

Minimally Invasive Cardiac Surgery

Written by Maria Vinall

Edward B. Savage, MD, Cleveland Clinic, Weston, Florida, USA, discussed the use of minimally invasive procedures for cardiac surgery. In his opinion, minimally invasive surgery is safe for coronary bypass and aortic and mitral valve surgery. Its use may result in faster recovery, especially in older patients. However, patient expectations for this type of surgery need to be carefully managed, and the risk and benefits should be better described.

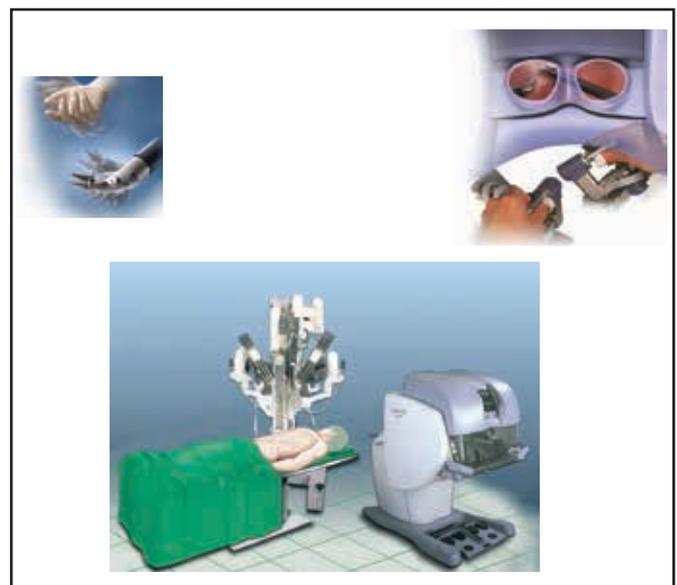
When considering surgery, patients generally want to minimize pain, cosmetic deformity, disability, and recovery time, and often, their perception of the magnitude of surgery is based on the location and size of the incision. Partially in response to these concerns, many cardiac surgeons are turning to minimally invasive techniques. Most surgeons acknowledge, however, that smaller or alternative incisions do not always equate to less pain or shorter hospitalizations, and they express that they have other considerations for using a less invasive strategy. These include the presumption of less physiological disruption, lower rates of infection, and fewer neurological complications. In some cases, however, these assumptions have yet to be proven. Other misperceptions concerning minimally invasive surgeries are that they result in overall cost savings due to faster recovery times, fewer blood products that are used, and fewer days spent in the hospital. While this may have some truth, the cost of newer equipment can sometimes offset these savings. For example, the increased cost to the hospital because of equipment can be as much as \$1000 to \$6000 per case, especially if robotics is involved.

Nevertheless, surgeons are quickly adopting minimally invasive approaches. But, do these approaches reduce morbidity? Some nonrandomized and small randomized trials show improved early outcomes, including fewer transfusions and shorter length of stay, but others do not. No large randomized comparative trials have been performed. One study by Lamelas et al. [*Ann Thorac Surg* 2011] suggests that the use of minimally invasive surgery for isolated valve lesions reduces morbidity and mortality in patients aged >75 years compared with median sternotomy. In a study that was conducted by Dr. Savage [Szwerc MF et al. *Ann Thorac Surg* 1999], no difference was found in early outcomes when upper sternotomy and full sternotomy for aortic valve

surgery were compared. Nevertheless, Dr. Savage feels that there is a benefit of using a mini-incision if the operation can be safely performed through the incision. In most cases, isolated aortic valve replacement, as well as ascending aortic and arch replacement, can be performed through an upper sternotomy. Dr. Savage has also performed right coronary bypass and tricuspid and mitral valve surgery through this incision. The mini right thoracotomy approach has also been used for aortic, mitral, and tricuspid valve surgery. This approach is generally associated with less blood loss.

Minimally invasive surgery using robotics is also increasing (Figure 1), primarily for mitral valve surgery with a similar approach to mini right thoracotomy. As with minimally invasive approaches, patients also have misperceptions about the use of robotics, some of which are due to how the use of robotics is presented by the surgeon. Patients are often led to believe that there will be no incision and that they will be back to work more quickly. The reality is that robotics will still involve cardiopulmonary bypass, and cardiopulmonary bypass times are longer. It is also important to consider experience with robotics, as there is a very steep learning curve for the entire team. No study has shown the use of robotics to be superior to mini right thoracotomy, and it is substantially more costly. However, as technology improves and costs are reduced, the robot may be more commonly used for certain types of heart surgery.

Figure 1. Minimally Invasive Robotic Surgery.



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