

# Is cardiac anaesthesiologist the best person to look after cardiac critical care?

Intensive care medicine also referred to as critical care medicine is that body of specialist knowledge and practice which is concerned with the treatment of patients who are at risk of recovering from potentially life threatening failure of one or more of the body organ systems. It includes provision of organ support system, investigations, diagnosis and treatment of acute illness, systems management and patient safety, ethics, end of life care and support to families.

Cardiothoracic anaesthesiology is a sub specialty of anesthesiology devoted to pre, intra and postoperative care of patients undergoing cardiothoracic surgery and related procedures.

Cardiac surgery patients are different; they are older, sicker and more frail. Also newer procedures like transcatheter aortic valve implantation (TAVI) and transcatheter endovascular aortic repair (TEVAR) are performed in moribund patients<sup>[1]</sup> so their postoperative critical care becomes even more important. Therefore delivery of high quality critical care medicine is vital to the success of cardiac surgery.<sup>[2]</sup> One needs the right operator to use right information making the right decision to use the right tool to perform the right task at the right time in the right manner!

Critical care is growing at a rate of 1% of GNP in the US.<sup>[3]</sup> Nearly three quarters of the care by intensivist is delivered by the 'open intensive care unit (ICU)' model.<sup>[4]</sup> Intensivist makes recommendations but has no authority over patient care while the admitting physician who is neither trained

in critical care nor is available 24 × 7 makes the final treatment decisions. Various other consultant who look at single organs make conflicting therapeutic decisions resulting in confusing orders, longer ICU stay and cost. Hanson *et al.* showed that patients cared for by the critical care team spent less time in the ICU, used fewer resources with lesser cost and all this was more obvious in sicker patients i.e. patients with higher APACHE II scores.<sup>[5]</sup>

Also in metaanalyses high intensity or closed ICU was associated with lower ICU mortality and length of stay than in open ICU.<sup>[6,7]</sup>

In a Canadian study in a large university trauma centre with a mixed (medical + surgical ICU) the authors found no significant difference in mortality in patients managed by intensivist with core training backgrounds in either internal medicine or in surgery/anaesthesiology.<sup>[8]</sup>

So, it is recognised that closed ICU is superior in terms of outcome compared with open ICU and anaesthesiologists is as good if not superior to someone from internal medicine background!

Post cardiac surgery patients require intensive monitoring, judicious use of cardiovascular drugs, effective pain control, early mobilization and intensive respiratory therapy.<sup>[9]</sup> The cardiothoracic intensivist should be expert at perioperative care with timely manipulation of cardiopulmonary physiology through precise and advanced application of pharmacology, resuscitative techniques, critical care medicine and invasive procedures.

In monitoring techniques pulmonary artery

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catheter (PAC) is still widely used in cardiac critical care unlike general ICU where it is on the decline. A multicentre study in the setting of non-emergency coronary artery bypass graft surgery (CABG) concluded that use of PAC was associated with increased hospital mortality, greater length of stay and higher total cost particularly with low volume PAC use and <50 surgeries per annum.<sup>[10]</sup> This just proves the point that with increased experience e.g. large PAC use in a busy cardiac ICU with experienced cardiac anaesthetists as intensivist this could be different. We in our group perform about 5000 cardiac surgical cases per year and most of the patients get a PAC and all of these are inserted by the anaesthesiologist. So which other specialist would be more experienced to insert, interpret and utilize PAC for hemodynamic manipulations than us in a cardiac ICU?

The other modality for haemodynamic monitoring particularly for cardiac surgical patients preoperatively is Transesophageal echocardiography (TEE). This has become the 'Gold Standard' for preload estimation and assessment of new segmental wall motion abnormality (SWMA) indicating ischaemia, global systolic and diastolic ventricular function, valvular pathology and aortic dissection. Most of the publications on TEE are either by cardiac anaesthesiologists or by non invasive cardiologists (which is an extinct species now!) so who is better qualified to perform TEE than cardiac anaesthesiologists? In fact even the guidelines for TEE are jointly made by Society of Cardiac Anesthesiology and American Society of Echocardiography.<sup>[11]</sup> We have also found TEE to be the best modality for quick diagnosis of haemodynamic instability in patients in cardiac surgical ICU<sup>[12]</sup> and also to recognize embolisation and subsequent stroke due to embolisation of aortic mobile atheroma.<sup>[13]</sup>

The only formal training in India with certification for TEE is done by Indian Association of Cardiovascular Throacic Anaestheisa (IACTA).<sup>[14]</sup> This itself is enough evidence to prove that cardiac anaesthesiologist is best equipped to carry out a postoperative TEE.

With the decline in use of PAC in critical care worldwide, newer methods of haemodynamic assessment are being investigated.<sup>[15]</sup> TEE, pulse contour analysis (PiCCO),<sup>[16]</sup> lithium dilution technique (LiDCCO),<sup>[17]</sup> flotracs (Edwards Lifesciences Corp, Irvine, CA 92614),<sup>[18]</sup> Transesophageal doppler (TECO),<sup>[19]</sup> have been investigated in cardiac

critical care and some of these are being used, in cardiac surgical ICU's. Most of these have been validated against PAC and most of the studies are by cardiac anaesthesiologists!

Who is better equipped to use, interpret and take appropriated therapeutic actions based on these in a cardiac surgical patient than the cardiac anaesthesiologists? In a national survey in U.K. it was found that of the 39 cardiac intensive cares contacted, 94% had consultants cardiac anaesthesiologist as the senior most incharge physician.<sup>[20]</sup>

With the advent of off pump coronary artery bypass graft surgery (OPCAB) the morbidity associated with cardiopulmonary bypass (CPB) like systemic inflammatory response syndrome (SIRS), platelet destruction and coagulopathy with subsequent blood and blood product requirement, renal dysfunction and neurocognitive dysfunction and stroke have been significantly reduced.<sup>[21]</sup> Also shorter anaesthetic and surgery with minimal access should lead to earlier extubation i.e. fast tracking.<sup>[22]</sup> Who understands and can implement it better than the cardiac anaesthesiologist?

Also postoperative analgesia is an extremely important part of the post operative care of these patients for early mobilization and shorter ICU length of stay and attenuation of stress response. For these various regional analgesia techniques can be used like thoracic epidural and interpleural anaesthesia,<sup>[23]</sup> subarcanoid analgesia,<sup>[24]</sup> paravertebral block<sup>[25]</sup> and nowadays local anaesthetic infusion into the wound, Cardiac anaesthetists can manage all these better than other critical care specialists or cardiac surgeons.

Ventilatory strategy is important in post cardiac surgical patients. Incidence of ventilator associated pneumonia (VAP) is directly proportional to the duration of ventilation.<sup>[26]</sup> ARDS network strategy<sup>[27]</sup> may have to be modified as permissive hypercapnia, high PEEP and traditional recruitment manoeuvres are detrimental in cardiac surgical patients. Prone ventilation has been used in these patients<sup>[28]</sup> and recently it has been shown to have mortality benefit.<sup>[29]</sup> Nitric oxide (NO) is another modality which has been used in refractory hypoxaemic and right heart failure with high pulmonary artery pressures.<sup>[30]</sup> In refractory cases extracorporeal membrane oxygenation (ECMO) is being used<sup>[31]</sup> although with a higher incidence of sepsis.

Cardiac anaesthesiologist is familiar and comfortable to deal with all these technologies.

Another important aspect of cardiac critical care is blood sugar control. The important paper which changed practice was by Van der Bergh<sup>[32]</sup> which showed mortality benefit in mostly cardiac surgical ICU by a tight sugar control. Subsequent work although has not reproduced it and the current practice is to keep blood sugar between 120-180 mg%.<sup>[33]</sup> We have recently shown how a graded scale for sugar control in cardiac surgical ICU can be successfully implemented.<sup>[34]</sup>

So although in my opinion cardiac anaesthesiologists is best equipped to be incharge of cardiac ICU but they need also to be trained in the other critical care management and procedures may be through a formal training by IDCCM, IFCCM or FNB. A lot has been done but a lot needs to be achieved still in this field. The woods are lovely dark and deep but I have promises to keep and miles to go before I sleep and miles to go before I sleep! (Robert Frost).

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