



CLINICAL PROFILE OF HYPERNATREMIA IN NEONATES IN A TERTIARY CARE CENTRE

Pediatrics

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ABSTRACT

INTRODUCTION: Hyponatremia is a common life-threatening condition in neonates associated with and without neurological manifestations. It is defined as a serum sodium level $>145\text{mEq/L}$. Early recognition and intervention is necessary to prevent potential adverse effects like cerebral edema, seizure and intracranial hemorrhage.

METHODOLOGY: Retrospective analysis of all neonates with hyponatremia admitted to the NICU of a tertiary care hospital (NKP Salve Institute of Medical Sciences, and Lata Mangeshkar Hospital and Research Centre) was done and data collected and expressed as percentage.

RESULTS: Out of total 1905 deliveries, 938 were admitted in NICU from January 2019 till December 2019. Of them, 21 patients were admitted for hyponatremia. Hospital based prevalence of 2.23%. Out of the total participants, 12(57.14%) were males and 9(42.85%) were females. 14(66.66%) were first born. 9(42.85%) were born by Normal Vaginal Delivery (NVD) and 12(57.14%) were born by Lower Section Caesarean Section (LSCS). 11(52.38%) had sodium levels $<160\text{mEq/L}$, 9(42.85%) had sodium between 160-170mEq/L and 1(4.76%) had serum sodium level $>170\text{mEq/L}$. The presenting features included Acute Kidney injury in 6(28.57%), Weight loss in 5(23.8%), Hyperbilirubinemia in 5(23.8%), Fever in 4(19.04%) and seizures in one (4.76%).

CONCLUSION: Hyponatremic dehydration is a common medical emergency caused by poor/ faulty feeding in early neonatal period especially in summer season. All infants should be routinely evaluated for any symptoms or signs to avoid the morbidities associated with hyponatremic dehydration. Weight loss $>10\%$ in first week is taken as a warning sign and fluid therapy along with promotion of breast feeding is the main treatment modality.

KEYWORDS

Hyponatremia, Dehydration, Neonates

INTRODUCTION

Hyponatremia is defined as a serum sodium $>145\text{mEq/L}$, although it is sometimes defined as $>150\text{mEq/L}$ also ^[1]. Serum sodium of $>160\text{mmol/L}$ is often regarded as severe hyponatremia ^[2]. It is common in neonates but can be a life-threatening condition ^[3]. It can present as normal, reduced or excessive Extra Cellular Fluid (ECF) volume. Hyponatremia with reduced ECF volume usually occurs in VLBW babies due to excessive loss of water through urine or insensible water loss through skin or lungs ^[4]. Metabolic acidosis may occur due to reduced renal perfusion because of depletion of ECF volume. The common clinical features which can aid in diagnosis are weight loss, tachycardia and hypotension, decreasing urine output supported with laboratory finding of metabolic acidosis and raised urine Specific Gravity ^[5]. Excessive weight loss and oliguria are taken as reliable signs, as the usual feature of dehydration like loss of skin turgor etc. appear late. Hyponatremic dehydration can be a potentially lethal condition and it is associated with complications like cerebral oedema, intracranial haemorrhage, hydrocephalus and, disseminated intravascular coagulation and seizures ^[6]. The breastfed infants are at high-risk for neurological damage from hyponatremia ^[7]. So, early recognition and appropriate intervention is necessary to prevent the morbidities associated with severe hyponatremic dehydration in neonates.

MATERIAL AND METHODS

We retrospectively reviewed in patient records of neonates delivered in Obstetric Department of Lata Mangeshkar Hospital, Nagpur, and admitted in NICU of Lata Mangeshkar Hospital, Nagpur from 1st January 2019 to 31st December 2019. Those neonates with serum sodium levels $>145\text{mEq/L}$, with or without symptoms with gestational age of 36 weeks or more, age less than 28 days and birth weight $>1.8\text{Kg}$ were included in the study. Those babies with any underlying pathological conditions (like sepsis, congenital anomalies etc.) which would affect the feeding of the neonate were excluded from the study.

the epidemiological and clinic features noted.

Clinical information pertaining to the mother like birth order, mode of delivery, and any pathologic condition and about the neonate like mode of delivery, weight at birth, percentage of weight loss, any other presenting feature like fever, hyperbilirubinemia etc., and laboratory results at admission and discharge were noted. The data collected and findings were expressed as percentage.

RESULTS

We reviewed all the deliveries at our institute from 1st January 2019 to 31st December 2019. Out of a total of 1905 deliveries, 938 were admitted to the NICU for various reasons like Birth asphyxia, Respiratory Distress, Sepsis, Dehydration, Acute kidney Injury (AKI) etc. Out of the total 938 NICU admissions, 27 were admitted for Hyponatremic dehydration. Of them 6 were excluded from the study because of sepsis, congenital anomalies and maternal conditions affecting breast feeding in neonates. Thus remaining 21 were included in our study. Thus, a hospital-based prevalence of 2.23% was observed.

Out of the total participants, 12(57.14%) were males and 9(42.85%) were females. Most of the patients i.e., 14(66.66%) were first born. 9(42.85%) were born by Normal Vaginal Delivery (NVD) and 12(57.14%) were born by Lower Section Caesarean Section (LSCS). The mean age of presentation was 3.5 days

Table 1: Serum Sodium Levels In Neonates

Serum Sodium	Number	Percentage
$<160\text{mEq/L}$	11	52.38
160-170mEq/L	9	42.85
$>170\text{mEq/L}$	1	4.76

Hyponatremia was taken as Serum sodium of $>145\text{mEq/L}$. 11(52.38%) had sodium levels $<160\text{mEq/L}$, 9(42.85%) had sodium between 160-170mEq/L and 1(4.76%) had serum sodium level $>170\text{mEq/L}$, as depicted in Table 1.

The data obtained from the medical records was collected, verified and

Table 2: Presenting Features Of Hyponatremia In Neonates

Presenting Feature	Number	Percentage
AKI	6	28.57
Hyperbilirubinemia	5	23.8
Weight loss	5	23.8
Fever	4	19.04
Seizures	1	4.76

The presenting features included AKI in 6(28.57%), Weight loss in 5(23.8%), Hyperbilirubinemia in 5(23.8%), Fever in 4(19.04%) and seizures in one (4.76%), as depicted in Table 2. AKI was defined as Serum Creatinine >1mg/dl.

Those with serum sodium >150mEq/L were given IV fluids and those with serum sodium <150mEq/L were managed with feeds alone. 15(71.4%) of the participants had received Intravenous (IV) fluids as a part of the treatment and 6(28.57%) recovered on feeds alone. The average length of ICU stay was 2.47 days (maximum 5 days and minimum 2 days). All the babies were discharged from the NICU and there were not mortality due to hyponatremia.

DISCUSSION

The study was conducted at the tertiary care NICU at Lata Mangeshkar Hospital, Nagpur. The hospital records of all the babies delivered in our hospital and admitted in NICU for Hyponatremic dehydration from 1st January 2019 to 31st December 2019 were reviewed and data collected. All patients with Serum sodium levels >145mEq/L were included in the study. After exclusion criteria, total 21 patients were admitted with Hyponatremia in the said time period. A hospital-based prevalence of 2.23% was observed. Similarly, in a study by Sajad Ahmad Bhat et al, a hospital-based prevalence of 1.3% was observed [8]. Oddie et al., reported an incidence of 2.5 per 10,000 live births [9].

In our study, 12(57.14%) of the participants were males and 9(42.85%) were females. Similarly, in a study by Sajad Ahmad Bhat et al., 55.2% of the babies were female and 44.8% were male [8]. However, in a study by Hassan Boskabadi et al., only 44% were females [10]. 14(66.66%) of the patients in our study were first born. Similarly, 58.2% of the patients were also first born in a study by Sajad Ahmad Bhat [8] and majority mothers were primigravida in a study by A.C. Wang et al [11]. This could be explained by decreased milk output in primi mothers especially in first 2 to 3 days.

42.85% participants were born by Normal Vaginal Delivery (NVD) and 57.14% were born by Lower Section Caesarean Section (LSCS). The Hyponatremia in these patients could be attributed to decreased milk output in the 1st few days and feeding difficulties in babies born by LSCS. The mean age of presentation was 3.5 days. This observation was different from various other studies by Verity H. Livingstone et al., where the mean age of presentation was 8 days [12].

The presenting features in our study included AKI in 6(28.57%), Weight loss in 5(23.8%), Hyperbilirubinemia in 5(23.8%), Fever in 4(19.04%) and Seizures in one (4.76%) of the participant. These findings differed from various other studies. In a study by A.C. Wang et al., 89% of the neonates presented with hyperbilirubinemia [11]. Similarly, in a study by Smita Nair et al., 75.5% patients presented with weight loss which was much higher than in our study [3]. In another study by Aydin Erdemir et al., 61.8% neonates presented with fever, which was higher than in our study [13]. However, comparable findings were seen with Bhat et al, where 31.3% babies had AKI and 5.9% had presented with seizures, which was 28.57% and 4.76% respectively in our study [8].

15(71.4%) of the participants in our study had received Intravenous (IV) fluids as a part of the treatment while only 6(28.57%) recovered on feeds alone. This was much higher than in other studies. In a study by A.C. Wang et al., only 4 infants had received intravenous fluid supplementation. In another study by Nilofer Salim Mujawar et al., breast feeding was continued in all the neonates [14]. A study by Aydin Erdemir et al., states that enteral fluid replacement is a safe and effective alternative to intravenous fluid therapy in newborns with hyponatremic dehydration.

CONCLUSION

Hyponatremic dehydration is a common medical emergency encountered in neonatal ICU and can be caused by poor/ faulty feeding. Thus, to avoid the morbidities associated with hyponatremic

dehydration, all infants should be routinely evaluated for any symptoms or signs. Vigilance on the part of health care provider can help in preventing hyponatremia which most commonly occurs due to faulty feeding in neonates. A weight loss of more than 10% in the first week should be taken as a sign of hyponatremic dehydration. Encouraging breast feeding and in severe cases fluid therapy is the cornerstone in management.

LIMITATION-

The results of this study “Clinical Profile of Hyponatremia in Neonates in a Tertiary Care Centre” NKP Salve Institute of Medical Sciences, and Lata Mangeshkar Hospital and Research Centre, study based on Retrospective study design and not having documented the breast milk sodium levels are the drawbacks of our study, and area based study.

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CONFLICT OF INTEREST-

The authors declare that they have no conflict of interest.

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