Original Article

COMPARISON OF THE EFFECT OF ALCOHOL 70% VERSUS DRY CORD CARE ON CORD BACTERIAL COLONIZATION AND CORD SEPARATION TIME AMONG NEWBORNS

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ABSTRACT

Objective: To compare cord bacterial colonization and cord separation time among newborns whose cords were treated with Alcohol 70% versus dry cord care.

Methodology: The participating neonates in the two hospitals affiliated to Shaheed Beheshti University of Medical Sciences of Iran were randomly assigned to two groups. Group 1, had 36 neonates and Group had 41 neonates, who were treated with dry cord care and Alcohol 70% methods respectively.

Results: In the dry cord care group infant were significantly colonized with group B *Streptococcus* (58.3% vs 35% p=0.042), *Staphylococcus epidermidis* (86.7% vs 61% p=0.020) and *Escherichia coli* (88.9% vs 67.5% p=0.025). There were no cases of local umbilical infection in either group. There was no significant correlation between separation time of umbilical cord and the two methods of the care.

Conclusion: Based on the present study, bacterial colonization was higher in dry cord care group. There is, therefore, potential risk in discontinuing bacterial treatment of the umbilical cord stump.

KEYWORDS: Umbilical cord, Alcohol, Infection, Colonization, Newborn.

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INTRODUCTION

The umbilical cord is an important bacterial colonization site, which may occasionally lead to neonatal infection such as omphalitis and sepsis. Corrected umbilical cord care is important to prevent infections in neonatal period.[1,2] The infection of cord stump delays cord detachment and consequently the cost of postnatal care and duration of hospitalization may unnecessarily increase.[3] The application of the rigorous and proper clean cord care programs, therefore, has become necessary for the prevention of omphalitis.[4]

Different methods of caring for the umbilical cord after delivery have been applied in or out of fashion over the years in an effort to

reduce the risk of neonatal infection,[5] but recent review of the literature has not supported one regime over another for preventing of infection and making short the cord detachment. The World Health Organization recommends that dry cord care at birth and the days following birth is effective in preventing cord infection and the antiseptic is not required.[6] Current recommendations for cord care are mainly based on research in the nurseries in the developed countries.[7] Some of these recommendations are not applied in the developing countries. In these countries, some traditional practices and the unclean living conditions increase the risk of sepsis.[1] There is not enough evidence to recommend the widespread use of topical antimicrobials on the cord stump. The decision to use them will depend very much on local circumstances.[6] In the postpartum wards of Iran the use of alcohol swabbing is considered as common method of caring the umbilical cord. In recent years in Iran, breast feeding as well as room maternity care rate has increased and neonates are discharged one day after delivery. The research conducted in the developed countries has shown that compared to no treatment, application of a topical antimicrobial on the cord stump reduces colonization by harmful bacterial in hospital nurseries.[7] Some recent studies have shown that alcohol delays the cord detachment and increases the risk of umbilical cord infection and lengths of hospital stay.[8,9]

The main purpose of this study was to compare the effect of two different cord-care regimens: alcohol and dry cord care on the cord separation time, bacterial umbilical colonization and infection of cord stump. We designed a randomized comparison of dry cord care/ alcohol regimes with two days follow-up after separation of cord.

METHODOLOGY

A quasi experimental study was conducted on all infants consecutively born with normal delivery in the obstetric wards of Imam Hussein and Mahdieh hospitals of Shaheed Beheshti University of Medical Sciences, Iran. Any newborns with gestational age <37 weeks, birth weight <2500gr, Apgar score <8 and the twins were excluded and so were infants receiving antibiotics or developing any complications requiring hospitalization. All study subjects were "room in" with their mothers. Informed consent was obtained from their mothers. Study subjects were randomly assigned into two groups, the method of selection of the treatment was according to criteria of weekly rotation in which each type of treatment method was applied for one week. Hence, 36 and 41 neonates were enrolled into the dry cord care and the alcohol groups respectively. The observations relating to umbilical cord region including redness, swelling, exudates, tenderness warmth and odor were recorded three times.

The umbilical swabs were taken from the base of umbilical cord two hours and, three day after delivery and the day of cord separation. They were transported in 0.5^{cc} Stuart's medium (Merck - Germany) and then were sent to Vahidieh Laboratory within one hour. All specimens were cultured in the blood agar and MacConkey agar plates (Merck Germany). The aerobic plates were placed on the aero bicondition, and were read at 24 hours. The parental demographic information, gestational age, gender, Apgar score, weight and time of birth, number of gravidity, history of abortion, stillbirth and the duration of rupture of membrane were documented as well.

The cord stump was examined two hours after birth and following the stabilization of vital signs in either group. The abdominal skin in the umbilical region extending around five mm from the umbilicus was observed and omphalitis was characterized by erythema (redness, swelling and warmth) and tenderness. The cord stump was examined for the exudates and bad odor as well.

In the dry cord care group, mothers were instructed to use the mild non perfumed soap and sterile water, clean the area with a cotton swab or a cloth, and leave it for two hours after birth. They had to do the fore mentioned three times a day (9am, 3pm, 9pm).

In the alcohol group, mothers were instructed to wash the area with sterile water and after it is dried up, rappe it down with alcohol. Both groups must continue taking care of the umbilical cord for two days after cord separation. Both groups were given bath with non perfumed soap every two day. Mothers were said to follow the instructions (mentioned above).

Statistical analysis were conducted by using SPSS and a P value of <0.05 was considered for statically significance, study groups were evaluated according to the demographic and the pregnancy-related variables using the $\div^2$ statistic, the Fisher exact test for the categorical variable, and the *t* test for continuous variables.

RESULTS

A total of 84 newborn infants were included in the study. Seven of them were excluded due to incomplete follow up or concurrent use of two methods for cord care. The main demographic characteristics of the subjects are shown in Table-I. Study groups were similar with respect to their mean maternal age (p=0.623), parental status (p=1.00) gravidity (p=0.306), gestational age (p=0.577), birth weight (p=0.06) and gender (p=0.631).

The results of the umbilical cord observation of the two cord care methods are presented in Table-II. There was no significant difference in the prevalence of the umbilical cord signs in all three times observation of the two umbilical cord care groups. Sepsis or death was not observed in any of the cases.

The mean time of cord separation in alcohol and dry cord care groups were 7.39 and 7.6 days after birth, respectively. No significant difference was observed in the mean cord separation time among the two groups (p=0.688). Table-III shows data regarding the cord separation time in two group of the study.

The umbilical cord colonization findings are shown in Table-IV. The group B *Streptococcus* contamination was significantly lower in newborns treated with alcohol (p=0.042). The umbilical cord contamination by *Staphylococcus epidermis* significantly decreased in alcohol group (p=0.02). The *Escherichia coli* contamination was significantly higher in dry cord care group (p= 0.025). While the rate of growth *Staphylococcus aureus* was higher in alcohol group, no significant difference was detected between two groups of the study.

DISCUSSION

This study showed the higher rate of group B *Streptococcus*, *Staphylococcus epidermidis* and *E.coli* colonization in newborns treated with dry cord care. This finding was similar with Janssen et al. study in which they demonstrated that colonization rates for the alcohol / tripled group were lower than the dry cord care group.[10] But this result differs from that of Alexandria and Minia hospitals study in which the rate of bacterial colonization (from 0- 3rd day of birth) was significantly higher in

Table-I: Demographic characteristic of mothers and neonates in two groups of umbilical cord care in Iran

Characteristics	*Alcohol Care group (41=N)*	*Dry Cord Care group (36= N)*	*P.Value*
Maternal age in year (x ± G)	5/53 ± 24/42	5/54 ± 25/09	0/623
Gravida (x ± G)	0/92 ± 1/87	0/86 ± 1/66	0/306
Abortion n (%)	6(14/6)	4(11/1)	0/646
Stillbirth (dead child) n (%)	2(4/9)	0(0)	0/496
Time of rupture of membrane in an hour	5/6 ± 3/79	3/6 ± 2/85	0/399
Gestational age (40-42 weeks)	15(36/6)	11(30/6)	0/577
Gender of neonate (♀)	24(58/5)	23(63/9)	0/631
Order of birth (4 or more)	2(4/9)	1(2/8)	0/580
single parent	1(2/4)	0(0)	1/00

Table-II: Observations of umbilical cord area in two groups of umbilical cord care in Iran

Signs	*Alcohol Group (n=41)*	*Dry Group (n=36)*	*Pvalue*
Redness	13(31/7)	11(30/6)	0/913
Warmth	1(2/4)	2(5/6)	0/596
Exudates	6(14/6)	3(8/3)	0/490
Foul odor	1(2/4)	1(2/8)	1
Tenderness	0	3(8/3)	0/098
Inflammation	1(2/4)	1(2/8)	1

Table-III: The cord separation time in two groups of umbilical cord care in Iran

Cord Separation time, (days)	*Alcohol Care Group (n=41)*	*Dry Cord Care Group(n=36)*	*Total*
3-4	5 (12/2)	4 (11/1)	9 (11/7)
5-6	17 (41/5)	7 (19/4)	24 (31/2)
7-8	6 (14/6)	14 (89/6)	20 (26)
9-10	6 (14/6)	6 (16/7)	12 (15/6)
>10	7 (17/1)	5 (13/9)	12 (15/6)
Total	41	36	77

the alcohol group (44%).[11] In their study on 370 infants with dry cord care, Stark and Harrison reported that 44 (12%) of infants developed Sauer's infections which consisted of septic blisters (n=27), conjunctivitis (n=9) or umbilical infections (n=5).[12] These infections, however, were not observed in our study.

Our finding about the bacterial colonization except Staphylococcus *aureus* is partially in accordance with data in the study of Pezzati and et al.in which colonization rates for the water group were 5.5% for the group B *Streptococcus*, 14% for *E.coli* and 22.6% for *Staphylococcus aureus* and colonization rates in alcohol 70% care group were 1.1% for the group B *Streptococcus*, 6.8% for *Staphylococcus aureus* and 9.6% for *E.coli*.[4]

Reduced bacterial colonization in alcohol group is similar with studies conducted in the developed countries.[13,14] The relationship between umbilical cord infection and colonization could not be addressed in our study because no evidence of umbilical cord infection or definite sepsis was available. If such an association exists, our findings of much higher rates of bacterial colonization in dry cord care group are cause for concern. The infants in the alcohol group had more redness around their umbilical cord stump than the dry cord care group but it is important to point out that there were no statically significant differences in redness of the two groups. Perhaps the redness around umbilical cord might be related to the alcohol absorption and the effect of it on skin. As a whole there were no differences in rates of the observation of warmth, bad odor, tenderness and inflammation of the cord between the study groups.

The duration of the cord separation in the dry cord care group, the study showed, is slightly longer than the alcohol group (7-8 days vs. 5-6 days) but there was no statistically significant difference between two groups (p=0.688).This finding is similar with study conducted in Thai neonates.[15] But it is not in accordance with some other studies.[4,16] It seems that the difference between various studies is due to other factors such as local circumstance and community. In our study, bacterial colonization was higher in dry cord care group. The relationship between bacterial colonization and risk of umbilical cord infection is still unclear.[10,15] There is, therefore, a potential risk in replacement of the alcohol care method by dry cord care method in treating the umbilical cord

Table-IV: Bacterial Colonization Rate of Umbilical Cord in two Groups of Umbilical Cord Care in Iran

Microorganisms	*Alcohol Care Group N (%) (n=41)*	*Dry Cord Care Group N (%) (n=36)*	*P value*
Staphylococcus aurous	4 (9.8)	2 (5/6)	0/679
Group B Streptococcus	14(35)	21 (58/3)	0/042
Staphylococcus epidermis	30(73.2)	34 (94/4)	0/013
Escherichia Coli	27(67.5)	32 (88/9)	0/025

stump in Iran. However, further studies are suggested for the comparison between the two methods.

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