Effect of Stripping of the Umbilical Cord Blood towards the Baby at Birth on Hematological and Developmental Outcome in Infants

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Abstract: Background- The base for common practice of cutting the umbilical cord after birth is in view of either that there is very little or no benefit by additional placental transfusion to the newborn. Active milking of the umbilical cord towards the baby prior to clamping (rather than passive) should take less than 10 seconds to perform and should resuscitation. Objectives1. Asses the selected neonatal and infant and developmental outcomes of the newborn after stripping of the umbilical cord blood at birth in interventional group. 2. Asses the selected neonatal and infant and developmental outcomes of the newborn in control group. To compare the effectiveness of selected neonatal and infant and developmental outcomes in interventional group and control group. Method- the sampling technique used was randomization. Results: Majority (56%) of the newborns were male and (44%) female in the experimental group and 60% male and 40% female in the control group. The post test Mean PCV at 6months, 9months and 12months study group was 36.84, 35.56, 35.88 and control group was 32.22, 28.90, and 26.80. - DDST-II the revised denvers developmental screening tool as per the percentile presentation ages of p25, p50, p75, and p90 readings of infants from study group for gross motor milestones showed that there are lift head up 45 degree at 2months milestones, sit head steady at 4months, chest up arm supported at 5months, roll-over 5 months, pull to sit no head lag 6months, is in advanced stage when compared to that of control group milestones. Language milestones showed that Vocalizes jabbbers at and make sound OOO/AAH at one month at p50, p75 and p90 and laughs, Dada/mama specific by one year at p75 and p90 is in advanced stage Squeals at 4months, Dada/mama Non specific at 7months is delayed at of p25, p50, p75 and p90 readings, Imitate speech sounds is delayed at p50. Conclusion- Stripping of the umbilical cord towards the baby at birth is a safe, simple and low cost delivery procedure. Early screening using DDST-II is a valuable test for immediate and late infant developmental outcome to detect early developmental delays.

Key words: Effect, stripping of umbilical cord, hematological outcomes, infant developmental outcomes, DDST-II.

I. Introduction

An Umbilical cord blood is a baby’s life blood until birth. The base for common practice of cutting the umbilical cord after birth is in view of either that there is very little or no benefit by additional placental transfusion to the newborn. Active milking of the umbilical cord towards the baby prior to clamping (rather than passive) should take less than 10 seconds to perform and should resuscitation. It is therefore important to develop cost effective interventions to improve hematologic status of millions of children affected by this condition worldwide. Bridging the “know-do” gap, it is time to reexamine stripping of umbilical cord towards the baby as a selective intervention to prevent anemia and iron deficiency in infancy.

II. Materials and Methods

Setting of the study: The study was conducted in MGM Hospital, Kalamboi and NMMC vashi. The population -In this study the target population consist of mothers who have undergone normal delivery and their full term neonates. Sample –In this study sample size (50) consisted of 25 neonates in control group, and 25 neonates in intervention group. Randomization done using computer generated randomized numbers. Inclusion criteria-Full term neonates delivered by normal vaginal delivery. Exclusion criteria -Mothers with very high risk pregnancy. (PIH, Severe Heart Disease, Gestational Diabetes Mellitus, Multiple...
Pregnancy, Rh-ISO Immunization, Severe Anemia), Severe birth asphyxia (Meconium aspiration syndrome, Cord prolapsed, Very low birth weight babies, Major congenital anomalies or chromosomal anomalies in the fetus. Procedure -Informed written consent was taken after fulfilling eligibility criteria-The screening proforma was completed for every pregnant woman screened for enrollment to the study. A structured questionnaire was used to gather obstetrical and medical details of patients. Baseline maternal data with regard to age, medicinal iron intake, parity, socioeconomic data, and detailed medical history was noted for all women. Detailed obstetric history was taken from all participants to recognize any high risk factors for PPH. The diagnosis was noted. Delivery outcome of all eligible participants was monitored. Stripping of umbilical cord Interventional protocol-Investigator accompanied the mothers as they were shifted to labour room for delivery.1. Informed the obstetrician the mother belongs to study group. 2. Normal preparations for full term normal vaginal delivery will be made.3. Once the baby is born he or she will be placed below the level of the placenta. The cord should remain unclamped until cord stripping is completed.4. Approximately 20 cm of cord will be stripped by hand from the mother towards the baby. 5. The cord will be stripped by compressing it between two fingers and pushing blood along the cord vessels towards the infant. This will be done swiftly 3 times at a rate of approximately 10cm/second.6. The procedure will not take no longer than 10 seconds to complete.7. The cord will be then be clamped and cut and normal resuscitation and care are commenced Standard care was provided if women refused to participate in the study at any time. Baseline physiological and anthropometric data with regard to birth weight, sex, gestational were recorded in all cases.

Statistical Analysis: The subject ID assigned to the enrolled women identified all the data. The data was regularly transmitted to the computer in MS excel data base and stored on email. Data will be analyzed using SPSS 19. All the data were expressed as mean, standard deviation (SD), range, Percentage using tables, graphs or charts along with Inferential and descriptive statistics. The level of significance will be set at 0.05. Comparison of control and study group p25, p50, and p75 and p90 milestone is done by Independent sample t test or unpaired t test.

Ethical clearance: The ethical permission was issued by IERC of M.G.M. University of Health Sciences.

III. Results

Table 1

<table>
<thead>
<tr>
<th>PCV levels</th>
<th>Mean</th>
<th>S. D.</th>
<th>df</th>
<th>t cal</th>
<th>t tab</th>
<th>p value</th>
<th>Significant At 5% Level (P&lt;0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>39.44</td>
<td>6.36</td>
<td>48</td>
<td>0.57</td>
<td>2.01</td>
<td>0.567</td>
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</tr>
<tr>
<td>Study</td>
<td>40.44</td>
<td>5.88</td>
<td>48</td>
<td>0.57</td>
<td>2.01</td>
<td>0.567</td>
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</tr>
<tr>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>32.22</td>
<td>5.12</td>
<td>48</td>
<td>3.81</td>
<td>2.01</td>
<td>0.000</td>
<td>yes</td>
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<tr>
<td>Study</td>
<td>36.84</td>
<td>3.23</td>
<td>48</td>
<td>3.81</td>
<td>2.01</td>
<td>0.000</td>
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</tr>
<tr>
<td>9 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>28.90</td>
<td>3.91</td>
<td>48</td>
<td>7.64</td>
<td>2.01</td>
<td>0.000</td>
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<tr>
<td>Study</td>
<td>35.56</td>
<td>1.91</td>
<td>48</td>
<td>7.64</td>
<td>2.01</td>
<td>0.000</td>
<td>yes</td>
</tr>
<tr>
<td>12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>26.80</td>
<td>3.31</td>
<td>48</td>
<td>12.34</td>
<td>2.01</td>
<td>0.000</td>
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<tr>
<td>Study</td>
<td>35.88</td>
<td>1.59</td>
<td>48</td>
<td>12.34</td>
<td>2.01</td>
<td>0.000</td>
<td>yes</td>
</tr>
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</table>

Compare the effectiveness of late infant physiological outcome among study group and control group: The calculated t value for Physiological parameter PCV levels on 6 mths, 9 mths and 12 mths is 3.81, 7.64 and 12.34 respectively which is statistically significant as they are more than the table ‘t’ value of 2.01 hence null hypothesis (H0) is rejected and alternate hypothesis (H1) accepted for them. There is significant improvement in PCV levels on 6, 9 and 12 mths readings among study when compared to control group subjects. The mean of study group is more than that of control group, thus proving the effectiveness of stripping of umbilical cord

Compare the effectiveness of infant gross motor developmental outcome among study group and control group: The gross motor milestone assessed of items among study group and control group at p25, p50, p75 and p90 percentile on lifts head up 45 degree and Chest up - arm supported had advanced outcome and head up 90 degree had delayed outcome at p50, p75 and bears weight on legs had delayed outcome at p25, p50, p75.

Compare the effectiveness of infant developmental outcome with language milestone among study group and control group: The language milestone assessed of items among study group and control group at p25, p50, p75 and p90 percentile were delayed in squeals and dada mama-non specific and turns to rattling sound had no significant difference.

Compare the effectiveness of infant DDST-II developmental outcome with fine motor milestone among study group and control group: The fine motor milestone assessed of items among study group and control group at p25, p50, p75 and p90 percentile were advanced in follow midline and hands together at p50, p75 and p90 and grasp rattle delayed at p25, p50.
The short-ants 48 1 als ere divided into two groups: early cord clamp time within 15 s (n=70) or delayed cord clamp time [15 s after delivery (n=30)]. The mean infant hemoglobin (Hgb; 16.08 gm/dL vs. 14.5 gm/dL; P<0.001)  

In a survey in India, 70% of infants between 6 and 11 months of age were found anemic.  

Nevertheless, methodological limitations of older studies hindered the adoption of UCM as a standard of care. A more recent series of studies assessed the safety and efficacy of UCM. Clamping the cord before 2–3 minutes is likely to restrict placental transfusion. The short-term and long-term effects of this simple intervention remain unclear. 


discussion

In a survey in India, 70% of infants between 6 and 11 months of age were found anemic. Iron stores at birth are a major factor influencing growth and the occurrence of iron deficiency anemia (IDA) during infancy. IDA in infancy is of particular concern because of potentially detrimental effects on physical and cognitive development.  

Table 2

Significant difference in percentiles of infant DDST-II developmental outcome for Personal and social milestone between control and interventional group

<table>
<thead>
<tr>
<th>Work for toy</th>
<th>Mean</th>
<th>S. D.</th>
<th>SEMD</th>
<th>t value</th>
<th>p value</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>P25 Control</td>
<td>4.18</td>
<td>.107</td>
<td>0.08</td>
<td>-1.75</td>
<td>0.106</td>
<td>No</td>
</tr>
<tr>
<td>Study</td>
<td>4.32</td>
<td>.180</td>
<td>0.068</td>
<td>-2.37</td>
<td>0.012</td>
<td>D</td>
</tr>
<tr>
<td>P50 Control</td>
<td>4.28</td>
<td>.136</td>
<td>0.13</td>
<td>-0.68</td>
<td>0.409</td>
<td>No</td>
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<tr>
<td>Study</td>
<td>4.46</td>
<td>.206</td>
<td>0.31</td>
<td>-0.85</td>
<td>0.402</td>
<td>No</td>
</tr>
<tr>
<td>P75 Control</td>
<td>4.54</td>
<td>.441</td>
<td>0.17</td>
<td>-0.28</td>
<td>0.778</td>
<td>A</td>
</tr>
<tr>
<td>Study</td>
<td>4.64</td>
<td>.341</td>
<td>0.17</td>
<td>-0.28</td>
<td>0.778</td>
<td>A</td>
</tr>
<tr>
<td>P90 Control</td>
<td>4.68</td>
<td>.509</td>
<td>0.14</td>
<td>-0.85</td>
<td>0.402</td>
<td>No</td>
</tr>
<tr>
<td>Study</td>
<td>4.80</td>
<td>.469</td>
<td>0.17</td>
<td>-0.28</td>
<td>0.778</td>
<td>A</td>
</tr>
</tbody>
</table>

Compare the effectiveness of infant DDST-II developmental outcome with personal social milestone among study group and control group: The personal social milestone assessed of items among study group and control group at P25,P50,P75 and P90 percentile were advanced in feed self, play pat a cake ,indicates want delayed at P25,P50,P75 and P90 and work for toy delay at p50 percentile
and hematocrit (Hct 47.6 vs. 42.8; P<0.001) levels were significantly higher in the delayed clamping group. McDonald et al., P. J. and P. Middleton, 2008 studied on “the Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes”. Andersson et al. 2011 studied the “Effect of delayed versus early umbilical cord clamping on neonatal outcomes and iron status at 4 months: a randomized controlled trial”. 400 full term infants were randomized to delayed umbilical cord clamping (3 minutes after delivery) or early clamping (> 10 seconds after delivery). The result shows that there was significant difference in the level of ferritin between the groups at 4 months. This intervention has not only been proven effective, but it is cost-free, making it a particularly appropriate and sustainable intervention for low-resource areas of the world. The available cord milking studies of term infants (8 controlled trials and 1 randomized controlled trial) conclude that cord milking significantly improves hematocrit and hemoglobin levels in the first few days of life when compared with ICC, with no associated harm.

Development is a dynamic process. Anemia in six-to-nine month olds raises the concern that birth iron stores in some infants are inadequate to sustain growth and development through the first six months of life. Ontivero et al. 2017, found differences between gender in the items “Crawls” and “Runs”, and they concluded that a high socioeconomic level and the stimulation available in the home both favor the early acquisition of motor behaviors. The items in the Personal-Social Area presented later in our study than indicated in the Denver II and in studies in Alaska, Brazil, Trinidad and Tobago, and Singapore. For example, Wijedasa 2020 estimated delays from 10 months of age with more than a month’s difference compared to the Denver II Fine Motor-Adaptive and Personal-Social areas were the most similar to that proposed by the Denver II, although Fine Motor-Adaptive deviated towards the right in the timeline by the advances. We found delay in personal/social, fine motor, and language development skills. Oski et al. 1978, found a significant increase in Mental Development Index scores (21.6 points) in infants aged 9 to 12 months with iron deficiency. These results indicated that iron deficiency, even in the absence of anemia, results in biochemical alterations that impair behavior in infants. Among 12 studies that Iron deficiency is associated with hypomyelination and less favorable developmental outcomes but long-term effects related to placental transfusion have not been studied. Iron supplementation in term infants is associated with improved neurodevelopmental outcome at 12 and 24 months of age. Fine motor milestones in our study showed that the Follows midline at one month, looks for yarn, hands together at 4 months advanced at , p50, p75 and p90, Follows 180 degree at 5 months, pass a cube, put block in a cup above 12 months delayed at p25, p50, p75, p90 readings for personal social milestones showed that the smiles responsively and spontaneously at 2 months, play pat a cake at 10 months and feeds self advanced at 10 months at, p50, p75 and p90. Conclusions: Child development is a dynamic process and is often hard to measure by its very nature. The findings of the study revealed that stripping of the umbilical cord towards the baby at birth is a safe and effective procedure and it improved hematocrit levels among term infants. The Denver Developmental Screening Test an easy clinically useful tool for the early identification of infants with developmental delay

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