

LETTER TO EDITOR (VIEWERS CHOICE)

## ACUTE KIDNEY INJURY IN HYPERNATREMIC DEHYDRATION IN NEWBORN

Abhishek K Phadke, Ali Kumble, Shakib Shafi.

Department of Neonatology, Indiana Hospital, Mahaveer Circle, Mangalore, Karnataka, India.

### KEYWORDS

AKI, hypernatremia, neonates

### ARTICLE HISTORY

Received 15 August 2020

Accepted 30 August 2020

Fourteen days old female baby born by vaginal delivery at term with birth weight of 2.75 kg was referred to our neonatal intensive care unit (NICU) in view of poor feeding and decreased urine output for 3 days. Baby was exclusively on direct breast feeds since birth. No pre-lacteal feeds were given. At admission, the neonate was lethargic and severely dehydrated. Baby had tachycardia and tachypnea with heart rate of 168/min, respiratory rate of 66/min and mean blood pressure of 48 mm of Hg. Admission weight was 2000 grams with significant weight loss (27%) compared to birth weight. Baby was noted to have cleft palate and micrognathia. Investigations revealed severe hypernatremia with serum sodium of 175 meq/L, serum potassium 6.35 meq/L and elevated serum creatinine of 9 mg/dl. Arterial blood gas revealed mild metabolic acidosis with pH of 7.2 and bicarbonate of 12 meq/L. Total leukocyte count was 9000 cells/cumm (neutrophil of 60% and lymphocyte of 32%) and CRP was 2.3 mg/dL. Blood culture did not grow any organism. Ultrasound (USG) abdomen revealed structurally normal kidneys bilaterally. Echocardiography showed moderate size atrial septal defect (ASD). Baby had oliguria with urine output of <0.5 ml/kg/hour. Initially baby was managed with intravenous (IV) normal saline bolus of 20 ml/kg over 1 hour. This was followed by maintenance fluid replacement therapy with isotonic fluid of 0.9% normal

saline over the next 72 hours. Fluid was changed to 0.45% normal saline by titrating with the serum sodium values. Orogastric tube feedings were given to provide nutrition and to maintain euglycemia. Gradual improvement in urine output, renal function, weight and general condition of baby was noted (Table 1). The cause for faulty feeding was identified to be cleft palate which in turn resulted in acute kidney injury (AKI). Baby's mother was counselled regarding importance of proper feeding and was taught technique of feeding with specialized bottle (Habermann nipple). Baby is doing well on follow up at the age of 6 months.

Problems in lactation can result in hypernatraemic dehydration in a neonate with potentially severe adverse consequences. Acute kidney injury (AKI) associated with hypernatremic dehydration though not uncommon, is a relatively under recognized condition. Bhat et al<sup>1</sup> and Boskabadi et al<sup>2</sup> did not mention about the presence or absence of AKI in their respective prospective series of exclusively breast-fed babies with hypernatremia and excessive weight loss (>10%). Oddie et al<sup>3</sup> and Livingstone et al<sup>4</sup> too did not mention about AKI in their case series even when the babies had weight loss up to 27% and 30% and serum sodium was increased up to 175 meq/L and 207 meq/L respectively. Hypernatremic dehydration due to inadequate breast feeding presents clinically between

**Table 1.** Serial urine output, renal function, weight of the child

Day of hospitalization	Weight in grams	S. Sodium (meq/L)	S. Potassium (meq/L)	S. Creatinine (mg/dl)	Urine output (ml/kg/hour)
Day 1	2000	175	6.35	9.0	0.3
Day 2	2100	164	4.54	6.2	0.6
Day 3	2300	163	4.39	5.5	1.2
Day 4	2380	156	3.89	4.0	2.1
Day 5	2520	145	3.30	2.5	1.6
Day 6	2480	139	3.33	1.8	2.0

**CONTACT** Abhishek K Phadke

**Email:** phadke18@gmail.com

**Address for Correspondence:** Abhishek K Phadke, Consultant Neonatologist, Indiana Hospital, Mangalore, Karnataka 575002, India.

©2020 Pediatric Oncall

first and third weeks of life. The relatively higher levels of insensible water loss per kilogram of body weight in infants and less efficient conservation of water due to renal immaturity at this age predisposes this group to dehydration. Thus, hypernatremic dehydration in the breastfed neonate should suggest an abnormal concentration of sodium in the mother's breast milk, a sign of lactation failure.<sup>5</sup> However, exclusively breastfed

neonates with hypernatremic dehydration generally have fewer long term complications. Fluid management is cornerstone of good outcome in hypernatremic dehydration.<sup>6</sup> Study done by Bhat et al showed that out of 67 babies admitted with neonatal hypernatremic dehydration, 16.4% had congenital abnormalities affecting feeding directly or indirectly like cleft palate and ankyloglossia<sup>7</sup> as was seen in our patient.

We highlight the importance of recognizing AKI in these neonates and the potential for its long-term consequences in such setting. The severity of AKI in the case that we described with serum creatinine up to 9mg/dl supports the concern of health care professionals over rising incidences of this entity in exclusively breastfed infants. This should encourage endorsement of improved monitoring of postnatal weight loss in newborns and breastfeeding supportive strategies.

#### **Acknowledgement**

Entire team of doctors at Indiana Hospital, Mangalore.

#### **Compliance with Ethical Standards**

**Funding:** None

**Conflict of Interest:** None

#### **References:**

1. Bhat SR, Lewis P, David A, Liza SM. Dehydration and hypernatremia in breast-fed term healthy neonates. *Indian J Pediatr.* 2006; 73:39-41.
2. Boskabadi H, Maamouri G, Ebrahimi M, Ghayour-Mobarhan M, Esmaeily H, Sahebkar A, et al. Neonatal hypernatremia and dehydration in infants receiving inadequate breastfeeding. *Asia Pac J Clin Nutr.* 2010; 19:301-7.
3. Livingstone VH, Willis CE, Abdel-Wareth LO, Thiessen P, Lockitch G. Neonatal hypernatremic dehydration associated with breast-feeding malnutrition: A retrospective survey. *CMAJ.* 2000; 162:647-52.
4. Oddie S, Richmond S, Coulthard M. Hypernatraemic dehydration and breast feeding: A population study. *Arch Dis Child.* 2001; 85:318-20.
5. Zaki SA, Mondkar J, Shanbag P, Verma R. Hypernatremic dehydration due to lactation failure in an exclusively breastfed neonate. *Saudi J Kidney Dis Transpl.* 2012;23:125-128.
6. Nair S, Singh A, Jajoo M. Clinical Profile of Neonates with Hypernatremic Dehydration in an Outborn Neonatal Intensive Care Unit. *Indian Pediatr.* 2018;55:301-305.
7. Sajad Ahmad Bhat, Zul Eidain Hassan, Shafat Ahmad Tak. Clinical profile and outcome of neonates with hypernatremic dehydration - a tertiary care hospital based study. *International Journal of Contemporary Medical Research.* 2019;6:B1-B4.