Preterm delivery: a single hospital experience

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Abstract

Objectives: The aim of this study was to evaluate relation of preterm delivery with mother’s age, premature rupture of amniotic sac, number of spontaneous vaginal deliveries or Cesar-ean sections (C-sections), Apgar score in the first and the fifth minute, as well as birth weight of newborns.

Methods: The study was retrospective, comparative, and data were obtained at the Clinic of Obstetrics and Gynecology of the University Clinical Centre Sarajevo for the period from October 2013 through February 2014. The sample was divided into two groups based on the timing of delivery: preterm delivery group (before 37th week of pregnancy) and term delivery group (after 37th week of pregnancy). The standard methods of descriptive statistics and the univariate analysis were performed.

Results: Univariate analysis showed that there was no significant association of mother’s age with preterm delivery (OR=1.02, CI: 0.94, 1.10; p=0.72). Rupture of fetal membranes was 4.53 times more frequent in preterm compared to term delivery group (OR=4.53, CI: 1.95, 10.51, p<0.001) while C-section was 9.8 times more frequent (OR=9.80, CI: 3.34, 36.14; p<0.001) times more frequent in preterm compared to term delivery group. Severely depressed Apgar score (0-3) was 84% more frequent in the first and 52% more frequent in the fifth minute after preterm compared to term delivery. Low birth weight (<2500g) was associated with preterm delivery group (OR=3.78, CI: 1.75, 9.33, p<0.001).

Conclusion: Significant association of preterm deliveries with rupture of fetal membranes, C-section, severely depressed one-minute Apgar score (0-3) and low birth weight was documented.

Keywords: premature membranes rupture, Apgar score, Cesar-ean section

Introduction

The amniotic sac is composed of an inner and an outer membrane. The outer layer (chorion) is formed by trophoblasts, while the inner layer (amnion) is formed by embryoblasts. The amniotic sac (also called fetal membranes) surrounds the fetus and provides shelter from traumatic external influences, prevents dehydration, compression of the umbilical cord and gives room for the child to move and grow. Besides, the amniotic fluid is necessary for the development of the lungs. Premature rupture of membranes (PROM) refers to rupture of the fetal membranes prior to the onset of delivery irrespective of gestational age (GA). According to the literature, it occurs in 1% to 2% of all pregnancies. However, a preterm premature rupture of the membranes (PPROM) occurs before the 37th week of pregnancy and it is the reason for 30% of preterm deliveries [1]. Since PPROM is associated with lower latency from membrane rupture until delivery, it is an important cause of perinatal morbidity and mortality [2,3]. Gestational rupture of membranes earlier than 37th weeks of GA, places the mother and the fetus at increased risk of short-term and long-term morbidity and mortality [4]. Preterm delivery is the most significant problem in current obstetric practice and according to the World Health Organization, is the direct cause accounting for 24% of neonatal deaths. Rates of preterm delivery range between 7-16% and are similar worldwide [5]. New research suggests that the mode of delivery of very preterm infants whether vaginally or by Caesar-ean section has little effect on neonatal outcomes [6]. We undertook this study as a single hospital experience of association between preterm delivery and maternal, birth, and neonatal characteristics.
Patients and methods

Retrospective study was based on the clinical records obtained at the Clinic of Obstetrics and Gynecology of the University Clinical Centre Sarajevo, in the period from October 2013 through February 2014. The total sample of this study consisted of 100 patients, which were divided into two groups of 50, depending on whether the delivery was made before 37th gestational week (preterm delivery) or after 37th gestational week (term delivery). In each group we analyzed mother’s age, duration of the pregnancy, the condition of the amniotic sac before the delivery and whether the delivery was spontaneous vaginal (SVD) or carried out by C-section. Apgar test scores were recorded at one minute and five minutes after birth and scores of 0 to 3 were designated as severely depressed. Low birth weight was defined as a birth weight of a live born infant of less than 2500g regardless of GA.

Statistical analysis was performed using SPSS software (version 16.0, SPSS Inc., Chicago, Illinois, USA). Continuous variables without normal distribution were expressed as median and interquartile range, and categorical variables as percentages. Significant associations were determined using univariate analysis, and data were presented as odds ratio (OR) with 95% confidence intervals (CI). All p values less than 0.05 were considered statistically significant.

Results

In our study, median values of mother’s age were 29 years in both groups. In the preterm delivery group mother’s age ranged from 17 to 40 years and in the term delivery group ranged from 20 to 42 years. Fetal membranes were 66% ruptured and 34% intact in preterm delivery group while 30% ruptured and 70% intact in the term delivery group. C-section was mode of delivery in 46% of cases in the preterm delivery group and in only 8% of cases in term delivery group. Spontaneous vaginal delivery was the main mode of delivery in both study groups, counting 92% of all deliveries in term delivery group and 54% in preterm delivery group. Median values of one-minute Apgar score were 6 in preterm delivery and 9 in term delivery group. Five-minute Apgar score median value was 8 in preterm and 10 in term delivery group. Median value of birth weight was significantly lower in preterm compared to the term delivery group. The summary of our results is shown in Table 1.

Univariate analysis showed that there was no significant association of mother’s age with preterm delivery (OR=1.02, CI: 0.94, 1.10; p=0.72). Rupture of fetal membranes was 4.53 (OR=4.53, CI: 1.95, 10.51; p<0.001) while C-section was 9.8 (OR=9.80, CI: 3.34, 36.14; p<0.001) times more frequent in preterm compared to term delivery group. Severely depressed Apgar score (0-3) was 84% (OR=1.84, CI: 1.01, 03.35; p=0.046) more frequent in the first and 52% (OR=1.52, CI: 0.72, 2.98; p=0.29) more frequent in the fifth minute after preterm compared to term delivery. Low birth weight (<2500g) was associated with preterm delivery group (OR=3.78, CI: 1.75, 9.33, p<0.001) (Table 2).

Table 2. Association of preterm delivery with maternal, birth, and neonatal characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Preterm delivery*</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.02 (0.94, 1.10)</td>
<td>0.72</td>
</tr>
<tr>
<td>Rupture of fetal membranes</td>
<td>4.53 (1.95, 10.51)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>C-section</td>
<td>9.80 (3.34, 36.14)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Apgar 1 min (0-3)***</td>
<td>1.84 (1.01, 03.35)</td>
<td>0.046</td>
</tr>
<tr>
<td>Apgar 5 min (0-3)***</td>
<td>1.52 (0.72, 2.98)</td>
<td>0.29</td>
</tr>
<tr>
<td>Low birth weight (&lt;2500 g)</td>
<td>3.78 (1.75, 9.33)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Univariate analysis.
CI denotes confidence interval.
***Infants with Apgar score of 7-10 served as the reference group.

Table 1. Maternal, delivery and neonatal characteristics

<table>
<thead>
<tr>
<th>Characteristics /Group</th>
<th>Preterm delivery (&lt;37GW*)</th>
<th>Term delivery (&gt;37GW*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yr*</td>
<td>29 (17, 40)</td>
<td>29 (20, 42)</td>
</tr>
<tr>
<td>Fetal membranes %</td>
<td>Ruptured 66</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Intact 34</td>
<td>70</td>
</tr>
<tr>
<td>Delivery %</td>
<td>SVB 54</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>C-section 46</td>
<td>8</td>
</tr>
<tr>
<td>Apgar 1 min, raw score**</td>
<td>6 (4, 8)</td>
<td>9 (9, 10)</td>
</tr>
<tr>
<td>Apgar 5 min, raw score**</td>
<td>8 (7, 8)</td>
<td>10 (10, 10)</td>
</tr>
<tr>
<td>Birth weight, g**</td>
<td>1645 (1250, 2100)</td>
<td>3600 (3250, 3850)</td>
</tr>
</tbody>
</table>

Numbers are percentage for categorical variables, median and range (*) or median and interquartile range (**) for non-normally distributed variables.
GW denotes gestational weeks.

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DISCUSSION

In our study of preterm delivery, mother’s age varied from 17 to 42 years and there was no significant association of mother’s age with preterm delivery. This does not coincide with the research of Noor et al. [7], who found that the largest number of deliveries with premature rupture of membranes was in the age group 15-25 years. This can be attributed to traditional and cultural customs which result in earlier marital relationships and consequently higher exposure to infections and other risk factors. In our study, rupture of fetal membranes was 4.53 times more frequently associated with preterm delivery which is in accordance with earlier observations that premature rupture of fetal membranes leads to preterm delivery [8]. The incidence of premature rupture of fetal membranes is about 10% of all births [9]. In our study C-section was 9.8 times more frequent in preterm delivery, which is consistent with the results of Brkičević et al. [8] but not with the study of Kirmizi et al. [10] in which vaginal delivery was significantly higher in patients with premature rupture of membranes than in the term delivery group (p<0.05). In our study severely depressed Apgar score (0-3) was 84% more frequent in the first and 52% in the fifth minute after preterm delivery. Amany Abd Elmegeed et al. obtained similar results [11]. We showed that low birth weight (<2500g) was 3.78 times more frequent in preterm infants which is in accordance with the study of Kirmizi et al. [10]. In contrary, Adeniji et al. found no statistically significant differences between birth weight among children born prematurely compared to children born on time [12]. Potential explanation is that their study was conducted in patients with rupture of the membranes between after 34th weeks of gestation, whereas our study included patients under the gestational age of 34th week, who have significantly higher risk of having children with lower body weight. This study has some limitations. It was conducted on the relatively small study population. More comprehensive approach would include larger study population at different levels of health care.

CONCLUSION

This single hospital study showed significant association of preterm deliveries with rupture of fetal membranes, C-section, severely depressed one-minute Apgar score (0-3) and low birth weight was documented. Apgar score improved at the 5th minute after delivery.

DECLARATION OF INTEREST

Authors declare that they have no conflict of interest.

References