

Profile of Neonatal Dehydration Fever in a Tertiary HospitalVivekanand Paul¹, Rakesh Kumar^{2*}, N P Gupta³¹Senior Resident, Department of Pediatrics, Darbhanga Medical College & Hospital, Darbhanga Laheriasarai Bihar, India.²Senior Resident, Department of Pediatrics, Darbhanga Medical College & Hospital, Darbhanga Laheriasarai Bihar, India.³Associate Professor, Department of Pediatrics, Darbhanga Medical College & Hospital, Darbhanga Laheriasarai, Bihar, India.

Received: 08-01-2024 / Revised: 06-02-2024 / Accepted: 16-03-2024

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Conflict of interest: Nil

Abstract:**Background:** Neonatal fever due to dehydration is common in warm climatic conditions. There are also reports of serious complications of dehydration fever such as seizures, disseminated intravenous coagulation, acute kidney injury, multiple cerebrovascular accidents, and even fatalities.**Objectives:** The objectives of the study were to determine the number of newborns admitted into the sick newborn care unit (SNCU) with dehydration fever, to ascertain about other associated comorbid conditions, and to know the outcome of these newborns following treatment.**Materials and Methods:** Data were collected from the SNCU records of neonates admitted with fever with no evidence of infection during three summer months (May, June and July) in the years 2018 and 2019. Status of hydration in all such babies at the time of admission was noted (as clinically evident by loss of more than 10% of birth weight, decreased urination, dryness of the oral cavity and eyes, loss of skin turgor, and sunken anterior fontanelle). The outcome of all the neonates, who were treated according to the existing protocol, were also noted.**Results:** Out of the total 3852 neonates admitted during the study period, 42 (1.09%) were having dehydration fever. Among them, 10 (23.80%) were preterm, 8 (33.33%) were intrauterine growth restriction, and the rest 32 (76.19%) were term, appropriate for gestation. Males were more than females (26:16). Electrolyte imbalance was not seen in any of the babies. Although, initially, all the babies were lethargic, they all improved promptly following intravenous rehydration along with the maintenance of thermoneutral environment and the maximum hospital stay noted was only 3 days.**Conclusion:** Fever in newborn due to pure dehydration, even without electrolyte imbalance exists, and it should be considered in warm climatic condition.**Keywords:** Dehydration Fever, Neonatal Dehydration, Neonatal Fever.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Regarding neonatal thermoregulation, too much emphasis has been given on hypothermia, while hyperthermia has always been a neglected and less discussed issue. Amidst the dearth of publications in literature on this subject, it has almost always been discussed that neonatal hyperthermia is usually iatrogenic, consequent to inadvertent dislodgement of skin thermistor in a baby nursed in a servo controlled incubator or open care system [1]. However, we have seen newborns being admitted into our "sick newborn care unit" (SNCU) with fever of varying degrees, associated with significant dehydration, lethargy, and refusal to feeds. A good number of these newborns improved rapidly following maintenance of hydration and supportive care only. Oddie *et al.* found that 1 out of 8 (12.5%) neonates with dehydration fever had convulsions [2]. In another study, hyperkalemia was noted in

83.67% of neonates with dehydration fever and acute kidney injury (AKI) in 18.36%, whereas 1 (2.04%) baby was treated with peritoneal dialysis. Therefore, it is apparent that failure to detect the condition can have serious consequences including death [3,4]. The aim of the study was to determine the number of newborns admitted into the SNCU with dehydration fever, to ascertain other associated comorbid conditions, and to know the outcome of those newborns following treatment.

Materials and Methods

It was a retrospective study. We analyzed the records of the neonates admitted into the SNCU of Darbhanga Medical College and Hospital during 3 months period (1st May – 30th July) for 2 consecutive years (2018 and 2019) with fever (surface temperature >99.5°F or 37.5°C) [5] who, on

subsequent investigations, were found to be negative for any infective condition. All babies admitted into the SNCU with fever, as usual, were subjected to the following investigations: Sepsis screen and blood and urine culture. The babies who were found to be negative for the three investigations were included in the study.

Dehydration was assessed by loss of more than 10% of birth weight on admission (daily weight was recorded with a digital weighing scale with resolution of 10 g), decreased urine output (as evident from the history on admission and subsequent observation in the SNCU regarding the number of times urine was passed every 24 h), dryness of the oral cavity and eyes, loss of skin turgor, and sunken anterior fontanelle (as clinically assessed on admission and subsequently from time to time). Babies with infective conditions as per the investigation reports and those without features of dehydration were excluded from the study.

Table 1: Profile of neonates with dehydration fever

Variables	Neonates	n=42 (%)
Birth weight and maturity	Preterm	10 (23.80)
	Intrauterine growth restriction	8 (33.33)
	Term, appropriate for gestation	24 (57.14)
Sex	Male	26 (61.90)
	Female	16 (66.66)

Electrolyte imbalance was not observed in any of the babies under study. All the babies were lethargic and prostrated on admission, which made it difficult to differentiate from other conditions associated with fever, notably sepsis. All the babies showed prompt improvement following maintenance of hydration along with exposing the baby to thermoneutral environment and tepid sponging. The maximum hospital stay was 3 days.

Discussion

There are reports of isolated cases of life-threatening hypernatremic dehydration in literature. In most of those studies, it was emphasized that life-threatening hypernatremic dehydration is an uncommon entity in newborn [6-15]. In the present study, however, dehydration fever accounted for 1.094% of all SNCU admissions in the summer months. Although all the babies showed other features of dehydration as elaborated earlier, associated with fever of varying degree, serum electrolytes were within normal range. This finding is similar to that observed by Boutin *et al.* [16].

Earlier, Davis *et al.* observed that fever in the presence of a normal osmolality makes infection very likely [17]. However, these were contrary to the observations in the present study. None of the serious complications such as seizures, AKI, disseminated intravenous coagulation, multiple

Serum electrolytes on admission of all the babies under study were also checked. All the babies were initially given resuscitating measures, namely, intravenous fluid, hydrotherapy, management of associated hypoglycemia, and empirical administration of antibiotics until the investigation reports supported non-infective condition. The outcome of the neonates, thus treated according to the standard protocol, was noted.

Results

Out of the total 3852 newborns admitted during the study period, 42 (1.09%) had dehydration fever and met the inclusion criteria. Among them, 10 (23.80%) were preterm and 32 (76.19%) were term babies. Of the term babies, 8 (33.33% of total) were intrauterine growth restriction, weighing <2500 g and 24 (57.14% of total) were weighing \geq 2500 g at birth (Table 1). All the 42 babies were exclusively breastfed. Out of the total 42 babies, 26 (61.90%) were male and 16 (66.66%) were female.

cerebrovascular accidents, and the need for peritoneal dialysis or amputations, as observed in the earlier studies [2,3,7,12,18,19], were seen in the present study. Zachariassen and Juvonen concluded that a rise in temperature could be a sign of neonatal dehydration [20]. Maayan-Metzger *et al.* concluded that in low-risk full-term infants, fever with no other symptoms during the 1st day of life is related primarily to dehydration [21].

Contrary to observations made in the earlier studies, hypernatremia was not associated with dehydration fever in the present study. The climatic condition of Darbhanga and the adjoining area, where the environmental temperature soars above 40°C during the summer months may have a role in causation of severe dehydration even without alteration of the serum electrolytes.

Management of the condition is by bringing the ambient temperature to the thermoneutral zone along with the correction of dehydration by fluid therapy. Considering the outcome following management in the current study, wherein no mortality was observed, it can be presumed that the prognosis of the condition is good. However, from the reports published in literature, it is apparent that the condition could have been fatal, if left untreated.

Since the study was done on the SNCU admitted neonates and data were collected from the records,

this study does not give any idea about the incidence of dehydration fever. A community-based study would have given insight into the real incidence of dehydration fever in the community.

Conclusion

In view of the current observations, the possibility of pure dehydration without electrolyte imbalance does exist. This possibility should be considered whenever a newborn presents with fever, where infective condition is less likely, especially in warm climatic conditions.

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