

Off pump coronary artery bypass grafting in a patient with cerebrovascular disease

Sir,

Despite some reservations after its early beginning and reported successes, off pump coronary artery bypass surgery (OPCAB) is regaining widespread acceptance as a viable alternative to standard revascularisation techniques. This resurgence of interest is because cardiopulmonary bypass is still associated with many adverse systemic effects including complement activation, neurocognitive dysfunction, coagulation abnormalities, and activation of systemic inflammatory response, cerebral oedema with increased extracellular brain water noted immediately after surgery.^[1] These changes are not seen with OPCAB surgery, making this more acceptable option for the patient with cerebrovascular disease.

An 83-year-old hypertensive, non-diabetic male patient weighing 63 kg with a history of recent non-Q-wave myocardial infarction (MI) and transient ischaemic attack (TIA) 3 months back presented with unstable angina. All his investigations were normal except ST depression on anterolateral leads of electrocardiogram (ECG). Transthoracic echocardiogram revealed akinetic basal, posterior inter ventricular septum and inferior wall with left ventricular ejection fraction of 40%. His coronary angiogram showed single vessel disease of left anterior descending (LAD) territory. Carotid Doppler showed left internal carotid artery stenosis (30%) and right internal carotid artery stenosis (50%). In view of TIA history, his computed tomography (CT) angiogram of the head was obtained which showed multiple intracerebral aneurysms of the circle of Willis and its branches. In view of his CT angiogram and unstable angina, an urgent OPCAB was planned as neurointervention was not feasible with on-going myocardial ischaemia.

Patient was premedicated and induction was facilitated with fentanyl 250 µg, thiopentone sleep dose, and intubation was performed with vecuronium bromide 8 mg. Monitoring included ECG, intra arterial blood pressure, central venous pressure (CVP), pulmonary artery pressure (PAP),

pulse oximetry, temperature, end tidal CO₂, arterial blood gases, blood sugar, urine output and bispectral index (BIS). After anterior left thoracotomy, left internal mammary artery to LAD anastomosis was performed on the beating heart. Haemodynamic recordings included blood pressure, 122/66 mm Hg, heart rate 82 beats/min, PAP 28/15 mm Hg, CVP 7 mm Hg and cardiac index $\times 2.9$ L/min/m². The BIS level was maintained between 40 and 45. During the anastomosis, haemodynamic parameters were stable. Trendelenburg position of the patient was avoided, and transient hypotension was managed with preload augmentation with fluid transfusion and vasopressors. After shifting to the ward, the patient was assessed by a neurophysician as a routine consultation. He was discharged from the hospital on sixth post-operative-day and was readmitted after 6 weeks for clipping of the intracerebral aneurysms.

Unstable angina is one of the most common life-threatening medical emergencies. It may result in death or nonfatal MI in up to 20% of patients within 30 days of the ischaemic event. Both conservative and invasive treatments for unstable angina are effective in reducing the death or MI, but the FRISC II trial recommended invasive treatment.^[2] Technical advances in surgical procedures, anaesthesia, and post-operative care have improved the results of surgery for unstable angina.^[3,4] Recently the benefits of OPCAB have been increasingly reported.^[5]

The patient in this report posed a clinical dilemma because of life-threatening intracranial pathology in the face of recent MI and unstable angina. The anaesthetic management proved challenging because of concerns about elevated intracranial pressure (ICP) and on-going myocardial ischaemia. Priority was given to the cardiac disease as is recommended by the American Heart Association/Society of Cardiovascular Anaesthesiologists guidelines of 2009. The effects of all anaesthetics and vasoactive drugs used had to be carefully considered, about cerebral blood flow and cardiac function and also the arterial blood gas management. The question of whether or not to hyperventilate the patient posed a dilemma. A balance was needed to be maintained to avoid the risk of aneurysm rupture and simultaneously maintain an adequate cerebral perfusion pressure. The decision was made to maintain the pCO₂ between 30 and 40 mm Hg. There was the theoretic concern that rapid normalisation of ICP with hyperventilation could

increase the transmural pressure gradient across the aneurysm wall with possibility of rupture. CVP was closely monitored as an indirect indicator of ICP. BIS monitor was used primarily to monitor the depth of anaesthesia, precise titration of anaesthetic agents and facilitate an earlier awakening, for early neurological assessment and early extubation of the patient. Stable haemodynamics was maintained throughout the procedure. The conclusion is that the OPCAB surgery is a safer option for the patient with intracerebral aneurysm undergoing coronary artery bypass grafting.

**S K S Rawat, Yatin Mehta, Harsh Spa,
A N Jha, Naresh Trehan**

Principle Consultant- Mednata Institute of Critical Care and Anaesthesiology, Chairman-Medanata Institute of Critical Care and Anaesthesiology, Sr. Consultant, Neuroanaesthesia, Chairman – Medanta Institute of Neuroanaesthesia, Chairman and Managing Director, Medanta The Medicity, Gurgaon, Haryana, India

Address for correspondence:

Dr. SKS Rawat,
Flat No 1-S, Sector 8, Jasola Vihar, New Delhi - 110 025, India.
E-mail: sarwen_k2@yahoo.co.uk

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