Tolerance of haemodynamic changes during beating heart coronary surgery

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Keywords: Off-pump; Coronary artery bypass grafting; Haemodynamic changes; Left ventricular function

During coronary surgery with the beating heart technique, varying degrees of haemodynamic alterations occur, sometimes necessitating expeditious institution of cardiopulmonary bypass. As a result there is a valid concern among surgeons about the possible deleterious effects on patient outcome, of the haemodynamic changes that attend off-pump coronary artery bypass grafting (OPCAB). I therefore congratulate Watter et al. for their study [1] which seeks to address this concern. In this study, Watter et al. determined the adverse effects of the haemodynamic changes during OPCAB involving the three territories by:

1. Continuous monitoring of heart rate, mean systemic arterial pressure, central venous pressure, and mean pulmonary arterial pressure.
2. Intermittent measurements of the pulmonary capillary wedge pressure, cardiac index, stroke volume, systemic vascular resistance index and pulmonary vascular resistance index, before the commencement of the distal anastomosis, 5 min after positioning and stabilization of the target coronary artery, and at completion of distal anastomosis.
3. And the recording of in-hospital complications and adverse events.

Although they reported changes in the haemodynamics associated with the distal anastomosis in the different set-ups, these were well tolerated by their select group of patients without pharmacologic or volume support. However their conclusion deviates from their findings, and suggests that this is achievable in all OPCAB cases.

I wish to make the following observations about this study.

The positioning of the heart and stabilization of the target coronary artery during OPCAB is notorious for engendering haemodynamic deterioration [2]. A major cause of conversion to on-pump coronary artery bypass grafting in my experience, which corroborates published reports [2,3], is haemodynamic upheavals during the dislocation of the heart to expose and stabilize the target site. After this stage the haemodynamics usually improves, especially in patients with good left ventricular (LV) function who tolerate these upsets well. Cardiac output measured 5 min after this crucial stage of haemodynamic disturbance does not capture the worst possible derangement that may occur. More so, since their cohort of patients all had good LV function (ejection fraction more than 40%), they would have recovered from any haemodynamic instability at the time of recording. Continuous cardiac output monitoring provides a more reliable recording of the haemodynamics changes during different set-ups of OPCAB and eliminates the injection-to-injection variation of intermittent measurements. This would have been an advantage in this study.

Patients with poor LV function and recent myocardial infarction have an impaired capability to tolerate haemodynamic changes. These groups of patients who have been found to benefit from OPCAB [4,5], and are increasingly selected for this procedure, usually require intraoperative support to withstand any haemodynamic instability. It would put their study in the right perspective, if Watter and associates had specified that patients with good LV function tolerate haemodynamic changes during OPCAB without a deleterious outcome.

References


