Reply from the authors

Editor—We thank Dr Minhas and colleagues for their comments and interest in our findings.1

As they correctly pointed out, we could not confirm the influence of goal-directed haemodynamic treatment (GDHT) on the length of hospital stay in contrast with previous findings on patients with hip fracture. In our study, an individualized multidisciplinary programme of standard care was applied in both groups and it is possible that this shadowed the effect of GDHT. Probably, the control group (routine treatment) in our population received better care compared with the control groups of the two previous trials.

Our ‘negative’ finding on the length of hospital stay should not be interpreted that the GDHT is not effective. We just could not capture it by measuring the hospital stay. We would like to reiterate that in our trial the length of hospital stay was not a measure of primary outcome as, in our opinion, the length of hospital stay is a suboptimal measure, which is influenced by a large number of factors that are not related to medical fitness. Even if the medical fitness is used as a surrogate for length of hospital stay in some studies, the definition of medical fitness is vague.

We agree that the choice of monitoring technology is important, especially if a GDHT protocol is used that is targeted by a set value of oxygen delivery index. Our aim was to choose a bedside monitor that is applicable in the clinical routine anaesthesia care of awake and even confused patients and which is possible to calibrate. Based on the available evidence when the trial was designed in 2008, the LiDCOplus had comparable accuracy and precision with the pulmonary artery (PA) catheter. In our opinion, it was an appropriate choice. Recalibration after spinal anaesthesia is not necessary according to the manufacturer, as spinal anaesthesia does not influence the capacitance of the aorta that is defined by the calibration. Of course this problem could have been addressed in a pilot study separately before we started the trial, but given the available evidence in 2008, the LiDCOplus monitor was considered to be the best choice under the circumstances of routine care of acute surgery. The ability of LiDCOplus to trace stroke volume changes in aged patients is an important issue and it is worthwhile to assess. The possible bias of the haemodynamic parameters compared with the PA catheter does not exclude the use of LiDCOplus relying on haemodynamic variables derived by the PA catheter.

It is a separate issue whether it was reasonable to test Shoemaker’s cut-off value in these aged patients. In general, we agree, each GDHT protocol should use monitors and haemodynamic values that may be traced with the actual monitor. Even if the sample size had been adequate in our trial, naturally findings on aged populations could be difficult to generalize, irrespective of the monitors used. As we discussed in the paper, an adequate sample size given the risk of postoperative complications we found in the control group—which was lower than expected complication rate used for sample size calculation—would require a sample size of more than 700 patients.

Sometimes, it is reasonable to make reflections around the effect size, even if the finding is not statistically significant. We did not find statistically significant reduction in postoperative complications, but we suggest that the size of relative risk (RR: 0.79) is clinically relevant. In a previous paper on cost-effectiveness analysis of GDHT by modelling the possible influence of GDHT on postoperative complications, we found that the GDHT is cost-effective even at lower clinical effect (i.e. RR up to 0.9). In that analysis, we could demonstrate that the length of hospital stay (i.e. hospital costs) had less impact on the cost-effectiveness than the frequency of postoperative complications.2

We are looking forward to publishing a detailed account of the haemodynamic responses to GDHT according to Shoemaker and routine care in the elderly. Our objectives are to continue the search for more adequate fluid protocols for these aged patients.

Declaration of interest

E.B. received a lecturing fee for one lecture from Edwards Life-sciences LLC (Irvine, CA, USA).

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