International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 8, August 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.8.2024.87

ORIGINAL RESEARCH

Assessment of umbilical cord milking in late preterm neonates and its effects on haematological and hemodynamical parameters

[1]Dr. (Lt Col) Vinod Kumar Dagar, [2]Dr. (Maj) Amritha Lal

[1,2]Department of Pediatrics, 167 Military Hospital, India

Corresponding author
Dr. (Lt Col) Vinod Kumar Dagar
Department of Pediatrics, 167 Military Hospital, India

Received Date: 23 June, 2024 Accepted Date: 28 July, 2024

ABSTRACT

Background: One of the most prevalent issues in infancy is anemia. It affects over 24.8% of people on the planet, both in developed and developing nations. The present study was conducted to assess umbilical cord milking in late preterm neonates and its effects on haematological and hemodynamical parameters. **Materials & Methods:** 90 late preterm neonates of both genders were divided into two groups. Group I was UCM group and group II was the immediate cord clamping group (controls). Primary outcomes were measured at 48 hours of age and included hemoglobin (Hb), hematocrit (Hct), and hemodynamic parameters (heart rate, respiration rate, and mean blood pressure). **Results:** In group I and II, mean heart rate (bpm) was 147.2 and 148.9, RR (bpm) was 46.3 and 47.2, SpO2 (%) was 97.3 and 97.8, Hb (gm/dL) was 19.2 and 16.8, RBC (million/mm3) was 5.9 and 4.3, haematocrit (%) was 56.4 and 48.5, platelet (lac/mm3) was 2.09 and 2.3, total count (c/mm3) was 12389.9 and 11983.2, MCV (fL) was 102.5 and 98.7, MCH (pg) was 34.2 and 34.8, MCHC (ug/dL) was 33.9 and 36.7, total bilirubin (mg/dL) was 9.4 and 9.9 and direct bilirubin (mg/dL) was 0.63 and 0.53 respectively. The difference was significant (P< 0.05). Neonatal complications were respiratory distress of newborn in 2 in group I and 5 in group II, sepsis in 1 in group I, jaundice 2 in group II and dehydration 1 in group I and 2 in group II. The difference was significant (P< 0.05). **Conclusion:** Higher hematocrit, hemoglobin, and less need for inotropes and blood transfusions all indicate that the UCM delivers a better placental transfusion. The risk of respiratory distress syndrome may be decreased by the UCM. Therefore, UCM might be better for late preterm infants, especially for newborns who require urgent resuscitation.

Keywords: anemia, haematological, preterm

INTRODUCTION

One of the most prevalent issues in infancy is anemia. It affects over 24.8% of people on the planet, both in developed and developing nations. According to the National Family Health Survey III, 70% of children in India under the age of five are anemic.[1] Iron deficiency causes anemia in the majority of instances. Iron deficiency is the global cause of 50% of anemia. Rich in hematopoietic stem cells (HSCs), cord blood (CB) is a unique substance that helps patients' HSCs function properly and is used in transplant settings to repair hemopoiesis. There have been suggestions that between 25 and 31 weeks of gestation, CB is rich in HSCs.[2]

About half of the volume of foetoplacental blood remains outside the newborn's circulation if the umbilical cord is clamped right away at 30 weeks of gestation.[3] When compared to prenatal fetoplacental blood, it has been observed that instantaneous clamping of the umbilical cord causes a 30–50% drop in blood volume in newborn animals. "Placental transfusion" is a safer, more affordable, and practical way to lower the incidence of iron deficiency anemia.

DCC and UCM/stripping are the two birth methods that can be used to perform placental transfusion. In DCC, the chord is clamped only 30 to 180 seconds after birth, enabling the baby's blood to pass from the placenta.[4] It has been demonstrated to enhance haematological parameters in preterm and term infants. The UCM also leads to comparable increase in Hb in both premature and term infants. DCC has been shown to be safe and effective for periods ranging from 30 to 180 seconds in several systematic reviews.[5] Nevertheless, this hampered the effectiveness of resuscitation and brought about grave side effects, particularly in newborns in need of

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immediate resuscitation. UCM is an alternative to this method that involves milking or stripping newborns in order to give them more blood from the umbilical cord.[6] The present study was conducted to assess umbilical cord milking in late preterm neonates and its effects on haematological and hemodynamical parameters.

MATERIALS & METHODS

The present study was conducted on 90 late preterm neonates of both genders. Parents were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. They were divided into two groups. Group I was UCM group and group II was the immediate cord clamping group (controls). In the, the baby's umbilical cord was milked shortly after delivery. The cord was clamped and cut right away in the ICC group. Primary outcomes were measured at 48 hours of age and included hemoglobin (Hb), hematocrit (Hct), and hemodynamic parameters (heart rate, respiration rate, and mean blood pressure). Additionally noted were clinical factors such as oxygen demand, respiratory distress, polycythemia, and jaundice necessitating phototherapy. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Assessment of parameters

Parameters	Group I	Group II	P value
Heart rate (bpm)	147.2	148.9	0.05
RR (bpm)	46.3	47.2	0.02
SpO2 (%)	97.3	97.8	0.04
Hb (gm/dL)	19.2	16.8	0.87
RBC (million/mm^3)	5.9	4.3	0.71
Haematocrit (%)	56.4	48.5	0.84
Platelet (lac/mm^3)	2.09	2.3	0.24
Total count (c/mm^3)	12389.9	11983.2	0.93
MCV (fL)	102.5	98.7	0.03
MCH (pg)	34.2	34.8	0.84
MCHC (ug/dL)	33.9	36.7	0.74
Total bilirubin (mg/dL)	9.4	9.9	0.11
Direct bilirubin (mg/dL)	0.63	0.53	0.13

Table I, graph I shows that in group I and II, mean heart rate (bpm) was 147.2 and 148.9, RR (bpm) was 46.3 and 47.2, SpO2 (%) was 97.3 and 97.8, Hb (gm/dL) was 19.2 and 16.8, RBC (million/mm3) was 5.9 and 4.3, haematocrit (%) was 56.4 and 48.5, platelet (lac/mm3) was 2.09 and 2.3, total count (c/mm3) was 12389.9 and 11983.2, MCV (fL) was 102.5 and 98.7, MCH (pg) was 34.2 and 34.8, MCHC (ug/dL) was 33.9 and 36.7, total bilirubin (mg/dL) was 9.4 and 9.9 and direct bilirubin (mg/dL) was 0.63 and 0.53 respectively. The difference was significant (P< 0.05).

Graph I Assessment of parameters

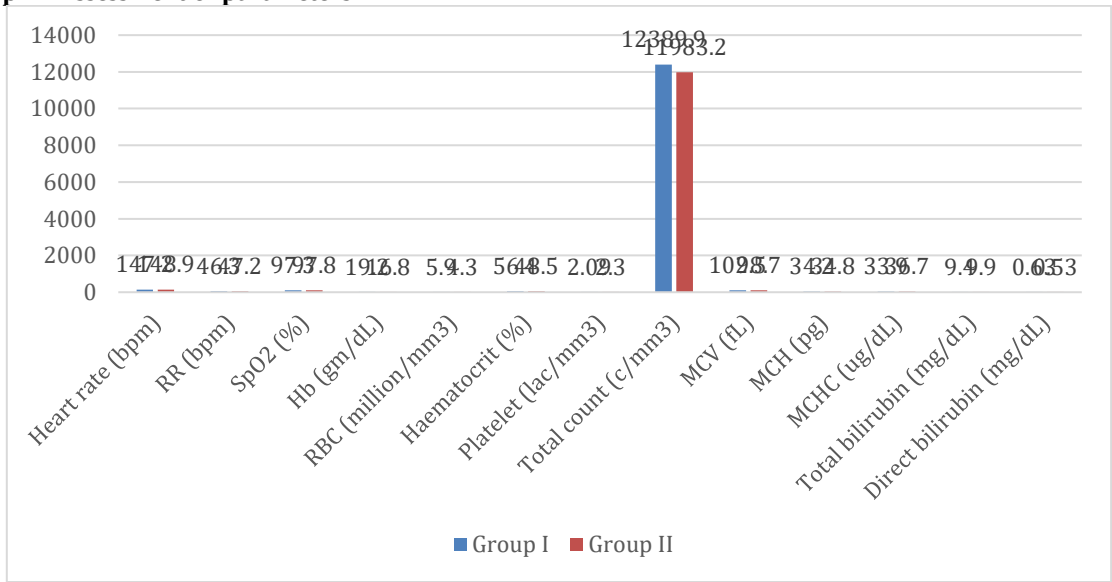

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Table II Neonatal complications

Complications	Group I	Group II	P value
Respiratory distress of newborn	2	5	0.75
Sepsis	1	0	
Jaundice	0	2	
Dehydration	1	2	

Table II shows that neonatal complications were respiratory distress of newborn in 2 in group I and 5 in group II, sepsis in 1 in group I, jaundice 2 in group II and dehydration 1 in group I and 2 in group II. The difference was significant (P< 0.05).

DISCUSSION

Ten percent or so of newborns are born prematurely. Global reports indicate that there are 15 million preterm newborns born each year, and this number is rising.[7] These demographic experiences one million deaths each year as a result of preterm birth outcomes.[8] Most of the remaining people suffer from a permanent condition such a learning, visual, or hearing impairment.[9,10] The present study was conducted to assess umbilical cord milking in late preterm neonates and its effects on haematological and hemodynamical parameters.

We found that in group I and II, mean heart rate (bpm) was 147.2 and 148.9, RR (bpm) was 46.3 and 47.2, SpO2 (%) was 97.3 and 97.8, Hb (gm/dL) was 19.2 and 16.8, RBC (million/mm3) was 5.9 and 4.3, haematocrit (%) was 56.4 and 48.5, platelet (lac/mm3) was 2.09 and 2.3, total count (c/mm3) was 12389.9 and 11983.2, MCV (fL) was 102.5 and 98.7, MCH (pg) was 34.2 and 34.8, MCHC (ug/dL) was 33.9 and 36.7, total bilirubin (mg/dL) was 9.4 and 9.9 and direct bilirubin (mg/dL) was 0.63 and 0.53 respectively. Sunil et al[11] found that there was a significant higher Hb in UCM group (19.27±2.64 gm/dL) than Immediate Cord Clamping (ICC) group (16.32±2.09 gm/dL) with p-value=0.012 and higher Hct in UCM group (55.41±5.07%) than the ICC group (48.99±5.57%) with a p-value <0.001. Hence, there was higher placental transfusion in UCM group as shown by higher Hb and Hct in UCM group. There was also higher systolic, diastolic and mean blood pressure in the UCM group as compared to ICC group. Difference for mean arterial blood pressure was about 3 mmHg and was statistically significant (p-value <0.001). Hence, UCM leads to a higher mean arterial pressure at 48 hours of life.

We found that neonatal complications were respiratory distress of newborn in 2 in group I and 5 in group II, sepsis in 1 in group I, jaundice 2 in group II and dehydration 1 in group I and 2 in group II. Alavi A et al[12] enrolled 80 pregnant women whose age of pregnancy ranged between 28 and 34 weeks. They were randomly divided into two groups. In the intervention group, an infant's umbilical cord was milked. In the control group, however, no extra action was taken. The two research groups shared similar demographic information. At the end of the study, such factors as birth hemoglobin and hematocrit levels, neonatal blood pressure and clinical symptoms including neonatal jaundice requiring a phototherapy and polycythemia 48 hours after the birth were higher in the intervention group than the control. On the other hand, the need for CPR and the volume of blood transfusion (in cc) and respiratory distress were higher in the control group than the intervention. Milking an delayed-clamping of the umbilical cord are effective in neonatal outcomes among preterm infants (28-34 weeks) and can be used as a well applicable method in hospitals to prevent he adverse effects of preterm birth The shortcoming of the study is small sample size.

CONCLUSION

Authors found that higher hematocrit, hemoglobin, and less need for inotropes and blood transfusions all indicate that the UCM delivers a better placental transfusion. The risk of respiratory distress syndrome may be decreased by the UCM. Therefore, UCM might be better for late preterm infants, especially for newborns who require urgent resuscitation.

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