

Safety of oral chloral hydrate as sedative during cerebral MRI in neonates with critical congenital heart disease

*Kuennen M.L.W., Claessens N.H.P., Jansen N.J.G., Wösten R.M., Stegeman R., de Vries L.S., Benders M.J.N.L., Groenendaal F., Breur J.M.P.
Wilhelmina Children's Hospital, Utrecht, The Netherlands.*

Introduction: To obtain a good-quality MRI, reduce scan-time and increase comfort of the neonate, short-acting sedation may be necessary. Several studies have shown that chloral hydrate (CH) is safe in neonates. However, neonates with critical congenital heart disease (CHD) might react differently to sedation, because of their changed circulation. Therefore, the aim of this study was to examine the safety of CH as short-acting sedative in neonates with CHD.

Methods: This retrospective, observational cohort study included 35 (near-)term neonates who received CH prior to cerebral MRI before and/or after cardiac surgery with cardiopulmonary bypass (surgery:<30 days after birth). Included cardiac anomalies were: single ventricle physiology(N=7), transposition of the great arteries(N=15), aortic arch anomalies(N=9) and pulmonary atresia(N=4). Sedation protocol included oral CH 50-60 mg/kg given by nasogastric tube 15-20 minutes prior to MRI. The following vital parameters were measured directly before and after MRI: heart rate (beats/min), transcutaneous oxygen saturation (%), respiratory rate (breaths/min) and temperature (°C). Number of events with desaturation (>10% decrease) or bradycardia (<100/min) and requirement of respiratory or circulatory support during MRI were reported.

Results: Forty-nine cerebral MRI scans of neonates who received CH prior to MRI were assessed (17 preoperatively and 32 postoperatively). Median dose of CH was 51.6 mg/kg (IQR 50.1-56.3). Saturation and respiratory rate before and after MRI were not significantly different at both preoperative and postoperative timepoint (all: $P>0.05$). Four neonates (8%) had desaturations during MRI (median lowest saturation: 70%). Two patients recovered spontaneously and in the other two patients oxygen support was started during MRI. Heart rate before and after MRI was not significantly different preoperatively ($P=0.072$). Postoperatively, heart rate showed a significant decrease after MRI compared to before ($P=0.003$). In none of the neonates bradycardia was reported and respiratory or circulatory support was needed. After MRI, temperature was decreased when compared to before, both preoperatively ($P=0.006$) and postoperatively ($P=0.001$).

Conclusion: CH in a dose of 50-60 mg/kg appears to be a safe short-acting procedural sedative in neonates with critical CHD undergoing MRI when appropriate monitoring is applied. Further studies should reveal the efficacy of short-acting sedatives in neonates with CHD.