carried out. The relevant information was obtained from the obstetric ward register, labour ward register, operation theatre register and the patient's case notes recovered from the medical records department. The case notes were studied for various predisposing factors, gestational ages at diagnosis, mode of delivery/other interventions and fetal outcome. The information obtained was coded and transferred on to a profoma already designed for the study, this was analysed using SPSS version 11.0 for window statistical package. Analysis were carried out for descriptive statistics and presented as tables. Chi-square test at 95% confidence interval were done where appropriate. The risk factors were compared to that in the general population of women delivered during the period of the study and the odd ratio for presenting with umbilical cord prolapse computed. Babies born with Apgar scores 7-10 are considered normal, while asphyxiated babies were babies with Apgar scores less than 7 and/or needed SCBU admission. Early neonatal death was death of the newborn within 24 hour of delivery.

## RESULTS

There were 27,753 deliveries during the study period, 75 women had umbilical cord prolapse

giving an incidence of 1 in 370 deliveries(0.27%). Only 66 case record were available for review; giving a retrieval rate of 88%. Table 1, compares the relative occurrence of the predisposing factors of umbilical cord prolapse among the general population of women delivered during the study period.. Significantly more patients with non vertex presentation 31/722(4.3%) had cord prolapse compared to those that had vertex presentation 35/27031 (0.13%),(p=0.000) and the Relative Risk (RR) of cord prolapse occurring in a non-vertex presentation was 33.13. Similarly there was statistically significant difference in occurrence of cord prolapse in those with twin gestation 13/339 (3.8%) than singleton .53/27414 (0.2%) (p=0.000) with OR=20.59 for having cord prolapse among the twin pregnancies. Preterm delivery and unbooked status were also risk factors for cord prolapse. Additionally, 62.2% of the cord prolapse occurred with unengaged fetal presenting part and 62.1% followed spontaneous rupture of fetal membranes. Majority of the patients(57.6%) who had cord prolapse were grandmultiparous women. Table 2, shows the various modes of delivery in patients with umbilical cord prolapse. Caesarean section accounted for 50% of the deliveries, while 21.3% had assisted vaginal delivery. The mean decision-delivery interval was 77.1± 21.7 minutes. Table 3 shows the various maneuvers done to relieve the pressure of the fetal presenting part on the umbilical cord and perinatal outcome. Knee-chest position was the most popular, followed closely by digital elevation of the presenting part. The perinatal death was highest when no effort

Table I: Risk Factor Associated With Cord Prolapse.

FACTORS	CORD PROLAPSE	NO CORD PROLAPSE	TOTAL
<b>1. Presentation</b>			
Non vertex	31	691	722
Vertex	35	26996	27031
Total	66	27687	27753
	$X^2= 513.97, P=0.000, OR = 34.60, RR, 33.13$		
<b>2. Birthweight</b>			
LBW	23	6915	6938
Normal	43	20772	20815
Total	66	27687	27753
	$X^2= 3.42, P=0.06, OR=1.61, RR=1.60$		
<b>3. Foetuses</b>			
Twins	13	326	339
Singleton	53	27361	27414
Total	66	27687	27753
	$X^2=187.16, P=0.000, OR=20.59, RR=19.84$		
<b>4. Gestational age</b>			
Preterm	19	4865	4884
Term	47	22822	22869
Total	66	27687	27753
	$X^2= 5.71, P=0.02, OR1.9, RR=1.9$		
<b>5. Booking status</b>			
Unbooked	33	4191	4224
Booked	33	23496	23529
<b>Total</b>	<b>66</b>	<b>27687</b>	<b>27753</b>
	$X^2= 6.02, P=0.000 OR=5.61RR=5.57$		

LBW=low birth weight

**Table 2: Shows the Various Modes of Delivery in Umbilical Cord Prolapse.**

Mode of Delivery	Frequency	Percent (%)
Forceps	4	6.1%
Assisted Breech delivery	4	6.1%
Vacuum	6	9.1%
Spontaneous vaginal delivery	19	28.8%
Caesarean section	33	50.0%
<b>Total</b>	<b>66</b>	<b>100%</b>

**Table 3: Shows the Various Maneuvers done to relieve the Pressure of the Fetal Presenting Part on the Umbilical Cord.**

Maneuver	Alive	Pnd	Total
Digital elevation	11	2	13
Knee-Chest	22	4	26
Nil	15	12	27
<b>Total</b>	<b>48</b>	<b>18</b>	<b>66</b>

$$X^2 = 6.79, P = 0.033$$

PND-Perinatal Death

**Table 4: Mode of Delivery and Fetal Outcome.**

Delivery	Alive	Asphyxiated	FSB	ENND	Total
Assisted Breech	2	1	-	1	4
Forceps	1	2	-	1	4
Vacuum	2	3	-	1	6
SVD	3	3	9	4	19
C/S	28	3	-	2	33
<b>Total</b>	<b>36</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>66</b>

SVD= spontaneous vaginal delivery.

C/S=caesarean section.

FSB=fresh stillbirth

ENND= early neonatal death

was made at alleviating pressure on the cord 12/27(44.4%) compared to 4/22(18.2%) in those managed in knee-chest position. Mode of delivery and fetal outcome are shown in table 4. The overall perinatal mortality due to cord prolapse was 18/66(27.3%). The perinatal mortality was higher among those delivered via spontaneous vaginal delivery 13/19(68.4%) compared to those delivered via caesarean section 2/33(6.1%). However, for those live fetuses that were delivered by assisted vaginal delivery, the perinatal mortality was 3/11(27.3%) compared to 2/33(6.1%) when such fetuses were delivered by caesarean section.

## DISCUSSION

The incidence of umbilical cord prolapse of 0.27% in this study falls within the range of 0.19 - 0.42% reported from other parts of Nigeria<sup>5,16</sup> and it also

agrees with the incidence for the developed world of 0.14-0.62%<sup>17</sup> Non vertex presentation, twin gestation, preterm delivery and unbooked status significantly increase the risk of umbilical cord prolapse. Abnormal fetal presentation (breech, transverse, or oblique lie) has consistently been associated with a high risk of cord prolapse<sup>4,6-8</sup>. Multiple pregnancy has also been associated with umbilical cord prolapse<sup>7</sup>, this is also seen in this study and the risk is higher for the second twin who is also at increased risk of malpresentation: an important cause of cord prolapse. Other clinically obvious risk factors were, grandmultiparity, unengaged presenting part and spontaneous rupture of fetal membranes. Similar association has also been found by other workers<sup>1-5,16</sup>. Studies have shown positive correlation between parity and uterine size<sup>18</sup>, therefore the larger intrauterine space in grandmultiparous women allows for easy slippage of the umbilical cord leading to cord prolapse. The incidence of grandmultiparity among the patients with umbilical cord prolapse was higher than of the general population of women delivered during the study period in the same center 57.6% compared to 14.5%<sup>19</sup>. Spontaneous rupture of fetal membranes increases the risk of cord prolapse as the umbilical cord easily flows out with the gush of liquor, similar finding has been reported in Ankara, Turkey<sup>20</sup>. This calls for early amniotomy with slow release of liquor in high risk patients. In the same vein the vaginal examination prior to the amniotomy allows for detection of cord presentation and deliveries with cord presentation have a better perinatal outcome than those with cord prolapse<sup>21</sup>. Although the occurrence of low birth weight among the cord prolapse group was not statistically significant (p=0.06), the mean birth weight of the babies born with cord prolapse was lower than that of the general population, 2.86±0.68kg compared to 3.40±0.29kg for babies born at term<sup>22</sup>. This finding contrast with the finding of Dilbaz et al in Turkey which showed umbilical cord prolapse to be particularly common in Low birth weight fetuses<sup>20</sup>. The occurrence of umbilical cord prolapse was lower among the booked and expectedly, the perinatal mortality for booked patients was also lower 5/33(0.15%) compared to 13/33(0.4%). This may be because of the early medical seeking attitude of the booked patients. Similar finding of high perinatal mortality among unbooked was also reported from Kaduna, Northwestern Nigeria<sup>16</sup>. The commonest mode of delivery was caesarean section which was offered to 50% of the patients. This was higher than 42% reported from Kaduna, Northwestern, Nigeria<sup>16</sup> and much lower than values of 72%<sup>10</sup>, 80%<sup>21</sup> and 93.5%<sup>23</sup> reported from Paris, Hong Kong and Saudi Arabia respectively. The high caesarean section rate was necessary to salvage the babies of 50% of the

patients that presented at cervical dilatation between 4-6cm with live fetuses. The mean decision delivery interval was 77.11±21.67 minutes, this is much higher than the recommended 20-30 minutes<sup>12,24,25</sup> for optimum fetal outcome. However 25/28(89.1%) babies delivered within 60 minutes had normal Apgar scores. This gives credence to the fact that the diagnosis delivery interval determines the survival of such babies. While making preparations for caesarean section various maneuvers have been devised to alleviate the compression of the prolapsed cord by the fetal presenting part. Though digitally elevating the presenting is quicker<sup>12</sup> we found the knee-chest position to be equally effective. This can be seen from 11/13 and 22/26 of the babies delivered respectively after the maneuvers had normal Apgar scores. There was no need for intervention in 27 cases, either because of IUFD(9 cases) or assisted vaginal delivery could be offered without delay. The high occurrence of IUFD at presentation may explain the high perinatal mortality in those delivered by spontaneous vaginal delivery. This may partly be due to reluctance of our women to seek hospital delivery. The gross perinatal mortality was 27.3% which was much higher than the 7.26% in the same hospital<sup>26</sup>. The high perinatal mortality in umbilical cord prolapse may be attributable to the condition itself as being an independent factor for perinatal mortality<sup>27</sup> as there was no gross congenital malformations seen in the babies born and the perinatal mortality in the preterm and term babies were comparable: 5/19(26.3%) and 13/47(27.6%) respectively. This contrast to the findings of Murphy and Mackenzie who attributed the mortality associated with cord prolapse to the concomitant prematurity and congenital malformation rather than the birth asphyxia<sup>28</sup>.

## CONCLUSION

Umbilical cord prolapse is one of the obstetric emergencies seen in maternity units and timely delivery is the hallmark of good clinical practice for fetal salvage. Identifying high risk patients and artificial rupture of the membranes rather than spontaneous rupture appear to be a better clinical practice. Moreover, immediate release of compression of the cord when it occurs, followed by delivery by the fastest route will go a long way towards reducing the high perinatal mortality associated with it. Improved communication among the theatre team will reduce the decision-delivery time and improve fetal outcome.

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