

Comparing the Effect of Topical Application of Human Milk and Dry Cord Care on Umbilical Cord Separation Time in Healthy Newborn Infants

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Received: Sep 09, 2010; Final Revision: Jun 22, 2011; Accepted: Oct 24, 2011

Abstract

Objective: Comparing the effect of topical human milk application and dry cord care on cord separation time.

Methods: This research was a randomized clinical trial study on 130 singleton and mature newborns. Newborns were placed randomly in groups of topical application of human milk and dry cord care. The umbilical separation time was compared in the two groups. Data was analyzed by SPSS software. Independent Samples t-Test, χ^2 , Fisher were used in this study.

Findings: Median time of cord separation in human milk application group (150.95±28.68 hours) was significantly shorter than dry cord care group (180.93±37.42 hours) ($P<0.001$).

Conclusion: Topical application of human milk on the remaining part of the cord reduces the cord separation time and it can be used as an easy, cheap and non invasive way for cord care.

Iranian Journal of Pediatrics, Volume 22 (Number x), June 2012, Pages: 158-162

Key Words: Dry Cord Care; Umbilical Cord; Human Milk; Separation Time

Introduction

In neonates, umbilicus is the area most susceptible for bacterial colonization^[1,2], which may occasionally lead to neonatal infections such as omphalitis and sepsis^[3]. Thus, care of the umbilical cord is important to prevent the occurrence of infection during the neonatal period. A variety of disinfectants or antibiotics for neonatal umbilical cord care have been reported: alcohol, triple dye, chlorhexidine, antibiotics, mupirocin, polybactrin, bacitracin, hexachlorophene-containing powder, silver sulphadiazine and povidone-iodine^[4-6]. However, a recommended method based on experimental evidence has yet to be established.

Regarding complications of different methods for caring umbilical cord, common recommendation of World Health Organization is to keep the umbilical cord dry^[7]. In the ground of naturally keeping dry of umbilical cord we have collected many data and this care method has been significantly supported^[8]. But there are a lot of discrepancies whether this method can be considered as the best method for caring umbilical cord^[9].

One of the methods which is used for caring umbilical cord is topical application of breast milk that has been used in Kwazula-Natal, some societies of Kenya and some areas of Turkey; and today by getting aware of complications of other

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methods and useful properties of breast milk, it has been attended again^[9]. Breast milk may accelerate the complicated process of umbilical cord separation through polymorphonuclear leukocytes present at umbilical cord, photolytic enzymes and other present immunologic compounds^[9]. Previous studies have reported that cord separation time in topical application of human milk and cord dry care groups was shorter compared to topical application of povidone-iodine^[9]. Because the mothers have insufficient knowledge regarding umbilical cord care and considering the custom of rubbing something on umbilical cord in our culture and having no sufficient knowledge about probable complications after cord separation as a result of topical application of human milk, researchers decided to perform a study with the purpose of comparing the effect of topical application of human milk and cord dry care on cord separation time in healthy neonates at Razi Hospital, Ghaemshahr, Iran in 2010.

Subjects and Methods

This randomized clinical trial study was performed on 130 singleton and mature newborns in Ghaemshahr Razi hospital (2010) after obtaining written permission from ethics committee of Mazandaran University of Medical Sciences. We took also written informed consent from all mothers. In delivery room the umbilical cord was cut in completely sterile conditions. No disinfection compound was used on the cord and the cord was not clumped with sterile gauze.

Entrance conditions in this study included having gestational age between 37-42 weeks, non existence of any disease or congenital malformation, not immediate need to assay and treat the newborn after birth, no rupture in amniotic membrane more than 12 hours, first minute Apgar equal to or more than 7 and not suffering from urinary system infection in mothers. If newborns suffered from respiratory distress, prenatal asphyxia, metabolic diseases,

thick and gelatinous umbilical cord which needs two clumps, hyperbilirubinemia and any problem that caused the newborn to be taken to NICU, the newborn would be excluded from the study.

All newborns who were selected for this study were breast milk fed and mothers and newborns were roommates after birth. Newborns were placed randomly and every other week in groups of topical application of human milk and dry cord care. In order to select group 1, we threw a coin upward and at first week we placed all study cases in topical application of human milk group and at second week we placed them in dry cord care group and other newborns were also selected in the same order. A training booklet instructed all mothers of the two groups about umbilical cord care during first 3 hours after birth and described its infection symptoms. They were controlled after instruction and scored at discharge. In human milk topical application group, we recommended all mothers to wash their hands with water and soap and scrub their milk on the remaining part of the cord and its cut edge and let the milk get completely dry beginning 3 hours after birth once every 8 hours (three times a day) for 2 days after separation of the cord. Mothers in dry cord care group were recommended not to use any compound on umbilical cord. All mothers in the two groups were asked not to cover the cord with diapers and not to bath the newborns in bathtub until the cord is separated. All mothers in both groups received forms to register symptoms of umbilical cord infection, cord bleeding, secretion from the cord, and cord separation time. The human milk topical application group was given a form for comments on observed care progress. Mothers completed these forms at home for 2 days after umbilical cord separation. Researcher called mothers daily to get informed on date and hour of cord separation as well as eventual complications and difficulties after cord separation including bleeding, mucoid secretions and colonization of granuloma tissue. Two days after cord separation, a physician checked cords of the newborns. The mothers could call researcher if they had any problems or questions. Data were analyzed by SPSS software using independent samples t-test, χ^2 and Fisher ($\alpha=0.05$).

Table 1: Characteristics of the examined newborns in two group f newborns

Variable	Topical application human milk N=65	Dry cord care N=65	P value	
Gender	Female	35 (53.85%)	31 (47.69%)	NS
	Male	30 (65.15%)	34 (52.30%)	NS
Birth weight (gr) [mean (SD)]	3402.30 (450.14)	3423.38 (450.21)	NS	
Delivery method	Normal Vaginal Delivery	25 (38.46%)	19 (29.23%)	NS
	Cesarean section	40 (61.53%)	46 (70.76%)	NS
Parity [mean (SD)]	0.72 (0.75)	0.71 (0.79)	NS	
Mother's age (year) [mean (SD)]	27.56 (4.32)	27.21 (4.48)	NS	
Duration of amniotic membrane rupture (day) [mean (SD)]	2.25 (3.23)	2.12 (3.41)	NS	

SD: Standard Deviation

Findings

From 152 newborns, 12 in topical application of human milk group were excluded from the study for the reason of scrubbing other compounds instead of breast milk on umbilical cord (n=7), application of antibiotics (n=1), having no tendency to continue the research (n=2), breast feeding difficulties (n=1) and hospitalization more than 10 days after birth in hospital (n=1) and 10 newborns in dry cord care group were excluded for the reason of application of antibiotics (n=5), breast feeding difficulties (n=3), hospitalization in NICU (n=1) and long hospitalization in hospital (n=1). Finally 130 newborns finished the study.

There was no significant statistical difference between the two groups in newborns' sex, birth weight, gestational age, type of delivery, maternal age and duration of amniotic membrane rupture (Table 1).

Results demonstrated that by controlling the effect of intervenor variables, median time of cord separation in human milk application group was significantly shorter than in dry cord care group, so that median time of the cord separation in human milk topical application group was 150.95 (28.68) hours and in dry cord care group 180.93 (37.42) hours. There was also significant statistical difference between two groups in the

number of bleeding continuation days after cord separation, so that the median of the number of bleeding days after the cord separation in human milk topical application group was 1.20 ± 2.33 days and in dry cord care group 3.1 ± 3.77 days, but there was no significant statistical difference between two groups in the number of days of mucoid secretions continuation after the cord separation. In addition, there was no significant statistical difference between the two groups in colonization of granuloma tissue after the cord separation (totally 6 cases were observed in two groups, i.e. 3 cases in human milk topical application group and 3 cases in dry cord care group).

No case of blood and umbilical cord infection was seen in the two groups (Table 2).

Discussion

In this study human milk efficiency in the time of cord separation was analyzed. Human milk has many immunologic and disinfecting factors and is the best nutrition source for newborns. It protects newborns against the infections^[10]. Present study demonstrated that human milk accelerates the cord separation.

Table 2: Differences in separation, bleeding and mucoid secretion time in the two groups

Variable	Application of human milk	Dry cord care	P value
Cord separation time (hour)	150.95 (28.68)	180.93 (37.42)	<0.001
Bleeding continuation after separation (day)	1.20 (2.33)	3.10 (3.77)	<0.001
Moucouid secretion after separation (day)	1.95 (0.676)	2.10 (0.76)	NS

In a clinical trial study, Amirfarhani et al compared bacterial colonization in umbilical cord in topical application of breast milk and dry cord care. They found that the most common cultured organisms were *Staphylococcus aureus*, *E. coli* and *Klebsiella* in the umbilical stump and there were statically significant differences between the two groups in colonization rate. They showed that in topical application breast milk group, *Staphylococcus epidermidis* was more than in dry cord care group and in this, *S. aureus*, *E. coli* and *Klebsiella pneumoniae* was more than in topical application breast milk group ($P < 0.05$)^[11].

Human milk may accelerate the complicated process of the cord separation through polymorphonuclear leukocytes present at the cord, proteolysis enzymes and other available immunologic compounds^[9]. Surveys such as that conducted by Vural and Kiza, have shown that median time of cord separation in human milk topical application and in dry cord care was shorter compared to that in povidone-iodine; generally, median time of the cord separation in dry cord care group/human milk topical application group and povidone-iodine group was 7,7.7 and 9.9 days^[9] respectively.

Also in a quadruplet randomized clinical trial study, median time of the cord separation in human milk topical application was significantly shorter compared to alcohol, silver sulfadiazine and dry cord care^[12]. In a similar randomized controlled trial study, researchers showed that the cord separation time in triple dye group was significantly longer than in alcohol group and dry cord care group, while there was no significant statistical difference between alcohol group and dry cord care group^[13].

In the present study, there was no statistically significant difference between the types of delivery (vaginal or cesarian) regarding cord separation time this correlates with the results of Chamnanvanakij and his colleagues. While one study reported that the median time of the cord separation in neonates born by cesarean section (15.9 ± 5) was longer compared to neonates who were born through vaginal delivery (12.9 ± 1.2)^[7], Ahmadpour et al found that there was statistically significant difference in cord separation time between cesarian newborns and those born by vaginal delivery^[12]. Cesarean delivery for the lack

of inflammatory process causes delay in the cord separation^[13].

Furthermore, present study showed that there was statistically significant difference between dry cord care group and human milk topical application group in bleeding continuation days after cord separation. Human milk is an expanded source of two regimens of major growth factors α and β transformer growth factor and 1 and 2 insulin like growth factors^[10]. These factors accelerate cartilage and muscle recovery and the process of wound improvement. Insulin-like growth factor 1 is called special factor of wound improvement and metabolism and stimulates muscular growth and recovery. Moreover, transformer growth factors interfere in natural activity of the cell like cellular proliferation and tissue recovery^[11]. On the other hand, there was no statistically significant difference between two groups in blood infection, granuloma and the umbilical cord infection, this correlates with the results of Ahmadpour and colleagues^[12].

We followed up cord separation time with phone contacts in both groups. This may be a limitation of our study. It is probable that mothers forgot the exact time of cord separation or applied other substances on the cord and did not inform us.

Conclusion

Generally, human milk is always available and its topical application on the remaining part of the cord reduces the cord separation time and it can be used as an easy, cheap and non invasive way for the cord care.

Acknowledgment

This study was done after obtaining written permission from ethics committee of Mazandaran University of Medical Sciences. Here it is necessary to thank friendly collaboration of Razi hospital personnel in Ghaemshahr for helping us in this research. This study registered in the Iranian

Registry of Clinical Trials with ID number: IRCT201102145830N1.

Conflict of Interest: None

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