JCC-ASIA-2-2

Surgical Treatment for Structural Heart Disease - valvular Heart Disease

Kuan-Ming Chiu

Cardiovascular Center, Far Eastern Memorial Hospital, Taiwan

Objectives: Cardiac surgery as other specialties has moved toward less invasiveness. Although there comes alternative, percutaneous valve repair or replacement technologies, majority of valve disease patients will probably not benefit from these soon. Due to heart lung machine is still inevitable, the endeavor in less invasive valve surgery has focused on decreasing surgical trauma by limiting the surgical trauma. Our approaches for less invasive valve surgery are to avoid sternotomy, reduce the length of incision and mechanical rib spreader as possible. All these consist of, so called, minimally invasive cardiac surgery (MICS).

Methods: Along with the development of enabling technologies, techniques were changed accordingly. For mitral valve procedures, cosmetic mini-thoracotomy is the incision of choice. We started from right thoracotomy and peripheral cannulation with the valve lesions dealt with surgeon's eyes under the assistance of surgical loupes and headlight. Then the rib spreader was eliminated, the vision and illumination were enhanced by videoscope. Four cm incision is made over the right anterior axillary fold. The pleural cavity is entered via fourth intercostal space. Aortic crossclamp, cardioplegia delivery and surgical exposure are achieved by specialized, extended-length instruments. Repair or replacement of mitral/tricuspid/or some congenital defects are then carried out. For aortic valve involvement, parasternal approach is our choice. A longitudinal 5-6 cm incision was made one finger-breadth later to sternal border from the lower margin of second rib to the upper margin of 4^{th} rib. The pectoralis muscle was cut in a reversed C fashion. The 3^{rd} rib was cut at the chondrosternal junction and bent into right pleural cavity. Then the small rib spreader was applied. After peripheral cannulation and CPB, the aortic valve was dealt with surgeon's direct vision and by conventional instrument. The rib was reduced into position with wire to eliminate postoperative chest deformity.

Results: Our experience shows the bypass time and ischemic time for endoscopic MICS and parasternal MICS are compatible with those of full-sternotomy approach. Aortic, mitral and tricuspid valve pathologies could be managed. Associated procedures, like Af Ablation and LAA closure are also feasible. Anesthetic preparation takes more time in mini-thoracotomy approach. The limited incisions help us to minimize operative and postoperative bleeding. These are particularly valuable in redo procedures after previous sternotomy. Through our redo procedures after previous cardiac surgery, we find the adhesion is mostly manageable which reduces the risk of sternal reentry. Parasternal approach has been performed in a routine basis in our institute. Stable sternoclavicular joints could facilitate early and aggressive activity of upper extremities for better postoperative recovery. In our series, the perfusion time, post-op ventilation time, blood product consumption and overall mortality are reduced.

Conclusions: Reviewing our MICS series, endoscopic and parasternal approaches are safe and effective. Equivalent operative time could be accomplished once the learning curve is negotiated. And the surgical trauma could be minimized. Besides, the repair rate is not compromised. Most importantly, these approaches are reproducible. These approaches are not only the cutting-edge or state-of-art techniques, they should be important treatment options in cardiac surgical practices.