A multicentre randomised controlled trial of Transfusion Indication Threshold Reduction on transfusion rates, morbidity and health-care resource use following cardiac surgery (TITRe2)

Barnaby C Reeves,1* Katie Pike,1 Chris A Rogers,1 Rachel CM Brierley,1 Elizabeth A Stokes,2 Sarah Wordsworth,2 Rachel L Nash,1 Alice Miles,1 Andrew D Mumford,3 Alan Cohen,4 Gianni D Angelini5 and Gavin J Murphy6 on behalf of the TITRe2 investigators†

1Clinical Trials and Evaluation Unit, School of Clinical Sciences, University of Bristol, Bristol, UK
2Health Economics Research Centre, Nuffield Department of Population Health, University of Oxford, Oxford, UK
3School of Cellular and Molecular Medicine, University of Bristol, Bristol, UK
4Division of Specialised Services, University Hospitals Bristol NHS Foundation Trust, Bristol, UK
5Bristol Heart Institute, School of Clinical Sciences, University of Bristol, Bristol, UK
6Department of Cardiovascular Sciences and National Institute for Health Research Leicester Biomedical Research Unit in Cardiovascular Medicine, University of Leicester, Leicester, UK

*Corresponding author
†Transfusion Indication Threshold Reduction (TITRe2) investigators are listed in Appendix 1

Declared competing interests of authors: Rachel CM Brierley, Alan Cohen, Alice Miles, Andrew D Mumford, Gavin J Murphy (up to 31 August 2012), Rachel L Nash, Katie Pike, Sarah Wordsworth, Elizabeth A Stokes and Barnaby C Reeves had varying percentages of their salaries paid for by the grant awarded for the trial. Some or all of the time contributed by Gianni D Angelini, Gavin J Murphy (from 1 September 2012) and Chris A Rogers was paid for by the British Heart Foundation. Barnaby C Reeves is a member of the National Institute for Health Research Health Technology Assessment Commissioning Board, Systematic Reviews Programme Advisory Board and the Efficient Studies Design Board.

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When patients lose blood during cardiac surgery, the oxygen-carrying capacity of the blood (haemoglobin) drops. Blood transfusion is thought to restore the oxygen-carrying capacity and a patient’s haemoglobin usually guides doctors’ decisions about when to give a transfusion. However, different hospitals and surgeons give transfusions at different levels of haemoglobin. The study investigated whether or not giving fewer transfusions (by allowing the haemoglobin to fall lower) reduces the risk of serious post-operative complications previously associated with transfusion.

Just over 2000 patients took part. They were allocated by chance into groups who were transfused at ‘low’ or ‘high’ haemoglobins. Almost all patients in the high group (92%), but only half of the patients in the low group (53%), had a transfusion. Slightly more patients in the low group experienced serious complications (infections, heart attacks, strokes, kidney and serious bowel problems) than in the high group (35% vs. 33%), but this was a small difference. However, more patients died in the low group than in the high group (4.2% vs. 2.6%, respectively). We found no substantial differences between groups in other aspects of patients’ recovery, including the duration of hospital stay, quality of life reported by patients or lung complications.

Contrary to our original expectation, the trial showed that waiting to transfuse until lower haemoglobin is reached might, in fact, be worse. It is particularly worrying that more patients died in the lower haemoglobin group. We have recommended that more research be done to understand the reasons for this finding.
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