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A RETROSPECTIVE STUDY OF PACKED RED BLOOD CELL TRANSFUSION IN NECROTISING ENTEROCOLITIS

B. Thyagarajan, A. Shirsalkar

Neonatal Intensive Care Unit, Queens Hospital, Romford, UK

Aims: We evaluated the role of packed red blood cell (PRBC) transfusion on the causation of necrotising enterocolitis (NEC) in neonates.

Methods: In a retrospective observational study (April 08-March 09), we compared neonates who developed NEC after PRBC transfusion (transfusion group) to neonates who developed NEC without blood transfusion (controls).

Results: Over the one year period, 20 neonates developed NEC (2/1000 live births). Gestation less than 30 weeks(75%) and birth weight less than 1500 grams (93.3%) were the most common risk factors. Nine (55.6%) babies had received a recent PRBC transfusion. The gestational age of the transfusion group (27.5 weeks) was comparable to the control group (26.89 weeks). NEC developed at a mean post natal age of 42 days in the transfusion group against 19.2 days in controls. 50% of babies in the transfusion group were Black African ethnicity compared to 14.3% in the control group. Perforating NEC developed in 22.2% of babies in the transfusion group (42.8% in the control group). An abnormal antenatal ultrasound scan (23.1%), maternal smoking (25%), antepartum haemorrhage (21.4%), chorioamnionitis (33.3%) and emergency caesarean section delivery (40%) were moderately associated with NEC, but were not significantly different between the groups. There was a bimodal pattern of onset. Early symptoms developed within 72 hours (mean 2.6 days) of the packed red cell transfusion in five (55.6%) babies and late symptoms developed at mean 10.6 days.

Conclusions: There is a close association between blood transfusion and NEC. Black African babies and older babies are at increased risk.

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NITRIC OXIDE AND LIPID PEROXIDATION ARE INCREASED AND ASSOCIATED WITH DECREASED ANTIOXIDANT ENZYME ACTIVITIES IN CHILDREN WITH NOSOCOMIAL PNEUMONIA

D. Dmytriiev, O. Katilov, K. Dmytriieva

Vinnitsa National Medical University, V innitsa, Ukraine

Background: Nitric oxide (NO), hydroxyl radical (OH*), superoxide anion (O2-) and hydrogen peroxide (H2O2) are free-radicals released in oxidative stress. Superoxide dismutase (SOD), glutathione peroxidase (GSHPx) and catalase (CAT) are antioxidant enzymes, mediating defense against oxidative stress. Excess NO and/or defective antioxidants cause lipid peroxidation, cellular dysfunction and death. Nosocomial pneumonia (NP) the leading cause of death in children.

Methods: NO, lipid peroxidation and the catalytic activity of SOD, GSHPx and CAT were measured in a group of 12 patients with nosocomial pneumonia (5 boys, 7 girls; 8.02 +/- 3.70 years) and compared with age- and sex-matched healthy control subjects without NP (7 boys, 7 girls; 8.42 +/- 3.40 days).

Results: All patients with NP had significantly ($p < 0.001$) higher plasma NO levels over control subjects (40.18 +/- 8.81 vs. 20.22 +/- 3.19 micromol/l). On the other hand, SOD and GSHPx activities were significantly lower in both RBCs and plasma of patients with NP than in control subjects (RBCs-SOD, 3400.00 +/- 400.22 vs. 5302.10 +/- 403.10 U/g Hb, $p < 0.001$; plasma-SOD, 500.01 +/- 50.00 vs. 710.10 +/- 40.10 U/g protein, $p < 0.001$; RBCs-GSHPx, 600.10 +/- 40.02 vs. 702.10 +/- 40.12 U/g Hb, $p < 0.001$; plasma-GSHPx, 90.20 +/- 10.10 vs. 138.80 +/- 9.06 U/g protein, $p < 0.001$). In addition, plasma NO levels were negatively correlated with SOD and GSHPx activities.

Conclusions: This study demonstrated for the first time that NO, the most abundant free-radical in the body, might be implicated in the pathophysiology of NP.