

Pain after Cardiac Surgery

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Most cardiac operations are performed via median sternotomy and cardiopulmonary bypass. Both thoracic incision and cardiopulmonary bypass cause major disturbances in the homeostasis of the patient. Disruption of the tissues by the incision initiates an immediate neurological reaction perceived as pain and an intense biochemical and cellular response to repair the wound. Cardiopulmonary bypass causes far more serious systemic changes in homeostasis than pain, and that is probably the main reason why cardiac surgery is behind other surgical specialties in the development of minimally invasive procedures. Pain associated with surgical incision is largely self-limited and resolves with time and, luckily, so do the changes caused by cardiopulmonary bypass. Obviously, surgical incisions that cause less tissue damage are associated with lower degrees of pain and metabolic disturbance than larger and more traumatic incisions.

In this issue of the International Journal of Cardiovascular Sciences, Silva and colleagues,¹ from the University of Fortaleza, Brazil, report a comparative study on postoperative pain following conventional median sternotomy and right mini-thoracotomy. The study has limitations because of the sample size (there were only 17 patients in each arm), the endpoint of the study was largely subjective, and patients were not randomized. However, as one would expect, both groups of patients complained of pain in the first three days but fewer patients with mini-thoracotomy complained of pain by the seventh postoperative day. In addition, mini-thoracotomy was associated with pain

of lower intensity, fewer sites, and shorter duration than median sternotomy.

Minimally invasive cardiac surgery was developed in the early 1990's consisting of partial or transverse sternotomy. The benefits, however, were largely cosmetic because of the length of time it took for the sternum to heal. Soon after, small thoracotomies were introduced for performance of coronary artery bypass, heart valve repair and replacement, and repair of congenital heart defects. The development of new surgical instruments and enhanced visualization including 3-D endoscopes have facilitated the performance of these operations. There have been many comparative studies on the early outcomes of heart surgery with conventional sternotomy and small thoracotomy but few randomized studies and no multicenter study. Case-control studies have consistently shown less pain and faster recovery compared with the conventional approach. Other advantages of minimally invasive surgery are less blood loss and lower transfusion rate and lower risk of postoperative atrial fibrillation, a common complication of heart surgeries that frequently prolongs hospital stay and requires hospital readmission. The incidence of stroke and occurrence of other neurological disturbances are often higher with minimally invasive approaches largely because of the need for peripheral arterial cannulation. In many centers, a computed tomography scan of the aorta is obtained before offering minimally invasive surgery to older patients.

The use of minimally invasive techniques has been lower than expected, even for procedures that can be safely performed through a small right thoracotomy such as isolated mitral valve surgery. A recent report from the Society of Thoracic Surgeons National Database on isolated mitral valve surgery in the United States showed that only 23% were performed using minimal invasive approaches including partial sternotomy.² Mean age of the patients was 64 years and this may be an influencing

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factor for the decision to perform a minimally invasive approach. But more importantly, I believe, is the fear of failure. Today, elective cardiac surgery is expected to be performed with very low operative mortality and morbidity, and experienced cardiac surgeons are

reluctant to change. The ingrained “do no harm” prevents us from adopting newer surgical approaches than the ones we have mastered. Innovation and progress require that we step out of our comfort zone while keeping patients safe.

References

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