

Research Article

Study of renal functions in preterm and full term new born in relation to parity of the mother

Jitendra P. Bhatnagar*, Virendra K. Gupta, Shagun Gupta, Alok Purohit

Department of Pediatrics and Obstetrics & Gynae, NIMS University; Jaipur, Rajasthan, India

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*Correspondence:

Dr. Jitendra P. Bhatnagar,

E-mail: drjpbhatnagar@gmail.com

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ABSTRACT

Background: During the intrauterine life, placenta performs the function of maintaining fluid and electrolyte balance and removing harmful waste products. The renal function is related more closely to gestational age, postnatal age and parity of mother. Objective of the study was to study renal functions in preterm and full term new born in relation to the parity of mother (primiparous versus multiparous mother).

Methods: The study was conducted from January 2015 to December 2015 on 500 healthy new-borns among them 250 were full term healthy new-borns and 250 were preterm healthy new-borns. They were divided into 3 groups on the basis of gestational age and parity of mother. Relevant investigations were done in all cases enrolled in study:

Results: Out of total 500 new-born 255 (51%) male 245 (49%) female. In both FT and PT new-borns, primigravida child was more dehydrated than multigravida (P- Value<0.001). Mean change in the levels of S. Na, S. urea, S. Cr, BUN Ratio at 72 hours in dehydrated PT (BF) new born was significantly higher than FT (BF) non-dehydrated new born (P-value<0.001).

Conclusions: Hypernatremic dehydration is a potentially fatal complication of the failure of establishment of breastfeeding mainly in primigravida so mothers should be highly motivated to breastfeed having either decreased milk production or nipple-related abnormalities that create feeding difficulty and result in inadequate fluid and caloric intake in their infants. Therefore, mothers should be helped and supported to breast feed their infants as soon as possible after delivery.

Keywords: Hypernatraemic dehydration, Primigravida, Gestational age

INTRODUCTION

During the intrauterine life, placenta performs the function of maintaining fluid and electrolyte balance and removing harmful waste products. At birth, the kidney replaces the placenta as a major homeostatic organ. The renal function is related more closely to gestational age and the postnatal age.¹

In preterm babies, there is difficulty in self-feeding due to weak sucking and swallowing but fluid needs of preterm babies are relatively higher during first few hour of life

due to large surface area, higher BMR, highly vascular skin predisposing these babies to dehydration.²

Primigravida mothers face difficulty in breast feeding initially due to anxiety worry and lack of confidence and have poor milk output in first few days.

Breastfeeding is a learned skill. Numerous breastfeeding problems can occur and many mothers struggle, especially in the initial stages to establish successful breastfeeding. Most of these problems are transient and can be overcome with practice, adequate support for the mother and careful monitoring of the mother-infant

couple at primary health care level. Adequate training of all health professionals involved in this area help in the early recognition and correction of these problems before they become serious. When inadequate breastfeeding is not recognized, the consequences to the infant can be serious.³

Inadequate breast milk can be due to various associated maternal factors such as stress and fatigue, it is important to recognize that a very small proportion of mothers may have primary lactation failure as well.³

Hence we had the study renal functions (Blood urea, serum creatinine, serum sodium, blood urea I serum creatinine ratio) in preterm and full term newborns to assess possible predisposition to dehydration and prerenal failure and the ultimate established renal failure if not managed appropriately with fluids in any form. This assumes ever more significance when this strategy is generalized to form a rigid national health policy for all newborns without considering the possible hazards in at least some of these patients. Objective of the study was to study renal functions in preterm and full term new born in relation to the parity of mother primiparous versus multiparous mother)

METHODS

The present prospective was carried out at special care neonatal unit of NIMS Hospital and medical collage The study was conducted from Jan 2015 to December 2015 on 500 healthy newborns among them 250 were full term healthy newborns and 250 were preterm healthy newborns.

They were divided into 3 groups:

- *Group 1:* 250 full term healthy newborns those were on exclusive breast feeding.
- *Group 2:* 125 preterm healthy newborns those were on exclusive breast feeding.
- *Group 3:* 125 preterm healthy newborn were on 100% fluid (I.V. fluid / I.V. fluid+ NG).

Birth weight were recorded using an electronic weighing machine.

Mothers are motivated to adopt exclusive breast feeding practice. Mothers are advised to initiate breast feeding with in 1 hour of birth No artificial teats or pacifier should be given to breast fed infants Mothers are told to give new born infants no food or drink other than breast milk.

Following investigation (Serum sodium, serum creatinine, serum urea, BUN / serum creatinine ratio) were done in all cases enrolled in the study:

- *Umbilical cord blood*
- *Within 12 - 48 hours*
- *After 72 hours*

All the studied new borns were followed from the birth to 5th day. Newborns developed septicemia, pathological jaundice, had serious congenital malformation (i.e. cleft palate, TOF, urogenital malformation etc.) respiratory distress, intracranial hemorrhage, intrinsic renal failure, DIC were excluded from the study.

RESULTS

This prospective study was conducted on 500 new born (250 full term and 250 preterm) born at NIMS hospital and collage Jaipur from Jan 2015 to December 2015.

- Studied 250 FTBF newborns, 10 were found dehydrated (4%).
- 125 PTBF newborns, 10 were found dehydrated (8%).
- 125 PT (IV), those who were on 100% fluid none was found Dehydrated.

Table 1: Distribution of new-born according to term of delivery.

Term	Sex				Total
	Male		Female		
	No	%	No	%	
FTND	145	58.00	105	42.00	250(100.00)
PT	110	44.00	140	56.00	250(100.00)
Total	255	51.00	245	49.00	500(100.00)

Table 2: Distribution according to dehydration of new-borns and parity of mothers.

Group	Parity				Total	
	Primi		Multy		Dehydration	No dehydration
	Dehydration	No dehydration	Dehydration	No dehydration		
FT(BF)	7 (5.7)	117 (94.3)	3 (2.4)	123 (97.6)	10 (4.00)	240 (96.00)
PT(BF)	7 (11.8)	52 (88.2)	3 (4.5)	639 (95.5)	10 (8.00)	115 (92.00)
PT(IV)	0 (00.00)	74 (59.20)	0 (00.00)	51 (40.80)	0 (00.00)	125 (100.00)
Total	14 (9.6)	132 (90.4)	6 (2.5)	237 (97.5)	20 (4.00)	480 (96.00)

Table 3: Distribution according to mode of delivery of mother and dehydration in new-born.

Group	Mode of delivery				Total	
	LSCS		Vaginal		Dehydration	No Dehydration
	Dehydration	NO Dehydration	Dehydration	No Dehydration		
FT(BF)	6 (9.4)	58 (90.06)	4 (2.1)	182 (97.9)	10 (4.00)	240 (96.00)
PT(BF)	7 (10.00)	54 (90.00)	3 (6.1)	61 (93.9)	10 (8.00)	115 (92.00)
PT(IV)	0 (0.00)	21 (16.80)	0 (0.00)	104 (83.20)	0 (0.00)	125 (100.00)
Total	12(8.3)	133 (91.7)	8 (2.2)	347 (97.8)	20 (4.00)	480 (96.00)

In our study Table 1 showing that 250 FTBF cases 145(58%) were male and 105 (42%) were female & rest 250 PT cases 110(44%) were male and 140 (56%) were female. Among total 500 newborn 255 (51%) male 245 (49%) female.

In term of parity Table 2 showing that out of 250 FTBF newborns, 123 born from primigravida among them 7 were found dehydrated (5.7%) and 126 born from multipara mother among them 3 were found dehydrated (2.4%). 125 PTBF newborns, 59 born from primigravida among them 7 were found dehydrated (11.8%) and 66 born from multipara mother 3 were found dehydrated

(4.5%). This reveals that dehydration is more among newborn from primigravida mother. In term of type of delivery of mother out of 250 FTBF newborns, 64 born by LSCS among them 6 were found dehydrated (9.4%) and 186 born by vaginal delivery among them 4 were found dehydrated (2.1%). Out of 125 PTBF newborns, 60 born by LSCS among them 10 were found dehydrated (10.0%) and 65 born by vaginal delivery among them 4 were found dehydrated (6.1%). 125 PT (IV) newborns, 21 born by LSCS, 104 by vaginal delivery and none were found dehydrated. This is showing that dehydration is more common among newborns born by LSCS delivery (Table 3).

Table 4: Mean change±SD of various parameters of FT/BF) dehydration patient and pt (IV) (72hrs).

Parameters	Mean change±Sd		P-value	Significance
	PT (BF)-D (n=10)	PT(IV) (n=125)		
Serum Na	15.70 +3.58	5.74+4.20	< 0.001	HS
Serum Urea	53.50+13.76	0.81+10.64	< 0.001	HS
Serum Cr	0.35+0.21	0.80+0.11	< 0.001	HS
BUN Ratio	17.20+3.28	1.08+4.67	< 0.001	HS

Table 5: Mean change+SD of various parameters of PT(BF) dehydration patient and PT (IV)(72hrs).

Parameters	Mean Change+Sd		p-Value	Significance
	FT (BF)-D (n=10)	PT (BF) (n=115)		
S.Na	16.00+3.58	3.69+5.06	< 0.001	HS
S.Urea	49.70+14.80	5.52+10.24	< 0.001	HS
S.Cr.	0.28+0.23	0.12+0.09	< 0.001	HS
BUNRatio	16.20+6.57	6.90+5.51	< 0.001	HS

Table 4 showing comparison of 'mean change' in values of S. Na, S. Urea, S. Cr, BUN Ratio between 10 PT(BF) dehydrated and FT(BF) non-dehydrated newborns. 'Mean change' in the levels of S. Na, S. Urea, S. Cr, BUN Ratio at 72 hours in dehydrated PT (BF) new born was significantly higher than FT (BF) non dehydrated new born (P-value 0< 00.001). Table 5 showing comparison of 'mean change' in values of S.Na, S.Urea, S.Cr, BUN Ratio between 20 FT+PT (BF) dehydrated and PT (IV) non dehydrated newborns (these were on 100% fluid)

'mean change' in the levels of S. Na, S. Urea, S. Cr, BUN Ratio at 72 hours in dehydrated FT+PT (BF) newborns was significantly higher than PT (IV) non dehydrated newborns (P-value <0.001).

DISCUSSION

Breast feeding is undoubtedly the best nutritional choice for the otherwise well new born and its numerous benefits are well described.

This prospective study conducted on 500 new born (250 full term and 250 preterm), among these 375 were exclusive breast-feed and 125 on 100% fluid. Those new borns who were exclusively on breastfeeding among them 20 (5.3%) showed hypernatremic dehydration. The incidence in the present study is higher than the prospective study done by Manganaro R et al of the university of Messina, Italy on 686 exclusively breast-fed healthy full term neonates among them 19 have hypernatremic dehydration (2.7%) this might be due to temperate climate of Italy and better health facility.⁴

In present study on 250 full term healthy exclusive breast feed newborns, among them 10 (4%) were found dehydrated (hypernetremic). Bhat SR, Lewis patricia et al in their prospective study at Bangalore found 50 case of hypernetremic dehydration out of 496 studied cases (10%), which is higher than our study.⁵ This might be due to that study was conducted in warm months. Manganaro P, Marni C et al in their prospective study at Italy found > 19 cases of hypernetremic dehydration out of 686 studied cases (2.7%), which is lower than our study.⁴ This might be due to temperate climate and better healthy facilities of Italy. Uras N, Karadag A et al in their retrospective study at Turkey found 43 hypernetremic dehydration cases in studied 1150 full term newborn cases (3.8%).⁶ This study match with our study. This might be because India and Turkey are developing countries and health facilities are approximately same.

In relation to gravity of mother present study on 250 full term exclusive breast feed babies 10 were found hypernetremic dehydrated, among them 70% are born from primi gravida mother and 30% from multiparous mother.

Yaseen H et al in their study on full term exclusive breast feed newborn observed 79% born from primigravida and 21% from multiparous mother to be hypernetremic dehydrated.⁷ Distribution of cases in our study are in agreement of above study but Zachariassen G et al in their retrospective study observed hypernetremic dehydration in newborns, in which 57% were born from primi gravida and 33% from multiparous mother which is slightly lower than our study.⁸ Penalver Giner O, Gisbert Mestra G et al in Spain in their retrospective study on full term exclusive newborn found hypernetremic dehydrated babies, 83% born from primiparous and 16% from multiparous which is higher than our study.⁹

CONCLUSION

Hypernetremic dehydration is a potentially fatal complication of the failure of establishment of breastfeeding especially when recognition of risk factors, signs and symptoms is delayed. Recognized complications of hypernetremic dehydration include

fever, lethargy, pre renal failure, jaundice, coagulopathy, seizures.

Mothers are usually primigravida women who are highly motivated to breastfeed but have either decreased milk production or have nipple-related abnormalities that create feeding difficulty and result in inadequate fluid and caloric intake in their infants. Prior breast surgery, inverted nipples, very large nipples or incorrect latching technique have all been recognized as factors contributing to insufficient feed intake.

Therefore, mothers should be helped and supported to breast feed their infants as soon as possible after delivery. Unnecessary system delays, particularly after caesarean section, should be minimized.

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