

ADULT TYPE ATRIAL AND VENTRICULAR SEPTAL DEFECT REPAIR BY MINITHORACOTOMY

M. HULUSI US, MD
K. İNAN, MD
A. TARHAN, MD
A. BALTALARLI, MD
H. TEKÜMİT, MD
M. SÜNGÜN, MD
Ö. Y. ÖZTÜRK, MD

From: GATA
Haydarpaşa Eğitim
Hastanesi, Cardiovascular
Surgery Clinic,
Kadıköy, İstanbul

**Address for
reprints:**
Melih Hulusi US
Department of
Cardiovascular Surgery
GATA Haydarpaşa
Research Hospital,
Kadıköy, İstanbul, Türkiye
Phone: 90 216 449 21 10
Fax: 90 216 302 99 29
E-mail: melihus@snu.com.tr.

In recent years, minimal invasiveness became popular in almost every branch of medicine. Most striking by-products are perfect cosmetic results and cost reduction. Cardiac surgery by minimally invasive methods are particularly preferred in correction of congenital anomalies. In GATA Haydarpaşa Education Hospital, 37 patients were operated by right minithoracotomy for repair of atrial and ventricular septal defects. The only disadvantage was the increase in cannulation time. However, better cosmetic results, shorter hospital stay and cost reduction makes minimal invasiveness the method of choice.

Key words: adult type atrial septal defect, adult type ventricular septal defect, minimal invasiveness

Advançe in technology and increasing interest in cosmetic results cause cardiac surgery to become less invasive gradually, like all the other surgical branches. Recently, repair of atrial septal defects (ASD) and ventricular septal defects (VSD) by smaller incisions and minithoracotomy became possible. Since they cause less trauma and perfect cosmetic results, minimally invasive procedures are becoming more popular. In addition, the patient population is younger in adult type ASD and VSD thus, the cosmetic results are more important.

METHODS

Between January and November 1998, 24 patients with ASD and 13 patients with VSD were operated by right minithoracotomy in GATA Haydarpaşa Education Hospital. All ASDs were ostium secundum

type and there were no accompanying defects, while all VSDs were perimembranous type. Seven of ASDs and four of VSDs were female with a mean age of 19 ± 4.3 . 17 of ASDs and nine of VSDs were male and mean age was 22 ± 3.3 . Breast development was completed in all of the female patients. The proper incision site was marked while standing up. After induction of general anesthesia, all patients were intubated with a Carlens intubation tube. Patients were given a 30° anterolateral position with right arm perpendicular and lateral to the chest. The lower part of the body was placed in a convenient position for femoral cannulation in case it was necessary. Skin incision was from right inframammary sulcus to parasternal and midaxillary line. The mammary and pectoralis major muscle was dissected from the chest wall. We entered the thorax from fourth right intercostal space. More attention was paid as getting closer to the sternum in order not to injure the internal mammary artery. Right lung was deflated, and in some of the cases right lobe of the thymus was dissected. Pericardium was opened vertically just 2cm anterior of the phrenic nerve and suspension sutures were placed. A wide tape was placed around the aorta, by the help of this tape the aorta was pulled distally and standard purse strings were placed on the aorta.

Bicaval cannulation was performed according to the type of the defect. For sinus venosus type defects, 90° angled cannulae were used in order to extend the operation field.

For low inferior type defects, 90° angled cannulae were used for inferior venous cannulation. After bicaval cannulation and connection of cardioplegia delivery system for antegrade cardioplegia, cross-clamp was applied and bypass was initiated. A wide tape was placed around both cavae and they were occluded for total bypass.

Right atriotomy incision was made from the usual region. ASDs and VSDs were repaired either by primary closure or Gore-Tex or pericardial patch.

Right atriotomy was closed with 4/0 prolene and continuous suture technique while de-aerating the atria. De-aeration was continued by suction from the aortic cardioplegia line. In all cases the heart was

decompressed through the right superior pulmonary vein. Pericardium was closed partially. Two drains, one to the pericardial cavity and second to the thoracic cavity -if necessary- were placed. Intercostal blockage was performed by bupivacaine. Intercostal space was closed by placing the ribs closer to each other and the layers were closed in the usual manner. All patients were taken to intensive care unit, intubated and mechanical ventilatory support was given. All of the patients were supported by mechanical ventilation for a while and then extubated. All operations were performed by the same surgical team. Hemodynamic data for all patients were recorded in the same manner. After the extubation, their opinion on the incision was asked and recorded.

RESULTS

Six of ASDs were superior type sinus venosus, 4 were inferior and 14 were fossa ovalis type. All VSDs were perimembranous type. Eight of ASDs were closed by primary closure, while four of VSDs were closed by primary closure. Mean cross-clamping time for ASDs was 24 ± 3.8 min, whereas mean cardiopulmonary bypass time was 36 ± 4.1 min. For VSDs, mean cross-clamping time was 28 ± 3.8 min and bypass time was 41 ± 4.3 min. Average length of skin incision was 7.8 ± 1.1 cm. Mean mechanical ventilation time was 6.2 hours, while mean stay in ICU was 1.3 days. All patients were discharged from ICU after chest tubes were taken off. All patients were discharged from the hospital at an average of 5.7 days with no mortality.

Mean amount of drainage was 290 ± 140 cc. Mean blood transfusion was 1.2 ± 0.4 units. Pneumothorax was seen in only one patient (3%). A chest tube was placed through the second intercostal space and the drainage was stopped after one day.

Four patients suffered from incisional pain. None of the patients experienced dyspnea. All patients were very pleased by the appearance of the incision. Cost was reduced by 15% compared to the standard cases.

DISCUSSION

Minimally invasive methods are becoming more popular in cardiac surgery as it is the case in all other surgical branches. Median sternotomy incision is still the method of choice for a better exposure in intracardiac congenital anomaly surgery, since intracardiac anomalies can be more than a VSD or ASD, accompanied by different types of other cardiac anomalies. Cardiac anomalies are generally diagnosed and repaired in early childhood. If median sternotomy is performed on especially a teenager, the long, ugly scar which cannot be covered completely can cause a serious psychological trauma. For this reason, in recent years, the use of different minimally invasive cardiac surgery techniques aroused a great excitement in cardiac surgery centers.

Although, femoral cannulation was preferred in some of these centers, we used the standard way of cannulation. Initially, while performing the very first cases, it was a little bit difficult technically. But this difficulty was reflected as only an increase in cross-clamping time. On the other hand, there was no difference in cross-clamping time and total bypass time compared to the standard method.

Respiratory complications were less due to early extubation and shorter period in ICU. Thorax stability was better in respiration and patients felt much more comfort during respiration. There was no symmetry problem in the breasts of the female patients. By this method, the need for blood transfusion decreases as well, since the incision is shorter and sternum is not cut.

Minithoracotomy is valuable because it gives an opportunity for re-operations with median sternotomy since pericardium is opened from the right. Cross-clamping time and total bypass time shows no difference when compared to conventional techniques. We believe that cross-clamping time will decrease as the experience of the surgical team increases.

There were no maldevelopments of chest since all our patients were adults. Cherup et al. have found 60% chest maldevelopment in pediatric age group. Dietl has found 7.4% chest tissue

asymmetry, 38.8% right periareolar anesthesia or hypoesthesia in his series. In Massetti's series, 56 young women were operated (using the same method used in the present series) and cosmetic results were perfect. Thus, this method is accepted as a safe method by the other centers as well.

In conclusion, recently, adult type congenital anomaly repair operations are performed less invasively taking the same time as the standard sternotomy. In minithoracotomy, hospitalization period, cost, and the amount of blood transfusion decreases. But the most striking by-product is a better cosmetic result for a patient who is becoming a teenager. We believe that minithoracotomy for uncomplicated ASD and VSD surgery will be the method of choice as the experience of the surgical team increases.

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