

Safety Issue of Hydroxy-Ethyl Starch on Neonatal Renal Function

Raktima Chakrabarti

The Pediatric Clinic M3M Urbana, India



Abstract

Aims: Hydroxyethyl starch (HES), a plasma volume expander, is started to get explored as a treatment-option for neonatal hypovolemia in the present decade. The objective of the present study was to assess the effect of this agent on the immature renal system of neonatal population. The secondary objective was to compare the renal impact of HES to that of isotonic saline solution (ISS), the most-commonly used volume expander in neonatal intensive care units (NICU).

Methods: The current university-hospital based retrospective-study expanded over 1 year (January 2009 - December 2009) and involved 50 inborn neonates (gestational age ranged from 24-38 weeks, birth weight 440-4580 grams) with hypovolemia. HES and ISS both are used in our NICU according to clinician's judgment. 25 neonates were chosen randomly from HES treated patients and 25 randomly from ISS treated cases. The exclusion criteria were: out born neonate, neonates with congenital anomaly of renal system, renal vein thrombosis, acute renal-tubular-necrosis, neonates simultaneously treated with veno-arterial extra-corporeal membrane oxygenation (ECMO) or nephrotoxic antibiotics, babies with diagnosed congenital syndrome complex, inborn error of metabolism. HES group neonates were treated with 4 ml/kg HES (200/0.5) over 30 minute and the others were with 10 ml/kg 0.9% normal saline. Blood samples were collected from all of them before, immediately after, 24 hours, 7 days and 14 days after volume treatment to check serum creatinine level. Urine output was continuously monitored. At those time points their Glomerular filtration rate (GFR), and urinary output were also recorded. The collected data were analyzed statistically using Graph-pad prism 5.03.

Results: The result showed that there was no derogatory effect of HES either on immature kidney or on other systems. There was no significant difference among these two groups at any point of time with respect to GFR, serum creatinine or urine output (our considered renal functional parameters) [table I]. But both groups showed significant changes of these functions with respect to time, which could be a normal physiological maturation of kidney during neonatal period as a result of adjustment from fetal to postnatal life. In case of HES group, there was a minute fall of GFR and rise of creatinine immediately after treatment which could be due to HES induced down regulation of endogenous nitric-oxide production.

But this was not statistically significant and did not give rise to any renal pathology.

Conclusion: A small-volume single-infusion of Hydroxyethyl starch is a good option for treating neonatal hypovolemia without any adverse effects and its impact on renal-function is comparable to isotonic saline. So it can be considered as an emergency medicine in NICU.

Table 1: Renal parameters of the two groups at different time

Renal parameters	Time	HES Group	ISS Group	Significance
GFR (Mean±SEM†)	Before	24.15 ± 2.814	18.10 ± 1.089	*P=0.5350
	Immediately after	22.00 ± 2.645	18.49 ± 1.116	*P=0.2311
	24 hours after	23.39 ± 2.504	20.64 ± 1.243	*P=0.3329
	7 days after	28.49 ± 2.947	23.71 ± 1.482	*P=0.1556
	14 days after	38.53 ± 4.741	30.11 ± 2.514	*P=0.1254
Creatinine (Mean±SEM)	Before	0.7196 ± 0.05023	0.7828 ± 0.03243	*P=0.2967
	Immediately after	0.7876 ± 0.04788	0.7740 ± 0.03844	*P=0.8256
	24 hours after	0.7604 ± 0.04734	0.6676 ± 0.03827	*P=0.1340
	7 days after	0.6320 ± 0.04980	0.6084 ± 0.03152	*P=0.6909
	14 days after	0.4972 ± 0.04477	0.4888 ± 0.02450	*P=0.8702
Urine output (Mean±SEM)	Before	3.202 ± 0.4789	3.274 ± 0.3685	*P=0.9061
	Immediately after	5.226 ± 0.5125	5.013 ± 0.3954	*P=0.7438
	24 hours after	5.917 ± 0.4453	4.981 ± 0.1896	*P=0.0620
	7 days after	5.491 ± 0.4381	5.635 ± 0.2888	*P=0.7851
	14 days after	6.143 ± 0.3161	6.347 ± 0.3522	*P=0.6677

[*=2-tailed P value by unpaired t-test, †= standard error of mean]

Biography:

Dr Raktima Chakrabarti is a renowned neonatologist with a rich 28 years of experience in both India and Germany. She has done her graduation from one of the oldest medical colleges of India, NRS Medical College Kolkata, subsequently MD in Pediatrics from LLRM Medical College Meerut. Post MD she was awarded scholarship at Friedrich Alexander University at Erlangen- Nuremberg Germany where she finished her super specialisation in Neonatology. During her studies and till now she is taking part in multiple research projects and already published more than 20 scientific papers in national and international journals, she authored multiple text book chapters for post graduate and super specialisation courses. She has a vast experience in dealing all pediatric illness with special emphasis in Neonatology. Her principal interest is treating critical problems in preterm babies. She has worked as consultant in many renowned hospitals in India, Cloudnine, Columbia Asia are few of them. Currently she is working as consultant in Apollo Cradle hospital Gurgaon.

[6th World Congress on Pediatric Disease, Care & Management](#); November 23-24, 2020.

Abstract Citation:

Raktima Chakrabarti, Safety Issue of Hydroxy-Ethyl Starch on Neonatal Renal Function, Pediatric Disease 2020, 6th World Congress on Pediatric Disease, Care & Mangement; November 23-24, 2020.