The technique of Awake coronary artery bypass (ACAB) is about seven years old, it was first reported by Karagoz and coworkers. They performed few successful cardiac surgeries using thoracic epidural anesthesia in an awake patients without endotracheal general anesthesia. After the initial reports, several authors reported series of cases, totaling to about one thousand cases so far. Ever since the first report, the topic of awake cardiac surgery has remained controversial, because purists argued against the use of regional anesthesia as the sole anesthetic. The author among the other pioneers of the technique has faced questions about the usefulness of this procedure. Having performed about six hundred cardiac surgical cases, the author is of the opinion that at certain situations in one's anesthetic practice, patients who are contra indicated for administration of general anesthesia (GA) may benefit from the regional anesthetic technique. The author has anesthetized patients (with myasthenia gravis, tracheal stenosis, multiple organ dysfunctions including hepatic and renal dysfunction) who may have carried higher risk with administration of GA. The author believes that the technique of awake surgery has to be practiced step by step. The first step being routine administration of thoracic epidural anesthesia in cardiac surgical population, thus increasing the total number of epidurals in cardiac surgical patients. With this action, the controversy about use of epidural anesthesia in cardiac surgical patients will be settled to some extent. One may debate about the benefits of ACAB by eliciting the risks and benefits of TEA and GA.

Benefits of ACAB may result from avoidance of endotracheal GA and from administration of TEA.

Benefits due to avoidance of GA: Although GA has been used for a large number of patients daily without significant complications, documented hemodynamic responses to tracheal intubation, suction of the endotracheal tube, and extubation may lead to myocardial ischemia and pose a potential risk in patients with coronary artery disease. The avoidance of GA may potentially benefit the patient. The avoidance of endotracheal intubation in cardiac surgery, however, was never before deemed necessary or feasible. In addition to these adverse effects of GA, endotracheal intubation has been shown to play an important role in causing pulmonary infection in intubated and mechanically ventilated patients. Endotracheal intubation has been shown to cause mucosal injury, reduced mucociliary function, bypassing upper airway defenses, and reduced effectiveness of cough. Avoiding any factors contributing to increased incidence of nosocomial pulmonary infection may benefit patients, especially so in those with cardiac implants.

A conscious patient can surrogate as the cerebral function monitor while undergoing COPAB. Despite advances made in monitoring brain activity, no final word can be said about the safety and efficacy of conventionally used cerebral function monitors. Monitoring cerebral function, during OPCAB is useful. One of the benefits of performing ACAB is the ability to monitor the cerebral, motor and sensory functions; with the patient herself offering the necessary details. The authors have reported patients getting irritable during phases of hypotension causing patient irritability which could be reversed by restoration of arterial pressure by depositing the heart to pericardial cradle. In yet another report, it was shown that patients undergoing ACAB after carotid endarterectomy, became unresponsive during clamping of ‘culprit’ internal carotid artery, which was reversed by declamping. Thus a potentially serious problem of cerebrovascular ischemia was avoided and surgery completed after insertion of intravascular shunt. It is not known whether these potential advantages translate to clinical benefits; large scale multi-centric studies are needed to arrive at conclusive evidence.

Benefits of TEA: A few benefits of TEA have already been described in the literature and others are being researched. Various benefits such as hemodynamic stability, superior analgesia, reduced oxygen demand, optimal redistribution of coronary blood flow, attenuation of stress response, and improved pulmonary function and early extubation, decreased neurocognitive dysfunction have been reported. Disadvantages of ACAB

The disadvantages of ACAB can be divided in to two, one due to use of TEA and the other due to avoidance of GA.

Possible disadvantages resulting from use of TEA:

1. Requirement of admission a day prior to surgery: The author's practice of performing epidural catheterization a day

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1. Unprotected airway: Cardiac surgeons and anesthesiologist commonly refrain from practicing ACAB for the fear of performing surgery in a patient with unprotected airway. Since the cranial nerves are not blocked, upper airway reflexes and cough reflex are intact. In elective cases, it may not be unsafe to practice awake surgery. Authors agree with other workers that the fear of carrying out surgery in spontaneously breathing patient is more theoretical.

2. Inability to perform transesophageal echocardiography (TEE): Inability to perform TEE during cardiac surgery is a real issue. The authors perform epicardial echocardiography when valve function and wall motion abnormalities have to be assessed intraoperatively.

3. Spontaneous ventilation causing movement of heart and great vessels: The discomfort caused to surgeons by the movement of heart and great vessels can be minimized to a great extent by routine use of non invasive pressure support ventilation through the face mask. It is the authors observation that with increasing experience, the excessive mediastinal movement can be decreased.

4. Problems of pneumothorax: More and more workers are dispelling fears about pneumothorax in a spontaneously breathing patient. It is author’s experience that by making a few modifications (as described in this review), the incidence of pneumothorax can be decreased and it seems to be a common understanding among practitioners of ACAB that occurrence of pneumothorax is not a sufficient reason to convert to GA.

5. Diaphragmatic paralysis: Although diaphragmatic paralysis due to spill over block of phrenic nerve can occur uncommonly, it can be treated without adverse outcomes. Administering the local anesthetic agent as an infusion seems to prevent this rare but dangerous problem.

6. Psychological influence of ACAB: Psychological aspects of patients who undergo ACAB is not studied yet. In the author’s pilot study of 56 patients, who were followed up for a period of 6 months following discharge, there was no increase in the incidence of neurocognitive dysfunction compared to the patients who underwent conventional OPCAB under GA. Unless large scale studies are conducted, no final word can be said about this aspect of postoperative psychological changes in these patients. Reduction in stress related neurocognitive dysfunction during CABG has been demonstrated with concomitant use of TEA.

7. Gastric distension: Gastric distension may result due to continuous positive airway pressure ventilation in patients who are deeply sedated. The incidence at the author's institute of gastric distension after ACAB is 1.4%. It is common to see this complication in obese individuals undergoing continuous positive airway pressure therapy.

In an invited commentary, David suggests that the issue of avoiding...
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GA with endotracheal intubation is said to offer more risks with little advantage while exposing the patient to risks, which he would not otherwise be incurring (epidural hematoma, pneumothorax in a spontaneously breathing patient etc.) and therefore the issue of coronary artery surgery without endotracheal GA remains controversial. The proponents of TEA suggest that epidural use should be encouraged. It is premature to comment whether ACAB will survive the test of time, but it is prudent perceive ACAB as a new technique which requires standardization. Every procedure has a learning curve and ACAB is not an exception to this. The use of epidural anesthesia should be encouraged, with frequent use, the actual complication rate and risks and benefits will become visible.

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