Comparative Study of Dry Cord Care versus Application of 5% Povidone-Iodine on Umbilical Cord in Newborns

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Abstract

Introduction: Infections are the most important cause of infant mortality, of which, umbilical cord infections are an important precursor. In developing countries, umbilical cord infections constitute a major source of neonatal morbidity and pose significant risk for mortality.

Methods: Prospective analytical study was conducted at KVG Medical College and Hospital, Sullia with an objective to study the aerobic bacteriological profile of umbilical cord in new born and their characterization and to compare two umbilical cord care regimens, that is, dry cord care, and 5% povidone iodine for their impact on colonization and infection. 50 cases, each in category of dry cord care and 5% povidone iodine application on umbilical cord were studied.

Results: The study showed that 5% povidone iodine application to the umbilical cord though appeared to reduce colonization with S. aureus, fail to inhibit it completely.

Conclusion: Antimicrobial application may enhance colonization with more dangerous multidrug resistant staphylococci (MRSA and MR-CONS). 5% povidone-iodine appeared to be inferior to dry cord care in preventing clinical manifestation in infants.

Keywords: 5% povidone iodine, Dry cord care, Newborns, Infant mortality

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Introduction

The World Health Organization (WHO) estimates that approximately four million children die during the neonatal period each year, with most deaths occurring in developing countries.(1)(2) Infections are the most important cause of infant mortality, of which, umbilical cord infections are an important precursor.(2)(3)(4) Many studies have been carried out to compare different regimens and their effect on infection rates, colonization and length of cord separation.(5)(6)(7)(8) The overall results conclude that more the cord is treated, the longer it will take to separate.

In developing countries, umbilical cord infections constitute a major source of neonatal morbidity and pose significant risk for mortality.(9) This is why an evidence-based approach to cord care is so important. By introducing easy-to-follow guidelines, it may be possible to reduce infection rates. Objective of the study was to study the aerobic bacteriological profile of umbilical cord in new born and their characterization and to compare two umbilical cord care regimens, that is, dry cord care, and 5% povidone-iodine for their impact on colonization and infection.

Material and Methods

Data was collected from Sullia Township which is situated at the foothills of Western Ghats, surrounded by hilly forests and valleys, predominantly inhabited by rural people. KVG Medical College and Hospital (KVGMCH) is a tertiary care centre catering to the needs of people around Sullia Taluk covering about 1, 50,000 population. New borns delivered at KVGMCH in Sullia during one and half-year period from November 2009 to May 2011 were enrolled for the study. Informed consent was taken from parents of new born who met inclusion criteria. All new borns born in the hospital during the study period were included, except those infants receiving antibiotics or infants developing any complications requiring hospitalization or infants subjected to umbilical catheterization.

As per the laid procedure, soon after delivery the cord was tied with sterile thread, clamped and cut with sterile instrument. Pre-warmed linen was used to clean newborns. No bathing of the newborn was done and the clamp had been left in-situ until cord separated. Newborns were cared by 24-hour rooming-in method. A total of 100 newborns were enrolled in the study group. They were segregated into two study groups using a simple randomization method in which during the time of birth, the newborn were randomly allotted into different groups and cord care was given as per the groups under study. The groups were:

Group 1(n=50): Dry cord care.

Group 2(n=50): 5 % povidone-iodine application.

Group 1: Dry cord care – With no topical application keeping the cord dry and exposed to air.

Group 2: Topical application of 5 % povidone-iodine solution within 24-h of birth and daily once thereafter with a sterile gauze to the cut end and surface of the cord for the next three days.

Results

A total of 100 newborn infants were enrolled in our study. There were 50 infants in each i.e., dry cord care and 5% Povidone-Iodine group. The mean birth weight (g) was 2830±394.87 and 2819.4 ± 377.24 respectively. In both groups, majority of the babies were of full term and normal vaginally delivered. Sex wise dry cord care group had equal number of male and female infants (25 each), and, 27 male and 23 female newborns babies in 5 % Povidone-Iodine group.

Table 1: Baseline characteristics of the subjects

Characteristics	Dry cord care, n=50	5% Povidone-Iodine, n=50
Sex 1. Male 2. Female	 25 25	 27 23
Birth weight(g): Mean +/- SD	2830.0 ± 394.87	2819.4 ± 377.24
Gestational age 1. Term 2. Pre term 3. Post term	 46 4 Nil	 43 7 Nil
Type of delivery 1. Normal vaginal 2. Caesarian section	 36 14	 41 9

Table 2: Distribution of organisms in the umbilical swab cultures on day 4

Organism Isolated on day 4	Dry cord care, n=50 No. (%)	5% Povidone-Iodine, n=50 No. (%)
No growth	07(14)	05(10)
Staphylococcus aureus	26(52)	12(24)
Cons (coagulase negative staphylococcus)	14(28)	20(40)
Mrsa (methicillin resistant staphylococcus aureus)	00(00)	05(10)
Methicillin resistant cons	01(02)	06(12)
Gram positive bacilli	00(00)	02(04)
Gram negative bacilli	01(02)	00(00)
Mixed growth	01(02)	00(00)

Table 3: Observation of the umbilical cord area

Clinical observation	Dry cord care, n=50 No (%)	5% Povidone-Iodine, n=50 No (%)
Redness	06(12)	13(26)
Swelling	00(00)	01(02)
Discharge	00(00)	00(00)
Fever	03(06)	12(24)
Omphalitis	00(00)	01(02)
Sepsis clinically treated	03(06)	11(22)

Discussion

Current cord care recommendations are chiefly based on research in hospital nurseries of developed countries. Such recommendation cannot be wholly applied to developing countries, where most deliveries take place at home, unclean substances may be applied to cord stump, different bacteria may cause cord infections and resources are scarcer. In the view of development of resistance, use of topical antibiotics is not recommended. In a 24-hour rooming-in system as the mother is the main care giver and if the clean cord is practiced, application of an antiseptic to the stump is not probably needed.(3)

Present study showed that S. Aureus is the predominant colonizer of the umbilical cord. Higher colonization (51%) of umbilical cord was seen in dry cord care group than 5% povidone iodine (24%). The study confirms the finding of earlier western studies(8)(10) that use of dry cord care alone will lead to an unacceptably high colonization risk with S.aureus. The relationship between cord colonization is well established and often the infection occurs after the infant has been discharged.(11)

One of the important observations of the study was the higher colonization of MRSA (10% each) and MR-CONS (12%) in 5% povidone iodine where as in dry cord care colonization, MRSA was absent and MR-CONS was only 2%. This may imply that methicillin resistant staphylococci were resistant to 5% povidone-iodine. The colonization with these organisms may be further enhanced by reduced competition by resident normal flora due to application of antimicrobials.

Significant number of cases of redness (26%), fever (24%) and clinically treated sepsis (22%) were associated with 5% povidone-iodine group compared to dry cord care group (redness 12%, fever 6% and clinically treated sepsis 6%). These finding implies that 5% povidone-iodine application to umbilical cord is not effective in preventing clinical manifestations in infants as compared to dry cord care.

WHO recommends that hospital and community based studies are needed in developing countries to compare the risk of cord infection and neonatal tetanus when cord is kept clean, dry and nothing applied to it with the risk when an antimicrobial or a dusting powder is applied. Reports of such studies are scanty from developing countries in general and hardly any from India. Present study was an attempt to compare umbilical cord care regimens to provide data in developing country.

Conclusion

The study showed that 5% povidone-iodine application to the umbilical cord though appeared to reduce colonization with S.aureus, fail to inhibit it completely. Antimicrobial application may enhance colonization with more dangerous multidrug resistant staphylococci (MRSA and MR-CONS). 5% povidone-iodine appeared to be inferior to dry cord care in preventing clinical manifestation in infants.

Conflicts of Interested: None

Source of Support: Nil

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