

## COMMENTARY

# The high-risk surgical patient revisited

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### Full text

The results of the various sepsis intervention studies and doubts about the efficacy of the pulmonary artery (PA) catheter have cast a considerable shadow over the intensive care community. They serve to highlight the importance of the recent paper published by Sinclair *et al* [1], in which the authors convincingly demonstrated that elderly patients undergoing surgery for a fractured neck of femur had a slightly significantly better outcome if they were aggressively volume loaded with colloid intraoperatively. They showed that the administration of an average of 750 ml of colloid during the course of the operation resulted in a highly significant reduction in hospital stay and a lower complication rate. The well-matched control group patients were treated conventionally, only receiving crystalloid.

The range of volumes of colloid given to the protocol group of patients was considerable, and the cardiovascular effects of the infusion were monitored using an intra-oesophageal Doppler device which measures descending aortic blood velocity and converts it into cardiac output using a built-in nomogram. Sinclair *et al* showed that, following colloid infusion, the protocol group of patients had significantly increased cardiac output and stroke volume when compared to their own baseline values and the control patients. This simple manoeuvre led to a 39% reduction in hospital stay and complication rate.

The obvious question is, could they have achieved the same result simply by administering the volume of colloid without monitoring cardiac output, albeit with a relatively noninvasive device that is placed in the oesophagus. This is an important question because it is likely to determine whether such an approach to the management of similar high-risk patients will be generally accepted and become the standard.

Others, including Shoemaker *et al* [2], Boyd *et al* [3] and more recently Bishop *et al* [4], have clearly shown that the recognition and very early optimisation of cardiac output in a wide range of high-risk surgical patients

produces highly significant reductions in both morbidity and mortality. This approach is time consuming and requires, in some cases, admission to the intensive care unit some hours prior to surgery and the insertion of PA catheters for the measurement and manipulation of cardiac output. This makes the approach unattractive to many clinicians, with their doubts being further amplified by the recent controversies. Shoemaker *et al* (pers comm) have estimated that as many as 8-10% of all surgical patients should be considered at high risk from developing significant post-operative morbidity and mortality. These patients warrant further extensive study and the Sinclair investigation is a welcome addition to the growing list of papers that demonstrate the benefits that can be obtained with this approach.

In general, the recent consensus meeting on efficacy of PA catheters [5] was unable to identify studies which offered scientific evidence that their use leads to clinical benefit, despite the fact that there is an annual world usage well in excess of 2 million, with the USA accounting for the large majority. The only area where benefit could in any way be ascribed to the use of the PA catheters was in those who fulfilled the criteria for being defined as high-risk surgical patients. In this group of patients the consensus felt there was evidence to suggest that systematically increasing oxygen delivery in the pre-operative period leads to significant improvement in both mortality and morbidity.

In most of the work identified, the increase in cardiac output was monitored using a PA catheter although two of the studies used the oesophagus Doppler instrumentation. Clearly the use or not of PA catheters arouses strong emotions and will undoubtedly continue to do so until the appropriate efficacy trials are undertaken. It is to be hoped that any such trials must include the category of high-risk surgical patients that statistically benefit from the insertion of a PA catheter. In addition, we should address the further question of whether alternative techniques for measuring cardiac output, including intra-oesophageal Doppler and indeed impedance plethysmography, are viable clinical alternatives to the PA catheter.

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