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Original Research Article

## Risk factor and perinatal outcome in umbilical cord prolapse

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### ABSTRACT

**Background:** This study is done to determine the risk factors and the perinatal outcomes in umbilical cord prolapse in a tertiary care centre. Umbilical cord prolapse is an utmost obstetrical emergency, which requires prompt intervention to have a good perinatal outcome. Identification of umbilical cord prolapse is of utmost important. Due to exposure of the cord to the external environment, the vessels undergo spasm, which leads to fetal compromise. Delivery of the baby either via caesarean section or vaginal delivery is required immediately following diagnosis. The goal of the current study is to identify the risk factor and also to see the perinatal outcome of umbilical cord prolapse in a tertiary care centre.

**Methods:** It is a retrospective study conducted in R. L. Jalappa hospital, Kolar from June 2021 to June 2022. Out of 2570 deliveries at our facility throughout the study period, 45 cases were that of umbilical cord prolapse, who were chosen for this study. Both singleton and twin pregnancies were considered. Women below 28 weeks of gestation was not included in the study.

**Results:** In this study, 45 patients were evaluated who had come with umbilical cord prolapse. It was seen that umbilical cord prolapse occurred in women of multiparity, 36% of the total study population. It was more commonly seen in fetuses weighing 1.5-3 kg, at term (93.3%). Babies that were delivered within 10 minutes of the diagnosis of umbilical cord prolapse has a survival rate of 100%. Whereas the babies delivered after 30 minutes of the diagnosis of cord prolapse did not survive.

**Conclusions:** Umbilical cord prolapse is associated with increased perinatal morbidity, especially if diagnosed late.

**Keywords:** Umbilical cord, Perinatal outcome, Obstetrics emergency, LSCS, Diagnosis delivery interval, APGAR score

### INTRODUCTION

Umbilical cord and placenta are the functional unit for fetomaternal gas exchange, nutrition and metabolic transfer. Umbilical cord is the structure through which the placenta is connected to the fetus.<sup>1</sup> It contains fetal vessels and is of utmost importance for the fetal survival. Umbilical cord prolapse can be occult or overt. In the occult type, the umbilical cord lies alongside with the presenting part of the fetus, the cord however slips past the fetal presenting part to present either at the cervix or descend into the vagina up to the introitus in the overt cases.<sup>2</sup>

The amniotic membrane is ruptured in both the cases.

Umbilical cord prolapse is an obstetrics emergency, which needs immediate intervention. It leads to compression and/or spasm of the fetal vessels due to contact irritation or temperature changes. This may lead to fetal circulatory compromise, fetal hypoxia, acidosis, fetal brain damage, and intrauterine fetal death or early neonatal death.<sup>3</sup>

The overall incidence of umbilical cord prolapses from studies range from 1 to 6 per 1000 deliveries (0.14% to 0.62%).<sup>4</sup> A study done in the United States of America revealed an incidence of 0.2%.<sup>7</sup> France, Singapore, and

Turkey have similar incidences between 0.12% and 0.14%.<sup>5</sup>

Risk factors such as malpresentation, abnormal lie, prematurity, multiparity, polyhydramnios, and multiple gestation (with second usually more involved) have also been identified. Others include fetal congenital anomaly, pelvic tumors, marginally sited umbilical cord in a low lying placenta, abnormal long umbilical cord (length of >75 cm), spontaneous premature or prelabor rupture of membrane, amniotomy, and external cephalic or internal podalic version have all been associated with umbilical cord prolapse.<sup>6</sup> Diagnosis of umbilical cord prolapse is basically clinical and the outcome is dependent on the promptness and appropriateness of the interventions adopted to alleviate fetal cord compression, resuscitate the fetus in utero and expedite delivery.<sup>1</sup>

The objective of this study is to identify the risk factors of umbilical cord prolapse. This helps in immediate diagnosis of the condition and also helps in decreasing the perinatal morbidity by immediate intervention. As the fetal compromise decreases with immediate termination of pregnancy, survival of the fetus is better.

**METHODS**

This is a retrospective study, that included 45 women who presented with umbilical cord prolapse in women beyond 28 weeks of gestation at R. L. Jalappa hospital, a tertiary care centre in Karnataka, between June 2021 to June 2022. The necessary permission from the ethical and research committee was obtained for the study. All study participants provided their written informed consent. The study included women with singleton or twin pregnancy, more than 28 weeks of gestation who presented to the institute with umbilical or prolapse or who had umbilical cord prolapse during rupture of amniotic membrane. Women without umbilical cord prolapse were not included in the study. The gestational age and the setting at which the cord accident occurred as well as the predisposing factors, diagnosis–delivery interval, mode of delivery, and the fetal outcome were also noted.

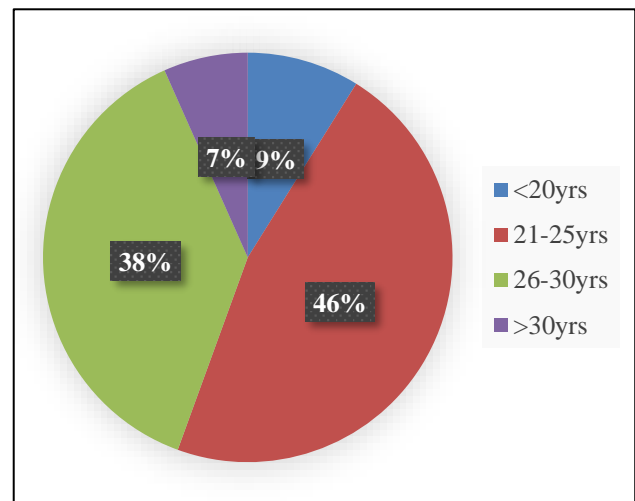
Data was entered into MS Excel and analysed using SPSS software, version 22. Chi- square test was used as test for significance. Continuous data was represented as mean and standard deviation. Independent t test was used as test of significance to identify the mean difference. P<0.05 was considered statistically significant.

**RESULTS**

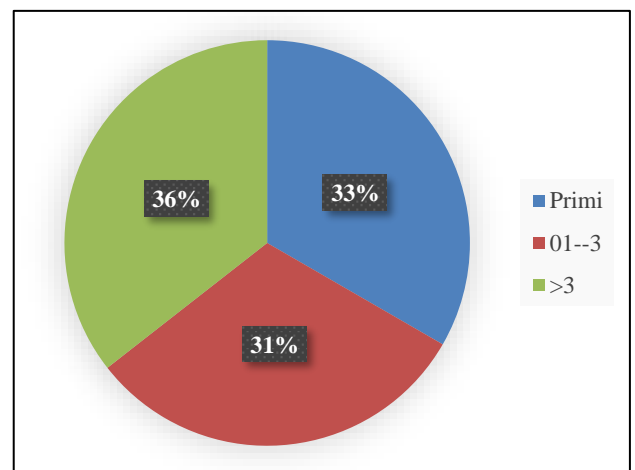
The incidence of cord prolapse was 1% in the tertiary care centre where the study was conducted. The study was conducted in a tertiary care centre over a period of one year. In this study, the maximum number of patients were in the age group between 21 to 25 years of age, accounting for upto 46.7% (Figure 1). Maximum number of umbilical cord prolapse were seen in patients who were multigravida

i. e., gravida 3 and above. Accounting upto 35.6% of the study population (Figure 2). Hence, multigravida can be considered as a risk factor for umbilical cord prolapse.

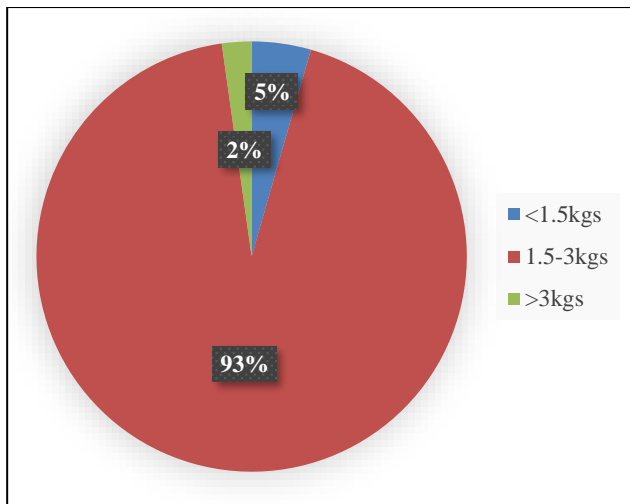
Around 64.4% of the women were term with gestational age ranging from 36 to 40 weeks. 93.3% of the babies were weighing 1.5 to 3 kg (Figure 3). With 77.8% having an APGAR score of >7 at 5 minutes after birth due timely intervention. Out of the 45 cases 43 cases were singleton pregnancies and 2 were twin pregnancy, where the twin 1 was delivered outside and the patient was referred to the tertiary care centre in view of umbilical cord prolapse of the second twin. 38 cases were of vertex presentation (84.4%). The diagnosis to delivery interval of maximum number of cases were 10 to 30 mins (66.7%) (Figure 4). The fast action could be possible to the good infrastructure of the centre in which the study was conducted. The rate of caesarean section among them was 60%. 5 babies were dead (11.1%), where the diagnosis and the delivery interval was more. The babies that were delivered within 30 minutes of diagnosis of umbilical cord prolapse had survived.



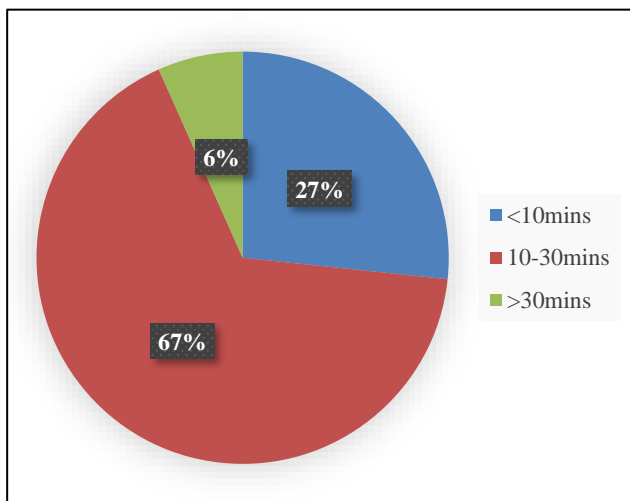
**Figure 1: Distribution of subjects according to age group.**



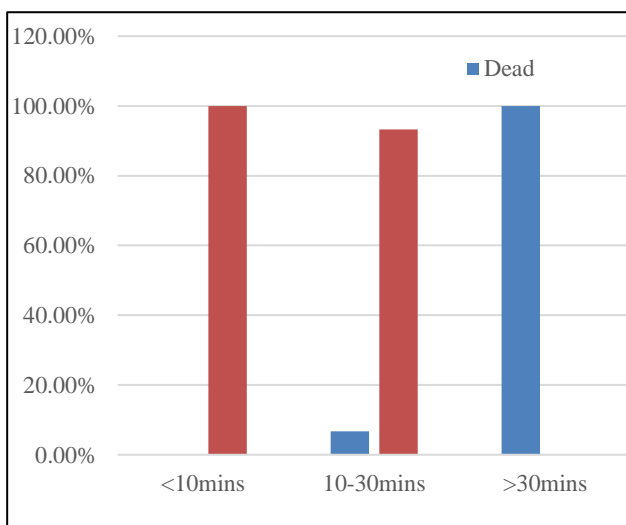
**Figure 2: Distribution of subjects according to parity.**



**Figure 3: Distribution of subjects according to birth weight.**



**Figure 4: Distribution of subjects according to diagnosis to delivery.**



**Figure 5: Perinatal outcome in relation to the diagnosis to delivery interval.**

## DISCUSSION

This study assessed the perinatal outcome in a tertiary care centre. Total of 45 cases were included in the study over a period of one year, after taking informed consent from each of them. Umbilical cord prolapse is an obstetrics emergency leading to significant perinatal mortality or long-term neurological morbidity. The incidence of umbilical cord prolapse in this tertiary care centre was 1% over one year. This represents the cases of overt cord prolapse in the hospital or among the cases that were referred to the hospital from primary health centres in view of cord prolapse.

In this study, 66% of the cases were multigravida cases, whereas in a study conducted in Nigeria as high as 78.3% cases were multigravida. Multiparity has been associated with an increased relaxation of the uterine myometrium, degenerative changes in the endometrium, and laxation of the anterior abdominal wall.<sup>2</sup> These associations are the risk factors for abnormal presentation, abnormal lie, abnormal placentation, and premature rupture of fetal membrane that as well predispose a multigravida woman to cord prolapse.

Abnormal presentation accounted for only 15% of the cases in this study which is lower than 53% in a study done in Pakistan.<sup>6</sup> Prematurity was however associated with 24.4% of the cord prolapse in this study.

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.<sup>7</sup> 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.

Perinatal mortality was 11.1% which was much lesser compared to the studies conducted in Africa and other South East Asian countries, which were as high as 36% to 91%.<sup>7,8</sup>

The ideal intervention on the event of cord prolapse with fetus alive is prompt delivery by the fastest route.<sup>9</sup> The choice and the promptness of such intervention constitute important determinants of the fetal outcome. The factors affecting the immediate management of cord prolapses include fetal viability, fetal maturity, and the presence of any significant life-threatening anomaly. Emergency delivery is recommended for a live and mature fetus. In the first stage of labor with partially dilated cervix, a cesarean section is the only way to achieve early delivery.<sup>10,11</sup>

In this study, 27 (60%) fetuses were delivered by cesarean section, 18 (40%) by spontaneous vaginal delivery.

The diagnosis-delivery interval has been observed to be directly related to the degree of asphyxia suffered by a

fetus during cord prolapse and therefore noted as a determinant of fetal outcome. The German society of gynecologists and Obstetricians recommend a maximum decision to delivery time of 20 min to achieve a favorable fetal outcome.<sup>12</sup> The presence of any significant life-threatening anomaly. Emergency delivery is recommended for a live and mature fetus. In the first stage of labor with partially dilated cervix, a cesarean section is the only way to achieve early delivery.<sup>13</sup>

In this study, the fetuses that were born within 30 minutes of diagnosis of umbilical cord prolapse has all survived with a average of 77% babies having an APGAR score of >7 after 5 minutes of birth. Around 80% of the cases were delivered within 30 minutes of the diagnosis of umbilical cord prolapse, and out of them 26.7% was within 10 minutes of the diagnosis. The efficiency of the neonatal care, maternal health status, the fetal maturity, and other fetal intrinsic factors also contribute the perinatal outcome.

Filling of the bladder with normal saline, knee chest position of the mother are some of the resuscitative measured followed in cases of umbilical cord prolapse.<sup>14,15</sup> A high index of suspicion and recognition of predisposing factors during antenatal care period may allow for early detection and timely delivery, thereby minimizing perinatal morbidity and mortality. Emergency delivery and prompt resuscitation of the neonate is associated with decreased risk of perinatal mortality and long-term neurological complication.

Limitation of the study was that, the study was done in a tertiary care centre. They were many referred cases of umbilical cord prolapse, where the exact time of prolapse is unknown. Also, the sample size of the study is limited.

## CONCLUSION

Umbilical cord prolapse is associated with very high risk of perinatal mortality. This study showed that early diagnosis, prompt delivery of the baby, immediate resuscitation of the neonate is required to reduce the chances of neonatal mortality.

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