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First use of Laser Speckle Imaging to guide surgical repair in ill newborn babies

D Sharkey[1], L Shipley[1], B Davies[2]

[1]Academic Child Health, University of Nottingham, [2]Nottingham University Hospitals NHS Trust

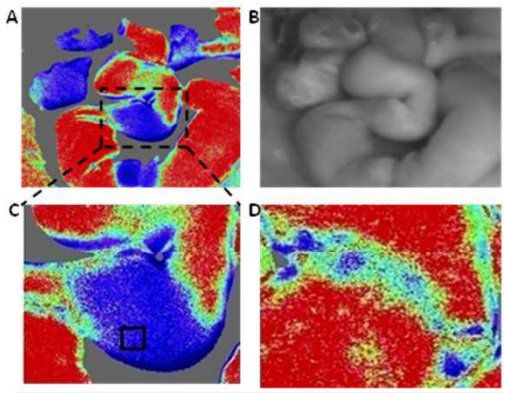
The Clinical Rationale

Preterm birth is common and accounts for almost 60,000 births in the UK each year. Necrotising enterocolitis (NEC) is a devastating condition of newborn babies resulting in significant morbidity, such as short bowel syndrome, or death. It accounts for 12% of all deaths in babies born <29 weeks gestation. Surgical resection of bowel can be lifesaving but assessing which areas of bowel are beyond repair, and so should be removed, is very subjective and could result in removal of viable bowel.

Area of severely disease bowel at operation

Our Technological Solution

Laser Speckle Imaging (LSI) is a real-time, high resolution non-contact method for detecting blood flow in tissue. We have successfully used this, for the first time, in babies undergoing extensive bowel surgery to quantify blood flow (perfusion) to areas of healthy and diseased bowel in those with NEC. The LSI also provided post-repair data to support clinical decision making aimed a minimising bowel loss.



Laser speckle images showing, **A** overall bowel blood flow image with areas of NEC (blue, low perfusion) vs good perfusion (red), **B** Photo of bowel in A, **C** Magnified area of NEC from A, **D** Post-repair perfusion.

Benefits for Children

Short bowel syndrome is the most common cause of intestinal failure in infants. The results from our work demonstrate the potential for this technology to improve surgical procedures aimed at preserving viable bowel and reducing excess resection that may result in short bowel syndrome. This technology may also be of use in other common conditions such as Gastroschisis and malrotation/volvulus.

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For more information email:
don.sharkey@nottingham.ac.uk

Nottingham University Hospitals NHS
NHS Trust