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MORE THAN HALF OF PRETERM INFANTS WITH NECROTIZING ENTEROCOLITIS OR SPONTANEOUS INTESTINAL PERFORATION LOSE CEREBROVASCULAR AUTOREGULATION DURING LAPAROTOMY

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Aim: Preterm infants who undergo major surgery are at risk of subsequent neurodevelopmental impairment. A possible explanation for this might be that cerebrovascular autoregulation (CAR) is reduced intraoperatively, resulting in harmful fluctuations of cerebral perfusion. Therefore, we wanted to evaluate CAR during laparotomy in comparison with pre- and postoperative CAR in preterm infants with necrotizing enterocolitis (NEC) or single intestinal perforation (SIP).

Methods: We prospectively included preterm infants (GA <37 wks) who underwent an exploratory laparotomy for NEC or SIP. We used Near-Infrared Spectroscopy (NIRS) to continuously measure mean cerebral oxygen saturation (rcSO2) eight hours preoperatively, during surgery and the first eight postoperative hours. To correct for effects of fluctuations of the arterial oxygen saturation (SpO2), we calculated the cerebral fractional tissue oxygen extraction (cFTOE) as follows: cFTOE = (SpO2-rcSO2)/SpO2. We used Spearman's correlation to determine the relation between cFTOE and mean arterial blood pressure (MABP) and defined inadequate CAR as rho >-0.3 with p <0.05. Comparisons in CAR were made using the MacNemar test.

Results: We included 27 preterm infants, twenty (74%) with NEC and seven (26%) with SIP. Median [IQR] GA was 27.6 wks [26.4-30.6], and BW of 1000 [790-1430]g. Surgery took place on median [IQR] postnatal day 9 [7-12]. Nineteen (70%) infants had MABP measurements (≥1x/5min) preoperatively, during surgery, and postoperatively. Of these, three (16%) infants had inadequate CAR preoperatively, twelve (63%) had inadequate CAR intraoperatively, and none had inadequate CAR postoperatively. There was a higher incidence of inadequate CAR during surgery compared to preoperatively (p=.02) and postoperatively (p=.002).

Conclusion: More than half of preterm infants with NEC or SIP lose CAR intraoperatively, despite adequate CAR pre- and postoperatively. This poses an extra risk for brain damage. Monitoring of CAR during surgery might help to guide hemodynamic support, thereby possibly reducing brain damage.