

Risk Factors, Maternal and Neonatal Outcome in Umbilical Cord Prolapse in South Indian Population

¹Madhusmita Hembram, ²Haritha Sagili

ABSTRACT

Objective: To assess associated risk factors, maternal and neonatal outcome of pregnancies complicated by umbilical cord prolapse in South Indian population.

Study design: It was a descriptive study. Risk factors, maternal and neonatal outcome were noted down retrospectively from case records of mothers affected by umbilical cord prolapse from April 2014 to March 2016.

Results: There were 39 cases of umbilical cord prolapse in 2 years. The incidence of umbilical cord prolapse in our hospital was 0.1%. Most of the women were ≤ 25 years of age (72%). Primis were 56%. Most common presentation in umbilical cord prolapse was cephalic presentation (64%). Among the affected individuals, 82% had term gestation, 79% had higher presenting part, and 87% had spontaneous rupture of membranes. Babies were delivered by lower segment cesarean section (LSCS) in 95% and birth weight was ≥ 2.5 kg in 67% of cases with umbilical cord prolapse. Decision to delivery interval (DDI) was ≤ 30 minutes in 84% of cases. APGAR score was ≥ 7 at 1 minute in 65% and ≥ 7 at 5 minutes in 83% of cases. There were 15 neonatal intensive care unit (NICU) admissions and 2 stillbirths. Most common gender was male (75%).

Conclusion: In our study, maternal risk factors were different from traditional risk factors in relation to age, parity, period of gestation, presentation, and birth weight. But, station of presenting part, early dilatation of cervix at diagnosis, and male gender predominance were similar to traditional risk factors. Neonatal outcome was good in our study with no birth injuries. All cases should be monitored properly to reduce the occurrence of umbilical cord prolapse even in low-risk population. Early detection and intervention is required for good neonatal outcome. Umbilical cord prolapse should be managed by an expert obstetrician.

Keywords: Maternal, Neonatal, Umbilical cord prolapse.

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INTRODUCTION

Umbilical cord prolapse is an obstetric emergency which can convert an uneventful ongoing normal pregnancy to a sudden emergency. Normal fetus *in utero* is at higher risk of sudden intrauterine death by cord compression due to umbilical cord prolapse. The incidence of cord prolapse has been reported to be 0.1 to 0.6% worldwide.^{1,2} Studies regarding cord prolapse are scarce in comparison to other obstetrical emergencies. Most of the previous studies have shown that those mothers having risk factors like polyhydramnios, noncephalic presentation, abnormal lie, multiparity, prematurity, etc., are at higher risk of cord prolapse.³⁻⁷ But, in modern obstetric practice, singleton term pregnancies with cephalic presentation and spontaneous rupture of membrane are risk factors for umbilical cord prolapse.⁸ Improvement in emergency LSCS facility and NICU care might help in improving neonatal outcome. Hence, the present study was conducted with an objective to observe associated maternal risk factors, maternal outcome, and neonatal outcome of pregnancy complicated by umbilical cord prolapse in South Indian population.

MATERIALS AND METHODS

This descriptive study was conducted in the Department of Obstetrics and Gynecology, Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry, a tertiary care referral center in South India. Medical records of all cases of umbilical cord prolapse from April 2014 to March 2016 were collected from the medical record section of the hospital. Those cases where umbilical cord was felt vaginally or seen prolapsed out of the introitus were considered as umbilical cord prolapse and included as the subjects. In case of multiple pregnancies, details of the baby in which cord prolapse occurred were considered. Maternal details like age, obstetric index, number of fetuses, period of gestation, presentation, station of

¹Assistant Professor, ²Additional Professor

¹Department of Obstetrics and Gynecology, Mahatma Gandhi Medical College & Research Institute, Pillaiyarkuppam, Puducherry India

²Department of Obstetrics and Gynecology, Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry India

Corresponding Author: Madhusmita Hembram, Assistant Professor, Department of Obstetrics and Gynecology, Mahatma Gandhi Medical College & Research Institute, Pillaiyarkuppam Puducherry, India, Phone: +914132616700, e-mail: titimadhusmita@gmail.com

presenting part, dilatation of cervix at diagnosis, spontaneous or artificial rupture of membrane, DDI, mode of delivery and neonatal outcome including APGAR scores, NICU admissions, stillbirths, birth weight, and sex of the baby were recorded. The results were calculated by Statistical Package for the Social Sciences software version 19 and expressed in percentages.

RESULTS

There were a total of 39 cases of umbilical cord prolapse from April 2014 to March 2016. Total number of deliveries over the same period was 31,281 and the incidence of umbilical cord prolapse was 0.1%. Antepartum maternal risk factors are summarized in Table 1. The mean age of the subjects was 24.5 years. Only one woman was 35 years old. There were eight multiple pregnancies among which only one was triplets and rest were twins. Intrapartum details are described in Table 2. In the present study, one had normal vaginal delivery, one had forceps delivery, and the remaining had emergency cesarean section. In most of the cases delivery was not imminent, so to prevent poor neonatal outcome, decision was taken for category one cesarean section. Neonatal outcome is tabulated in Table 3. Among total 48 babies, only 2 were stillborn (4.16%) though cesarean section was done for

Table 1: Maternal risk factors

Parameters	Number	Percentage
<i>Age</i>		
≤25 years	28	71.79
>25 years	11	28.21
<i>Parity</i>		
Primigravida	22	56.41
Multigravida	17	43.58
<i>Number of fetuses</i>		
Singleton	31	79.48
Twins	7	17.94
Triplet	1	2.58
<i>Presentation</i>		
Cephalic	25	64.10
Breech	8	20.51
Transverse	6	15.39
<i>Period of gestation</i>		
<37 weeks	7	17.49
≥37 weeks	32	82.51
<i>Station</i>		
<(-3)	26	78.78
≥(-3)	7	21.22
<i>Rupture of membranes</i>		
Spontaneous	34	87.17
Artificial	5	12.83
<i>Dilatation of cervix</i>		
<5 cm	31	79.48
≥5 cm	8	20.52

Table 2: Intrapartum details

Parameters	Number	Percentage
<i>Mode of delivery</i>		
LSCS	37	95.0
Instrumental delivery	1	2.5
Spontaneous delivery	1	2.5
<i>DDI</i>		
≤30 minutes	33	84.61
>30 minutes	6	15.39

Table 3: Neonatal outcome

Parameters	Number	Percentage
<i>Birth weight</i>		
<2.5 kg	21	43.75
≥2.5 kg	27	56.25
<i>APGAR score</i>		
<i>1 minute</i>		
<7	16	35.42
≥7	32	64.58
<i>5 minutes</i>		
<7	9	18.75
≥7	39	81.25
<i>Place of postdelivery care</i>		
NICU	15	31.25
Mother side	33	68.75
<i>Viability of the baby</i>		
Stillborn	2	4.16
Alive	46	95.84
<i>Sex</i>		
Male	36	75
Female	12	25

both of them. Both of them were referred from other hospitals. So, delayed intervention was responsible for negative outcome. Among the two stillbirths the first was twin pregnancy with first breech with cord prolapse. Emergency cesarean section saved the second twin with APGAR of 5 and 7 at 1 and 5 minutes respectively. The second stillbirth was at period of gestation of 28 weeks and 5 days and birth weight of 800 gm. There were no birth injuries or congenital anomalies in any of the babies delivered. Though there were NICU admissions, all the babies were discharged along with the mother.

DISCUSSION

The incidence of umbilical cord prolapse in our hospital was 0.1%, which is consistent with incidence of umbilical cord prolapse worldwide. Two studies have shown similar incidence of umbilical cord prolapse as ours.^{9,10}

Umbilical cord prolapse is more frequent in advanced age^{11,12} but, in our study umbilical cord prolapse occurred in a younger age group, which is in agreement with another study.¹³ The younger affected cases in the



present study may be attributed to early marriage in our population.

Studies have shown that multigravidas are most commonly affected with umbilical cord prolapse.^{9,13} But, in the present study, most of the umbilical cord prolapse occurred in primigravida.

Multiple pregnancies are associated with umbilical cord prolapse.^{5,14,15} But, in present study singleton pregnancy was associated with more cases of umbilical cord prolapse. Number of cases of umbilical cord prolapse due to multiple pregnancies was higher in our study when compared with another study from India.¹⁶

Though studies have shown umbilical cord prolapse to be more common in noncephalic presentation,^{13,14,17} in the present study, most of the cases were cephalic. Similar to our study, some other studies have also shown higher incidence of umbilical cord prolapses with cephalic presentation.^{8,9,12,16}

Most studies have shown umbilical cord prolapse to be frequent in preterm pregnancies,^{5,17-19} but on the contrary, in our study umbilical cord prolapse was frequent in term pregnancies. Our study is supported by three other studies which also found that term gestations are the ones mostly affected by umbilical cord prolapse.^{8,9,12}

The risk factor in our study similar to the traditional risk factor is higher station of the presenting part. In most cases of our study, station was -3 or above. Unengaged head is one of the known risk factors for umbilical cord prolapse as proven by other studies.^{8,14,15}

In the present study, spontaneous rupture of membranes was associated with higher incidence of umbilical cord prolapse than artificial rupture of membranes. Similar to our study, some studies have shown more cases of umbilical cord prolapse with spontaneous rupture of membranes,^{5,8,12} but one study¹⁰ has shown more number of umbilical cord prolapse with artificial rupture of membranes.

Traditionally, it has been observed that early dilatation is associated with umbilical cord prolapse. Present study also showed higher incidence of umbilical cord prolapse in dilatation less than 5 cm.

Adverse neonatal outcome increases with increase in DDI.^{1,20} The American Congress of Obstetricians and Gynecologists recommends the decision to delivery time to be between 20 and 30 minutes. Boyles and Katz²¹ concluded that decision to delivery time of more than 10 minutes is an independent risk factor for poor neonatal outcome in umbilical cord prolapse and Khan et al⁸ were of the opinion in their study that 39.28% of newborns with poor APGAR score at 5 minutes had DDI within 20 minutes, but studies have shown that DDI in the range of 10 to 30 minutes has good fetal outcome.^{22,23} One study was of the opinion that DDI does not have adverse effect

on neonatal outcome unless there is severe fetal distress not relieved by intrauterine resuscitation.⁹ In our study, mean decision to delivery time was 21.47 minutes with good neonatal outcome.

Cesarean section has been shown to be associated with more birth injuries than vaginal birth.¹² But, we contradict the statement in our study as 37 among total 39 had cesarean section without any birth injuries. Our study advocates for cesarean section when immediate delivery is not anticipated. We believe that iatrogenic birth injury is surgeon expertise dependent. In our tertiary center, abruption, fetal distress, etc., contribute to major bulk of category 1 cesarean section without any significant birth injuries. Instrumental vaginal delivery can also have more complicated birth injuries than cesarean section if not done by well-trained obstetricians. So, we prefer expert obstetrician in the scenario of umbilical cord prolapse. Risk of perinatal mortality due to umbilical cord prolapse is decreased by cesarean section.⁷

Umbilical cord prolapse leads to early complications like low APGAR score, asphyxia, stillbirth, and neonatal death. According to one study, umbilical cord prolapse is an independent risk factor for perinatal mortality.²⁴ According to Murphy and MacKenzie, fetal outcome is not dependent on cardiotocography, low APGAR score, and acidemia; rather, mortality is associated with congenital anomalies and prematurity.¹ In the present study, APGAR score was good. Stillbirth in the present study was much less when compared with one study where it was 68.2%.¹³ We consider this outcome to be due to early detection and delivery of the babies. Cesarean delivery decreased the risk of neonatal mortality in umbilical cord prolapse. The Royal College of Obstetricians and Gynaecologists also recommends emergency cesarean section when vaginal delivery is not imminent.²⁵ In the present study, 56.25% of the babies born after cord prolapse had birth weight more than 2.5 kg, which is supported by several studies where birth weight was more than 2.5 kg.^{9,13,16} Out of all newborns, 31.25% required NICU care and all of them were discharged along with mother after proper management. Good NICU facility is required for survival of the affected newborn.

Umbilical cord prolapse is more associated with male babies than female babies,^{9,12} similarly, in our study also, umbilical cord prolapse was more with male fetuses.

CONCLUSION

In our study, maternal risk factors were different from traditional risk factors with respect to age, parity, period of gestation, number of fetuses, presentation, and birth weight. But, station of presenting part, early dilatation of cervix at diagnosis, and male gender predominance were similar to traditional risk factors. All cases should be

monitored properly to reduce the occurrence of umbilical cord prolapse even in low-risk population. Early detection and intervention is required for good neonatal outcome. Umbilical cord prolapse should be managed by an expert obstetrician.

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