



QUANTIFICATION OF UMBILICAL CORD MILKING

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ABSTRACT

Introduction: Delayed cord clamping (DCC) is recommended for premature infants to improve blood volume. An alternative to DCC is umbilical cord milking (UCM), or stripping, in which blood is pushed toward the infant several times before it is clamped to autoicous blood into the neonate.

Aims & Objectives:

1. Estimate the amount of blood per unit length of the Umbilical cord.
2. Effectiveness of Umbilical cord milking.

Materials and Methods: Infants born in SSIMS-RC, Davangere, Karnataka between Dec 2015 to Feb 2016 are taken into study. One hundred eleven newborns are analyzed. The Umbilical cord is milked after clamping and the amount of blood present quantified. Statistical analysis was done using the Mann Whitney U test. A P value of less than 0.05 was considered significant.

Results: Amount of blood obtained from Umbilical cord milking is negligible even if there is a statistically significant difference between primigravida and multigravida. The average blood per unit length in a centimeter of Umbilical cord from the entire sample was 0.16ml/cm.

Conclusion: The quantity of blood expected from umbilical cord milking after cutting (CUCM) is negligible and unlikely to improve the hemodynamic or hematological parameters of the infant. Umbilical cord milking is unlikely to improve the iron status in infants or help in their growth. Umbilical cord milking cannot be an alternative for delayed cord clamping. Metacentric and large sample study required to give recommendations on umbilical cord milking (CUCM).

KEYWORDS :**INTRODUCTION:**

Placental transfusion is accomplished in one of three ways: delayed cord clamping (DCC); milking the umbilical cord (UCM) before it gets separated from the placenta or milking the umbilical cord after cutting (CUCM). Delayed cord clamping (DCC) is recommended for preterm infants to improve blood volume. In DCC cord is clamped after a short delay (30 to 180s) after birth, which improves the iron status, reduces anemia and requirement of blood transfusion, and also provides placental stem cells to the infant without causing harm to the mother^{1,2}.

Even though DCC is advised and there is evidence for the same, there is still reluctance by the neonatologists and obstetricians to adopt it due to possible difficulty during immediate newborn resuscitation³. An alternative method to DCC is umbilical cord milking (UCM). In this, the unclamped umbilical cord is grasped, and blood is pushed by squishing the umbilical cord toward the infant several times before clamping to autoicous blood to the newborn⁴.

Kumar et al.⁵ reported increase in ferritin levels after six weeks in late preterm infants born between 32 and 36 weeks gestational age by using CUCM with three milking's of the umbilical cord after birth. It was hypothesized that UCM can improve perfusion, or systemic blood flow, in neonates by measuring superior vena cava flow and right ventricular output and could be associated with reduced neonatal morbidities compared with DCC and that UCM can stabilize blood pressure and cerebral oxygenation as measured by near-infrared spectroscopy.

Cord milking increases the neonate's initial hematocrit and can reduce the need for transfusion in the neonatal period⁶.

A study compared UCM with DCC (n = 58) in infants of 33

weeks' gestational age, and found no major clinical differences between UCM and DCC.⁷ A meta-analysis of 7 randomized controlled trials of UCM in infants of <33 weeks gestational age demonstrated that infants who underwent UCM have higher hemoglobin (Hb) and a lesser risk for oxygen requirement at 36 weeks and lower IVH of all grades in comparison with those who undergo immediate cord clamping⁸.

Considering insufficient data regarding the effectiveness of the umbilical cord milking after separation from placenta and the amount of blood expected to be transfused by this method, we designed this trial to quantify the blood per unit length of the umbilical cord in infants.

AIMS & OBJECTIVES:

1. Estimate the amount of blood per unit length of the Umbilical cord.
2. Effectiveness of Umbilical cord milking.

Study design

This is a observational study conducted in Department of the Pediatrics, SSIMS-RC, Davangere, Karnataka.

MATERIALS AND METHODS:

Infants born in SSIMS-RC, Davangere, Karnataka between Dec 2015 to Feb 2016 are taken into study. One hundred eleven newborns were analyzed. Soon after delivery, the umbilical cord was clamped and cut immediately at the placental end leaving the cord length of at least 10 cm from the umbilicus of the baby. Attending pediatrician placed the infant under radiant warmer where the cord is clamped at 2-3 cm from the umbilicus and the remaining umbilical cord was held upright and milked thrice into a bowel and later the amount of blood in the bowel was measured by syringe. The length of the umbilical cord was measured and documented along with the

amount of blood. Other details of baby and mother like gravida, birth weight and maturity of the infant were also noted.

The details were entered in an excel sheet and analyzed later. Statistical analysis was done using the Mann Whitney U test. A P value of less than 0.05 was considered significant.

RESULTS:

Table 1 shows the details of the Umbilical Cord (U Cord) length and the mean blood amount (ml) with its range in a different category. We can see that, as expected the mean blood volume is increasing with the increase in umbilical cord length.

Table 1

U cord length	Number	Mean Blood	Range
10 – 14	32	1.87	0.5–12
15 – 19	41	2.12	0.3–6
20 – 24	20	2.65	1 – 5
25 – 29	7	5.75	1.2- 16
30 – 34	4	8.72	2.5–18
>35	7	9.5	4 - 15
Total	111		

The term and preterm infants are compared for the mean birth weight and the corresponding mean blood volume per unit length in centimeter of Umbilical cord in Table 2. It is found that blood volume was marginally higher in term infant, but statistically not significant.

Table 2

Gestation	Number	Mean U. Cord length(cm)	Mean birth weight(kg)	Blood/ unit length (ml)	P value
Term	89	18.45	2.85	0.159	0.121
Pre term	22	19.86	2.13	0.149	

The amount of blood i.e. means blood volume per unit length in centimeter of Umbilical cord was compared between primigravida and multigravida in Table 3. We can see that the quantity of blood was higher in infants of multigravida than primigravida which, was statistically significant.

Table 3

Gravida	Number	Mean U. Cord length(cm)	Mean birth weight (kg)	Blood/ unit length(ml)	P value
Primi	55	17.56	2.64	0.132	0.012
Multi	56	19.87	2.76	0.181	

DISCUSSION:

The study demonstrates that the amount of blood obtained from Umbilical cord milking (CUCM) is negligible even if there is a statistically significant difference between primigravida and multigravida. The average blood per unit length in a centimeter of Umbilical cord from the entire sample was 0.16ml. Suppose you milk an umbilical cord with a length of 25cm, you expect the only 4ml of blood. This amount of blood in a 3kg infant is not expected to improve the hemodynamics and also unlikely to improve the iron status of the infant.

The study gives us information that umbilical cord milking (CUCM) is not an alternative for delayed cord clamping, and is not expected or unlikely to improve the hemodynamics of the infants. The study group is small to generalize the results, and metacentric studies are required to give recommendations on the umbilical cord management, cord clamping, and milking of the umbilical cord.

The limitations of the study are, a small group of infants are examined. It was done in a single center, and only from one particular region.

WHAT IS ALREADY KNOWN?

- Delaying of cord clamping at birth improves hematological parameters in infancy. Umbilical cord milking is an alternative for delayed cord clamping for transfer of more blood from the placenta to the infant.

WHAT THIS STUDY ADDS?

Umbilical cord milking is unlikely to improving hematological status in postnatal life in neonates.

CONCLUSION:

1. The quantity of blood expected from umbilical cord milking after cutting (CUCM) is negligible and unlikely to improve the hemodynamic or hematological parameters of the infant.
2. Umbilical cord milking after cutting is unlikely to improve the iron status in infants.
3. Umbilical cord milking after cutting (CUCM) cannot be an alternative for delayed cord clamping.

REFERENCES

1. Gupta R, Ramji S. Effect of delayed cord clamping on iron stores in infants born to anemic mothers: A randomized controlled trial. *Indian Pediatr.* 2002; 39:130-5.
2. Mathew JL. Timing of umbilical cord clamping in term and preterm deliveries and infant and maternal outcomes: A systematic review of randomized controlled trials. *Indian Pediatr.* 2011; 48:123-9.
3. Mercer JS, Erickson-Owens DA. Is it time to rethink cord management when resuscitation is needed? *J Midwifery Womens Health.* 2014; 59:635-44.
4. Katheria AC, Leone TA, Woelkers D, Garey DM, Rich W, Finer NN. The effects of umbilical cord milking on hemodynamics and neonatal outcomes in premature neonates. *J Pediatr.* 2014;164(5):1045–1050, e1041
5. Kumar B, Upadhyay A, Gothwal S, Jaiswal V, Joshi P, Dubey K. Umbilical cord milking and hematological parameters in moderate to late preterm neonates: A randomized control trial. *Indian Pediatr.* 2015;52:753-7.
6. March MI, Hacker MR, Parson AW, Modest AM, de Veciana M. The effects of umbilical cord milking in extremely preterm infants: a randomized controlled trial. *J Perinatol.* 2013;33(10):763–767.
7. Rabe H, Jewison A, Alvarez RF, et al; Brighton Perinatal Study Group. Milking compared with delayed cord clamping to increase placental transfusion in preterm neonates: a randomized controlled trial. *Obstet Gynecol.* 2011; 117(2 pt 1):205–211
8. Al-Wassia H, Shah PS. Efficacy and safety of umbilical cord milking at birth: a systematic review and metaanalysis. *JAMA Pediatr.* 2015;169(1): 18–25.