AN ALTERNATIVE APPROACH FOR MITRAL VALVE REPLACEMENT THROUGH A MINISTERNOTOMY

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ABSTRACT

During the period of Jan. 1998 to Dec. 1999 a total number of 10 patients underwent mitral valve replacement by minimally invasive procedure i.e. via lower median sternotomy. Of these 5 patients had mitral regurgitation (MR) and 5 had mixed mitral valve disease (i.e. both mitral stenosis & regurgitation. They were all adults age ranging from 21 years to 35 years. The approach was via a small incision 8-10cm in length from xiphoid upwards and asymmetrical lower median sternotomy upto the second inter costal space (ICS) deviated from midline on the right side. All operations were performed on cardio pulmonary bypass (CPB) with conventional cannulation techniques. All operations were performed successfully. There was no sternal dehiscence and wound infection. The minimally invasive sternotomy patients had less postoperative morbidity, shorter hospital stay excellent cosmetic results. PJCTS 2004;III:85-87

INTRODUCTION

Longitudinal median sternotomy has stood the test of time since the beginning of cardiac surgery. It is the best approach for open heart surgery procedures as it allows good exposure of the heart and origin of great vessels.

Median sternotomy itself has significant morbidity including rib fractures, brachial plexus injuries, wound infections, postoperative wound scar pain etc.. Many surgeons introduced an alternative approach to median sternotomy a few years ago to avoid the possible complications of median sternotomy.

Since valve replacement requires the opening of cardiac chambers the invasiveness of CPB cannot be waived. Minimally invasive technique for valve operations are in actuality minimal access procedures which aims at reducing consequences of currently used large incision such as bleeding, pain, risk of infection etc.

PATIENTS AND METHODS

During the period of January 1998 to December 1999, a total of 10 patients had mitral valve replacement through asymmetrical lower median sternotomy. Informed Consent was obtained from all these patients. Age ranging from 21-35 years. Only patients with MR and mixed mitral valve disease were including in the study. Patients with small LAs were excluded from the study.

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ALTERNATIVE CONSIDERATIONS AND OPERATIVE PROCEDURE

The patients were placed in supine position. The minimal monitoring utilized with a central venous pressure (CVP) line, arterial line, electrocardiograph(EKG) display and esophageal temperature. The surgical field was prepared and draped as for classical median sternotomy. We utilized a low dose narcotic based anaesthesia with short term postoperative sedation with midazolam to permit earlier extubation and discharge of the patient from intensive care unit (ICU).

Hypothermic CPB was utilized with systemic heparinization as for conventional surgery and aortic and caval cannulation. Myocardial protection used was systemic hypothermia and cold crystalloid cardioplegia of St. Thomas plus topical cooling.

DETAILS OF THE INCISION

A lower midline incision 10-12 cm given from xiphoid upwards. Skin subcutaneous tissues were divided by cautery an asymmetrical lower median sternotomy was done upto the third costal cartilage deviated to the second intercostal space on the right side. A small single blade spreader is used, pericardiotomy

done and stay sutures applied to the pericardium.

CPB was established as mentioned above. The left atrium (LA) was opened just behind and parallel to the interatrial groove. There was no difficulty in de airing the heart at the time of termination of CPB because left ventricle (LV) vented trans atrially through mitral valve. The heart was defibrillated with small internal paddles. After cardiac function returned to normal, CPB was discontinued, cannulae were removed and chest was closed in layers after putting two drains in the mediastinal cavity.

RESULTS

Of the patients who had mitral valve replacement, five had MR while others had mixed lesions. These valves had rheumatic pathologies and were not repairable.

There was no mortality. The average duration of intubation was 3 hours and ICU stay on the average was <30 hours. Average blood loss was <300 mls/24 hours and total hospital stay on average was 5 days.

Overall patients had less pain postoperatively, no incidence of sternal dehiscene. Early mobilization was achieved. Scar was cosmetically much better than conventional sternotomy scar and was completely hidden under the shirt.

DISCUSSION

The current increase in interest in minimally invasive technique has in part been stimulated by the recognition of their efficiency in other surgical disciplines. As modern cardiac surgery improved the prognosis of most type of operations, surgeons became innovative to perform the procedures through a minimally invasive approach.

Cosgrove and associates (4) first described the cirmovative minimal access approach to the aortic / mitral valve operation. Konertz (Berlin) proposed an interesting approach to valve operation through a superior partial paramedian sternotomy that can permit the surgeon to expose both the aortic and mitral valve. Several other approaches utilizing video assistance through thoracotomy have been published, but the elective indications seems to be directed to selective patients.

The lower median sternotomy approach used in this study remains faithful to the principle of median approach to the heart and great vessels which one is familiar with. A small incision associated with limited sternotomy with a limited opening of the mediastinum usually provides adequate exposure of the heart. Routine cannulation can be carried out to establish CPB.

The minimal access approach has been said to contribute to rapid recovery and earlier discharge from the hospital. This is because there is less pain and less postoperative mediastinal bleeding. The time of extubation was less than three hours and the patient was out of ICU in less than 30 hours.

Another important advantage was that sternum remains stable as the manubrium is not divided. Moreover the cosmetic results were excellent and the patients were satisfied with this small scar.

This incision is more advantageous in obese patients where stable manubrium is imported. This approach reduces the risk of postoperative infection and mediastinitis. We did not encounter any case of infection in our study.

CONCLUSION

In conclusion minimally invasive approach to open heart surgery possible through a modified sternotomy. The technique provides many advantages like less trauma and less postoperative pain. Small wound reduces the risk of infections and blood loss. Patients recovery is quick, short hospital stay, cost effective and aesthetic postoperative wound scar.

Although our study is small and we continue to perform minimally invasive sternotomy at our institute in selected patients as it is safe, cosmetically attractive and cost effective interms of shorter hospital stay and early return to work and normalization.

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