Effect of Early Bathing on Temperature of Normal Newborn Infants

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Abstract

Background: Nowadays there is a strong tendency for early bathing of healthy newborns but little is known about the thermal stability of newborns in response to early bathing. The aim of this study was to compare the thermal effect of bathing on healthy newborn within 1-2 h of life versus 4-6 h after birth.
Methods: In this randomized comparative study 100 healthy newborns in a newborn nursery of a charity hospital in Tehran were studied. The inclusion criteria were: healthy term ($\geq$ 37 wk) newborn over 2500 grams with rectal temperature > 36.5 °C , apgar score > 7 in 1 and 5 min after birth and lack of manifestations of any diseases like sepsis or respiratory distress syndrome .The exclusion criteria were the history of recent fever, leukocytosis , urinary tract infections and using medicines in their mothers. In the experimental group, 50 newborns were bathed within the first 1-2 h of birth; those in control group were bathed at the 4-6 h of age. Rectal temperatures were measured in four different times: before bathing and immediately as well as 30 and 60 min after bathing.
Results: Rectal temperatures as measured at four different times did not differ significantly between infants bathed within 1-2 h of birth and those bathed 4-6 h after birth .There were no significant differences between the groups in types of gender, birth weight, gestational age, parity, delivery route, interval time between rupture of membranes and delivery, apgar scores at 1 and 5 min of age.
Conclusions: Healthy full term newborns with rectal temperature > 36.5 °C can be bathed within 1-2 h of birth without any risk of hypothermia.

Keywords: *Infant, Newborn, Body temperature*

Introduction

In most Iranian hospitals and delivery facility centers, newborns are routinely bathed within several hours of birth to remove amniotic fluid, blood and other birthing fluids. After the bath, newborns are dressed and bundle in blankets or placed under a radiant heater until body temperature is within normal limits and there after when the temperature become stable, they are returned to the family.

It is theoretically possible that bathing a newborn infant early after birth may affect its adaptation to extra uterine life, particularly by adversely affecting its pulmonary and gastrointestinal circulation as well as its thermoregulation (hypothermia), by increasing evaporation and dilating the peripheral vessels in skin (1). In fact some reports have found a higher incidence of hypothermia in newborns that were bathed early (2- 4). World Health Organization (WHO) recommended that bathing before 6 h of life is not suitable for newborns because of thermal instability (5), however in many hospitals of North America and Europe newborns are bathed in the first few h of life. A reason for early bathing of the newborns is that they are presumed to be infectious until

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bathed. The potential harmful pathogens for health care providers and family are include human immunodeficiency virus and hepatitis viruses (6).

In the past years concerning about hypothermia and accompanied destabilization of vital signs made health care providers to prefer the delayed bathing, however newer studies showed the negligible risk of hypothermia associated with early bathing and nowadays there is a strong tendency to bathing normal newborn infants early after birth (7-12).

There was a paucity of research that evaluated the thermal change of newborn infants after bathing in our country, therefore we conducted a study to test the assumption that no difference would occur in the temperatures of normal newborn infants when they were bathed after 1-2 h after birth compared with 4-6 h after birth.

Materials and Methods

This study was conducted using a randomized controlled trial design and the setting was a newborn nursery of a charity hospital (Third Sha'aban) in Tehran, Iran.

From September to December 2005, all infants born at the hospital who met our study criteria were recruited for this trial. The inclusion criteria were: apparently normal and well newborn from normal newborn nursery with a gestational age $\geq$ 37 wk, birth weight $\geq$ 2500 g, apgar scores of at least 7 in 1and 5 min of age, rectal temperature $\geq$ 36.5 °C without any major anomalies or any signs or symptoms of sepsis or respiratory distress. The exclusion criteria were: recent history of fever, leukocytosis or urinary tract infections in mother, or maternal history of disease that would adversely affect neonatal morbidity such as diabetes mellitus, hyperthyroidism or hypothyroidism and infections. All newborns were screened by a pediatrician before the bath and were excluded if their condition were not suitable for study.

Gestational age was estimated from both the mothers' menstrual history as well as early ultrasound dating. Ethical approval for the study was obtained from the local ethics board and informed consent was obtained from the parents of each neonate. Both parents and investigators were blind to group assignment. The participants were randomly divided in 2 groups, using random numbers table.

Demographic data obtained from the mothers' chart including time and date of birth, maternal age, type of birth, gestational age, maternal parity, as well as gender and weight of the newborns. It was confirmed in analysis that there were no between group differences with respect to demographic variables. Demographic data presented in Table 1. Newborns assigned to the experimental group were bathed within 1-2 h of life and those assigned to the control group were bathed within 4-6 h after birth. Bathing lasted 2-3 min with warm water (38±1 °C at the start of the bath) without using soap in a especial place; blood and meconium were removed but vernix was not removed completely.

After bathing, neonates dried with a prewarmed towel, dressed in diaper, shirt and hat and wrapped in a blanket and thereafter transferred to an open bassinet in nursery. Room temperature was kept constant between 24-26 °C. Rectal temperature was measured using mercury rectal temperature on four occasions: immediately before bathing, immediately after bathing and at 30 and 60 min after bathing. Hypothermia was defined as a rectal temperature below 36.5 °C. The infant was transferred to an incubator if the rectal temperature reached under 36.5 °C in two consecutive measurements within 15 min. The thermometer was kept inside the rectum not more than one centimeter due to rectal perforation concerns. All staff members were instructed in the study protocol and received a copy of study protocol. Stopwatch was used to determine the time of bathing and times between measurements.

Conventional criteria for type 1 and type 2 errors were used. The alpha level was set at 0.05 and beta level at 0.2 to set power at 80% and 50 newborns were required for each group to detect a difference of only 0.1 °C. After comple-

tion of data collection, data were coded and entered twice into the computer files to verify accuracy. Analysis was carried out using SPSS 11.5 (Chicago-IL) using Chi- square test, student's t- test and paired t- test. All t-tests were two tailed and the level of significance was set at 0.05. Normal distribution of all continuous variables was confirmed in both groups and results are expressed as mean±standard deviation.

Results

The subjects were 100 newborn infants (48 males and 52 females) who randomly divided in "experimental "and "control groups". The characteristics of the two groups are summarized in Table 1. Gestational age, birth weight, sex, Apgar score, ratio of primipara to multipara and time of first feeding did not differ significantly between the two groups. All newborns fed by their mothers' milk. Rectal temperature of the two groups did not differ significantly before bathing, being 36.97 ± 0.18 °C and 36.95 ± 0.22 °C in experimental and control group, respectively. After bathing, the rectal temperature of experimental group has decreased immediately after bathing and at 30 min after bathing ($P< 0.001$, $P< 0.001$) and then increased in 60 min after bathing ($P = 0.3$).

In control group the rectal temperature has decreased immediately after bathing ($P< 0.001$) but reached the before bathing temperature after 30 min ($P= 0.21$) and increased to above that at 60 min ($P= 0.04$). There were no significant differences between rectal temperatures in experimental and control groups in immediately before and after bathing times as well as at 30 and 60 min after bathing (Table 1).

Hypothermia with rectal temperature under 36.5 °C was seen only in two infants of control group. The temperature of those infants was 36.2 °C and 36.3 °C at 30 min after bathing .No one required transfer to incubator.

Table 1: Baseline variables in Experimental and Control groups

Baseline Measure	Experimental Group (n = 50)	Control Group (n = 50)	P
Gestational Age (week)*	39.2 ± 0.88	39 ± 0.95	NS*
Gender			
Male	22	26	NS
Female	28	24	
Birth Weight (gram)*	3364 ± 413	3322 ± 424	NS
Birth Method			
Vaginal	24	17	NS
Cesarean Section	26	33	
Parity			
Primipara	20	24	NS
Multipara	30	26	
Rectal Temperature (°C)**			
Immediately before bath	36.97 ± 0.18	36.95 ± 0.22	NS
Immediately after bath	36.72 ± 0.19	36.80± 0.24	NS
30 Min after bath	36.85± 0.16	36.91± 0.23	NS
60 Min after bath	36.94 ± 0.15	37.02± 0.23	NS

*NS= Non Significant, **Mean±Standard Deviation

Discussion

In recent decades several studies have been performed to evaluate the effects of timing of the newborns' first bathing on their thermal balance. Based on the thermoregulatory theory, it is recommended that the bathing of the newborn infants is delayed until they achieve and maintain a normal body temperature (1). Recently time of first bathing has been modified within hospitals because of increasing concerns about the transmission of communicable diseases through blood or body fluid contact (6).

In the present study, newborn infants in both experimental and control groups showed comparable characteristics and rectal temperature did not differ between the two groups immediately before and after bathing as well as 30 and 60 min after bathing. A clinical deduction for these findings is that heat losing in newborns did not correlate to the bathing time.

Temperature changes associated with bathing newborns have been evaluated in many studies. In 1975 Leboyer advocated bathing immediately follow birth (7). The Leboyer method shown to be safe and hypothermia (<35 °C) did not develop in newborns even after prolong immersion in water when room and water temperatures were monitored (8, 9). Penny-McGillivray reported that healthy full-term newborns with a rectal temperature above 36.5 °C could be bathed immediately after the initial assessment examination and observed no significant differences in rectal temperature between the group bathed at 1 h of age and the group bathed at 4 h of age (10). In other study, Behring & colleagues (11) evaluated the effects of bathing on thermoregulation of healthy newborns within the first hour of life compared to bathing 4-6 h of life. Axillary temperatures did not differ significantly between infants bathed within 1 h birth and those bathed 4-6 h after birth (11).

The same conclusion was reported by Varda and Behnke (12). In contrast to these studies, Takayma & colleagues reported a decreased axillary temperature after early bathing among 114 neonates (13).

Bergstrom and colleagues in a clinical trial on 249 African newborn, noticed that bathing in the first hour after delivery against no bathing resulted in a significantly increased prevalence of hypothermia (under 36.5 °C at 70 & 90 min postpartum) (14).

Results of the current study are the same as previous studies by Behring, Penny- Mc Gillivray and Varda & Behnke (10- 12).

Although type of delivery, sex, gestational age, room temperature and route of temperature measuring were different in those studies, beyond these differences the results were the same. In the present study we used rectal thermometer (mercury type), however Behring, Varda & Behnke measured axillary temperature and Penny- McGillivray used rectal thermometer. Measuring temperature in newborn infants can be difficult especially when they are restless. It is believed that both rectal and axillary temperatures are reliable. The axilla is a safe and accessible site, but concerns have been raised about its accuracy (15, 16). Measurement of rectal temperature is frequently preferred over other ways, however the newborn can be exposed to cold air for up to 5 min while the temperature measured because it may experience unnecessary cooling that interfere with the temperature assessment (17). We considered this important point in our assessment.

The obstetric unit (as well as other units of hospital) is a high risk environment for trans-mission of pathogens (especially hepatitis B virus, human immunodeficiency virus and herpes virus) by blood or body fluids and this transmission can occur during the birth process or by handling the newborn covered with maternal blood and body fluids from the birth canal (6). Early bathing of newborns after birth could decrease the exposure of health care providers and family members to bloodborne pathogens.

A limitation of the present study is that data collection was limited to a single newborn nursery and a sample of healthy, full-term newborns. Further studies also could be included comparison groups of the low birth weight newborns.

In summary the results of the present study did not demonstrate any negative effect of early bathing on the early adaptation of newborns therefore we conclude that healthy full term newborns with rectal temperature over 36.5 °C can be bathed within 1-2 h of birth without any risk of hypothermia.

Acknowledgements

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