Original Research Paper

Risk Factors And Perinatal Outcome In Umbilical Cord Prolapse

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ABSTRACT:
The umbilical cord prolapse complicates 0.11 to 0.18% of live births. The overall incidence of umbilical cord prolapse is reported to be 0.1%–0.6% with higher incidences in non-cephalic presentations, multiple gestations, and earlier gestational ages. Preterm labour, multiparity, malpresentations, polyhydramnios, multiple gestations particularly in the second twin, preterm labor, and preterm premature rupture of membranes (PPROM),all have been associated with cord prolapse. The outcome of any fetus affected by cord prolapse depends on a number of factors which include, the gestational age, duration of cord compression before interventional measure is instituted (diagnosis–delivery interval), the efficiency of the intrauterine resuscitation, and the definitive management adopted as well as the standard of the available neonatal care. **Background:** Umbilical cord prolapse is an obstetric emergency in which the umbilical cord comes through the cervical os in advance of or at the same time as the fetal presenting part leading to fatal complications. **Methods:** was a prospective observational study conducted in LD hospital an associated hospital of government medical college Srinagar for duration of 18 months. All pregnancies with cord prolapse were included in the study where as pregnancies with major fetal anomalies and Gestational age < 28 weeks were excluded. **Results:** The incidence of cord prolapse during the course of study was found to be 0.0012% and the maternal risk factors that were found to be associated with cord prolapse were multi gravida, twin pregnancy, malpresentations, pre-term premature rupture of membranes, amniotomy. Conclusion: Early detection and intervention is required for good perinatal outcome and umbilical cord prolapse should be managed as an obstetric emergency.

KEYWORDS: Diagnosis–Delivery Interval, Cord Prolapse, Multigravida, Malpresentations

INTRODUCTION:

The umbilical cord consists of one umbilical vein and two umbilical arteries, the umbilical vein carries the oxygenated blood and nutrients from mother to fetus and umbilical arteries carry deoxygenated blood from fetus to the mother, thus forming an important conduit between the developing fetus and mother. Umbilical cord prolapse is an obstetric emergency in which the umbilical cord comes through the cervical os in advance of or at the same time as the fetal presenting part. It is overt if the cord is seen within the cervix or in the vagina, whereas occult cord prolapse is when it presents alongside the fetal presenting part but not below it, thus getting compressed between the uterine wall and the presenting part.[1]The umbilical cord prolapse complicates 0.11 to 0.18% of live births.[2]Umbilical cord prolapse results in poor perfusion to the fetus due to compression of the cord between the presenting fetal part and the birth canal which leads to perinatal mortality that varies from 0 to 3%.[3] The overall incidence of umbilical cord prolapse

is reported to be 0.1%–0.6% with higher incidences in non-cephalic presentations, multiple gestations, and earlier gestational ages. Preterm labour, multiparity, grand multiparity (75% of cord prolapse events in the 1940s), malpresentations, polyhydramnios, multiple gestations particularly in the second twin, preterm labor, and preterm premature rupture of membranes (PPROM),all have been associated with cord prolapse . The relationship between malpresentations including breech and transverse lie and UCP is well documented and is due to the poor engagement/non-engagement of the presenting part into the maternal pelvis allowing the space for the cord to prolapse. The outcome of any fetus affected by cord prolapse depends on a number of factors, each of which could be acting solely or in synergy with others. These include, the gestational age, duration of cord compression before interventional measure is instituted (diagnosis–delivery interval), the efficiency of the intrauterine resuscitation, and the definitive management adopted as well as the standard of the available neonatal care.[4] The RCOG recommend

DDI less than 30 minutes in order to optimise the perinatal outcome, particularly in the presence of evidence of fetal compromise. However hypoxemic encephalopathy has been reported with very short DDI, which suggest that other factors may play role in outcome. Such factors include prolapse preceding diagnosis by a significant length of time, the degree of cord compression and the presence of fetal compromise.[5] The location where cord prolapse occurs can have effect on the perinatal outcome: Occurrence in the hospital with rapid recourse to delivery is associated with improved outcome. Those foetuses who maintain normal heart tracing at the time of cord prolapse have lower incidence of adverse neonatal outcome.[6]

AIM AND OBJECTIVES:

- To study the risk factors associated with umbilical cord prolapse.
- To study the perinatal outcome in patients with cord prolapse and its relation with diagnosis to delivery interval.
- To study the effect of cord prolapse on the APGAR score of baby at 1 and 5 minute.

MATERIAL AND METHODS:

STUDY DESIGN: This was a prospective observational study conducted in LD hospital an associated hospital of government medical college Srinagar for duration of 18 months. All pregnancies with cord prolapse were included in the study where as pregnancies with major fetal anomalies and Gestational age < 28 weeks were excluded.

METHODS:

All pregnant females admitted in L.D hospital or patients who were referred to the L.D Hospital who have umbilical cord prolapse were included in this study. The parity of the patients, gestational age, presentation of the fetus, whether the pregnancy is singleton or twin pregnancy, the time period elapsed between diagnosis and delivery, status of membranes, mode of delivery, birth weight and APGAR score of the baby at 1 minute and at 5 minute were recorded. The time period between diagnosis of umbilical cord prolapse to delivery of the baby and its effect on the perinatal outcome was studied.

STATISTICAL ANALYSIS:

Statistical analysis was performed using software package of statistical analysis (SPSS for Windows, version 19, Armonk, NY: IBM Corp). Normality testing of the data was done using Shapiro-Wilk test, which showed that the data deviated from normal distribution ($P<0.05$). The relation of perinatal outcomes with DDI was assessed using Mann-Whitney U test and Spearman's correlation test. The level of significance for the present study was set at a P value of less than 0.05.

RESULTS AND OBSERVATIONS:

TABLE 1: DISTRIBUTION AS PER PARITY

Parity	Number	Percentage (%)
Primi	40	33
Mutligravida	80	67
Total	120	100

Table 1. In the present study,80 (66.7%) of the participants were multigravida whereas 40 (33.3%) of the participants were primigravida.

TABLE 2: DISTRIBUTION AS PER TYPE OF PREGNANCY

TYPE OF PREGANACY	Number	Percentage
SINGLETON	48	40%
MULTIPLE	72	60%
Total	120	100%

Table 2. In the present study, 48 (40%) participants had singleton pregnancy.

TABLE 3: PRESENTATIONS DURING DELIVERY

Presentation	Number	Percentage (%)	P value
Cephalic	40	33	0.0001*
Transverse	24	20	

Breech	56	47	
Total	120	100	

*Statistically Significant (p-value<0.05)

Table 3. Significant correlation was found between presentation of fetus and cord prolapse. In the present study, 56(47%) pregnancies reported with breech presentation, 40 (33%) pregnancies reported with cephalic presentation and transverse position was detected in 24(20%) participants.

TABLE 4: DISTRIBUTION AS PER MATURITY OF PREGNANCY

	Number	Percentage
Term	72	60%
Preterm	48	40%
Total	120	100%

Table. 4 In the present study, 72(60%) babies were born at term, while 48(40%) babies were born pre-term.

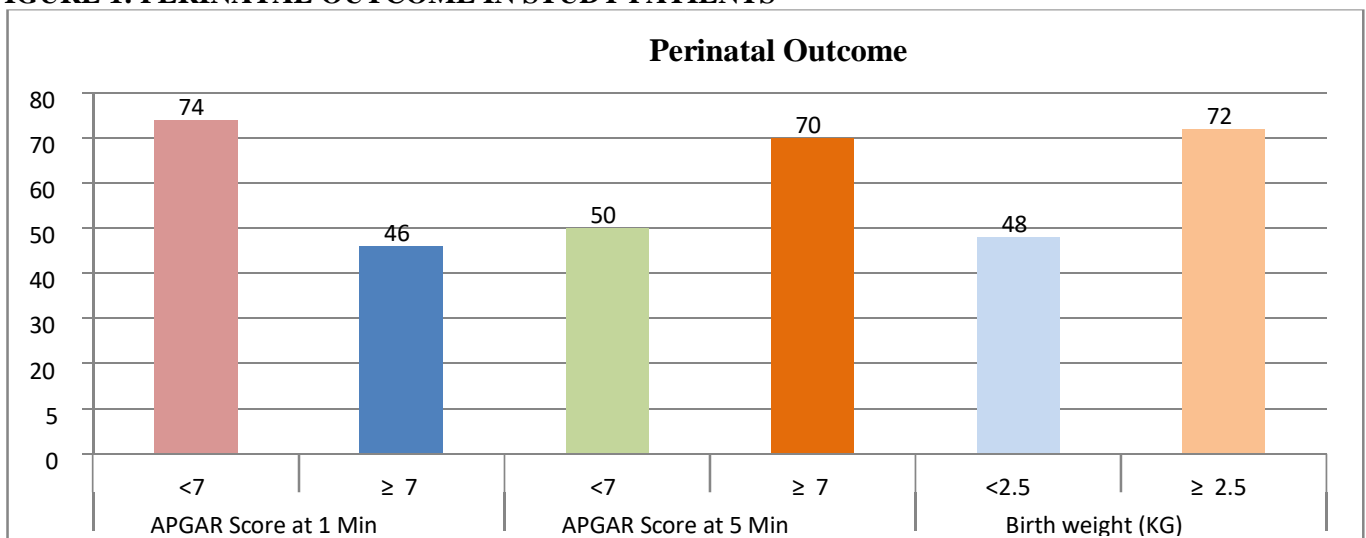**FIGURE 1: PERINATAL OUTCOME IN STUDY PATIENTS**

Figure 1. The mean APGAR score at 1 minute was 5.36±2.15 (Range: 0-8) whereas the mean APGAR score at 5 minutes was 6.13±2.31 (Range: 0-8). The mean birth weight of babies born to the study participants was 2.35±0.61 Kg (Range: 1-3 Kg).

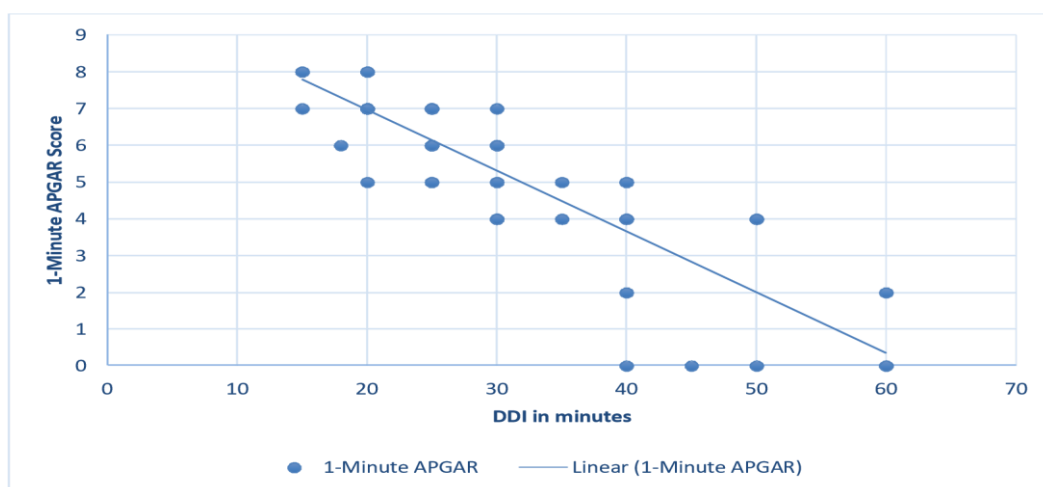**Figure 2. Correlation between 1 -Minute APGAR Score and DDI** LINEAR (1-MINUTE APGAR)

Figure 2. It was also found that there was a statistically significant strong negative correlation between 1-minute APGAR score and DDI (Spearman's rho = -0.849, P<0.001).

DISCUSSION:

The outcome of any fetus affected by cord prolapse depends on a number of factors, each of which could be acting solely or in synergy with others. These include, the gestational age, duration of cord compression before interventional measure is instituted (diagnosis–delivery interval -DDI), the efficiency of the intrauterine resuscitation, and the definitive management adopted as well as the standard of the available neonatal care.[4] In the present study, 80 (66.7%) of the participants were multigravida whereas 40 (33.3%) of the participants were primigravida. In a study conducted by Egbo, et al. [2019][4] reported that the majority 80% study participants were multigravida and 20% study participants were Primi who had umbilical cord prolapse . In our study, 48(40%) participants with singleton pregnancy and 72 (60%) participants with twin pregnancy had cord prolapse. In our study, 56(47%) pregnancies reported with breech presentation, 40 (33%) pregnancies reported with cephalic presentation and transverse position was detected in 24 (20%) participants who had cord prolapsed. In similar study conducted by R Asahina, et al. [2021][7] reported 62% pregnancies reported cephalic presentation, 34% pregnancies reported pelvic presentation and 4 % pregnancies reported transverse presentation had cord prolapse. In another study conducted by In this study, 72(60%) babies were born at term, while 48(40%) babies were born pre-term. In a study conducted by Egbo et al. [2019][4] reported preterm birth in 24% of study participants and 76% had term birth. In similar study conducted by Hembram, et al. [2017][6] found preterm birth in 17.49% of study participants and 82.51% had term birth. Polyhydramnios was found in 27 (45%) participants of our study as observed by Hasegawa, et al. [2016][8] and Rezaee, et al. [2015][9] in their study. The mean gestational age of the study participants was 36.25±2.62 weeks (Range: 30-40 weeks). In similar study conducted by Asahina, et al. [2021][7] found that 2.9% study subjects had <30 weeks gestational age, 2.4% study subjects had 30-31 weeks gestational age, 4.8% study subjects had 32-33 weeks gestational age, 18.2% study subjects had 34-35 weeks gestational age and 71.6% study subjects had ≥36 weeks gestational age. SROM was seen in 23 (38.3%) participants, PPROM was seen in 22 (36.7%) participants whereas amniotomy was done in 15 (25%) participants. This was comparable to the study conducted by Hembram, et al. [2017][6] who reported spontaneous rupture of membranes in 87.17% study subjects and artificial rupture of membranes in 12.83% study subjects. In the present study, caesarean section was carried out for 98(81.7%) participants, whereas 22(18.3%) participants gave birth through Normal Vaginal Delivery. In another study conducted by Omololu, et al. [2017][10] reported that cesarean section was done in majority 84.6% and 15.4% study participants had vaginal delivery. Similar observations were made by Hembram, et al. [2017][6] and Egbo, et al. [2019][4] in their study˙ . The mean DDI of the study participants was 29.71±11.13 minutes (Range: 15-60 minutes) and DDI was <30 minutes in 73% of my study population which was similar to the study conducted by Sangwan, et al. [2011][11] reported average DDI was 26.00 minutes. The mean APGAR score at 1 minute was 5.36±2.15 (Range: 0-8) whereas the mean APGAR score at 5 minutes was 6.13±2.31 (Range: 0-8). The mean birth weight of babies born to the study participants was 2.35±0.61 Kg (Range: 1-3 Kg). In a study conducted by M Hembram, et al. [2017][6] reported APGAR score was reported ≥7 at 1 minute in 65% study subjects and ≥7 at 5 minutes in 83% study subjects. Similarly W E Wasswa, et al. [2014][12] reported the mean APGAR score at 5 minutes was 6.9±3.88. Both these studies are consistent with the present study. 48 children were born with birth weight of less than 2.5 kg, and 72 children with birth weight of 2.5 kg and above. A study conducted by Hembram, et al. [2017][6] reported <2.5kg birth weight in 43.75% study subjects and ≥2.5 kg birth weight in 56.25% study subjects. There were 74 children with 1-minute APGAR score of less than 7, and 46 children with 1-minute APGAR score of 7 and above. It was found that there was a statistically significant difference (P<0.001) in mean DDI of children with 1-minute APGAR score of less than 7 (Mean DDI = 34.81±11.16) compared to children with 1-minute APGAR score≥7 (Mean DDI = 21.52±3.82). It was also found that there was a statistically significant strong negative correlation between 1-minute APGAR score and DDI (Spearman's rho = -0.849, P<0.001). In a study conducted by Kalu, et al. [2011][13] reported apgar score of less than 8 in the first minute compared to 44 (31.9%) of the control group (P <0.001).Similar observations were made by Hembram, et al. [2017][6] in his study. There were 25 children with 5-minute APGAR score of less than 7, and 35 children with 5-minute APGAR score of 7 and above. It was found that there was a statistically significant difference (P<0.001) in mean DDI of children with 5-minute APGAR score of less than 7 (Mean DDI = 39±11.18) compared to children with 5-minute APGAR score ≥7 (Mean DDI = 23.08±4.27). It was also found that there was a statistically significant strong negative correlation between 5-minute APGAR score and DDI (Spearman's rho = -0.846, P<0.001). In similar study conducted by Kahana B, et al. [2004][1] showed lower Apgar scores, less than 7, at 5 min (OR=11.9, 95% CI 7.9-17.9). In another study conducted by Kalu, et al. [2011][13] and Hembram, et al. [2017][6] similar observations were made.

CONCLUSION:

This prospective observational study concludes that umbilical cord prolapse remains a rare but high risk obstetric complication. In this study, the incidence of cord prolapse during the course of study was found to be 0.0012% and the maternal risk factors that were found to be associated with cord prolapse were multi gravida, twin pregnancy, malpresentations, pre-term premature rupture of membranes, amniotomy. The outcome was found to be dependent on decreasing the time interval between diagnosis of cord prolapse to delivery of the baby and the gestational age\birth weight of the baby. It was found that decreasing the DDI resulted in delivering the neonate with good APGAR score. The perinatal outcome was found to be better in patients who were detected with cord prolapse early and were delivered via c-section. All the cases were monitored appropriately to reduce the further complications. Hence it is concluded that early detection and intervention is required for good perinatal outcome and umbilical cord prolapse should be managed as an obstetric emergency.

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