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Faecal calprotectin levels as a diagnostic marker for necrotising enterocolitis in infants with congenital heart disease: cross-sectional validation study (preliminary data)

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Introduction

Infants with duct-dependent circulation defects experience suboptimal splanchnic perfusion resulting in gut inflammation which is exacerbated by cardiac surgery and enteral feeding, increasing the risk of necrotising enterocolitis (NEC). NEC leads to extensive feed interruptions contributing to poor growth particularly during the early post-operative phase but continuing up until discharge. Poor growth and longer hospital stay are risk factors for death in infants with congenital heart disease. Calprotectin (36.5kDa) is a neutrophil activation marker which is exhibited in the cytoplasm of neutrophils and expressed on activated monocytes and macrophages; and participates in leukocyte interactions with the endothelium and cellular adhesions, leading to the recruitment of leukocytes to inflamed intestinal tissue and hence a measure of gut inflammation (normal faecal calprotectin level <50mg/kg).

Methods

To date, faecal calprotectin levels have been measured in twenty term infants with duct-dependent circulation defects using ELISA methods. Samples are collected post-surgery once feeding is established and bowels open. Infants follow a high risk feeding protocol (starting at 0.5ml/kg) consisting of either expressed breast milk or hydrolysed formula (Pepti-junior). Infants with suspected NEC underwent an abdominal radiography.

Results

Incidence rate of NEC (Bell's stage 2) was 15%. The mean faecal calprotectin level for infants with NEC was significantly higher 3957mg/kg compared to those without 713mg/kg (95% CI 223, 6918; p-value 0.02). Infants with single ventricles have higher baseline calprotectin levels 2184mg/kg compared to other duct-dependent circulation infants (p-value 0.04). Time to establish 100ml/ kg feed volume was on average 10 days longer in the NEC group (22 days) compared to those without NEC.

Conclusion

Infants with duct-dependent circulation defects have elevated baseline faecal calprotectin levels, particularly infants with single ventricle. Faecal calprotectin may be a useful marker for gut inflammation eliminating abdominal radiography and exposure to radiation.