

The Use of a Noninvasive Hemoglobin Monitor for Determining Fluid Distribution and Elimination in Pediatric Patients undergoing Minor Surgery

Lian Q., Li H., Zeng R., Lang J., Shangguan W., Liu H., Wang B., Rodhe P.M., Svensen C.H. *J Clin Monit Comput.* 2014 Feb 19.

In pediatric fluid therapy it would be preferable to describe distribution and elimination a fluid bolus based on repetitive hemoglobin (Hb) according to kinetic principles. Pulse CO-Oximetry is a recent advancement in patient monitoring that allows for the continuous noninvasive measurement of Hb (SpHb). The aim of this study was to describe the distribution and elimination of hydroxyethylstarch (HES) 130/0.4 in combination with crystalloids using a noninvasive Hb monitor in two cohorts of young children undergoing minor surgeries under general anesthesia.

Two cohorts, 16 children aged 1-3 years and 12 aged 4-6 years, were investigated during anesthesia and minor surgical procedures. They were given a maintenance solution of lactated Ringer's and a fluid bolus of HES 130/0.4, 6 mL/kg over a period of 20 min. The whole procedure lasted 120 min, and SpHb values were measured every 10 min. The SpHb values were used to calculate plasma dilution, net volume, and mean residence time (MRT) of the infused fluid.

A total of 377 measured SpHbs generated individual dilution plots that showed variability, particularly for the older cohort. Distribution and elimination rates of the infused fluid were calculated. Mean dilution plots were generated. There were no significant differences in dilution, net volume or MRT between groups.

A noninvasive Hb analyzer could be used to calculate fluid distribution. The variability in the data can probably be explained by reactions to anesthetic drugs, variability in measurement technique, variability in generating the complex capillary signals, and individual variability in baseline fluid status. The latter finding is important because this is a prerequisite for perioperative fluid planning for each individual.