

## CASE REPORT

**Minimally invasive mitral valve surgery**

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**Abstract**

Minimally invasive mitral valve surgery is an operation through a small incision without compromising the quality of the procedure. The sternum is partially split leading to better cosmesis, less bleeding, less pain and quicker recovery. Generally no additional equipment is required without any added cost to the patient. We report a case of mitral valve replacement through mini-sternotomy.

**Key words:** mini-sternotomy; mitral valve replacement

**Introduction:**

Full median sternotomy has been a standard surgical approach for mitral valve replacement for the past several years. Recently there has been a lot of interest in minimally invasive cardiac surgery. Surgeons around the world are now replacing mitral valve through small incisions with safety and good results<sup>1</sup>.

Although right para-sternal incisions have been used in the past partial upper sternotomy is the incision of choice for minimally invasive mitral valve replacement. This incision affords good exposure for mitral valve repair and mitral valve replacement<sup>2</sup>. The purpose of this case report is to share our experience of mitral valve replacement through a minimally invasive approach.

**Case Report**

I present a case of a 19 years old man who has been suffering with shortness of breath and left sided chest pain on and off for four years. During routine chest examination a cardiac murmur was picked up. The initial echocardiogram showed rheumatic mitral valve with moderate mitral regurgitation. He was followed with serial examination and echocardiogram. Over a course of four years his symptoms have become worse with echocardiogram showing several mitral regurgitation and left ventricular dilatation.

At this stage he was referred for mitral valve replacement.

**Operative Steps**

A 6-8 centimeter incision is made beginning from the angle of Louie. The incision is carried down to the sternum using cautery. The sternum is opened from the sternal notch to the third interspace on the left (Fig 1).

The aorta is cannulated for arterial return and the venous drainage is obtained by cannulae placed in the superior vena cava and inferior vena cava. To reduce the size of venous cannulae vacuum-assisted venous drainage is used. After cardiopulmonary bypass is established the aorta is closed clamped and antigrade cardioplegia is given (Fig 2).

The right atrium is isolated with caval tourniquet and opened in a vertical direction. The interatrial septum is incised and the left atrium is decompressed. Mitral valve replacement is carried out in the usual fashion. The anterior leaflet is excised and most of the posterior leaflet is preserved. 2-0 Ethibond<sup>®</sup> sutures are placed along the annulus and a prosthetic valve is implanted into position (Fig 3).

The septal incision in the left atrium is closed with a continuous running 3-0 Prolene<sup>®</sup>. The in-

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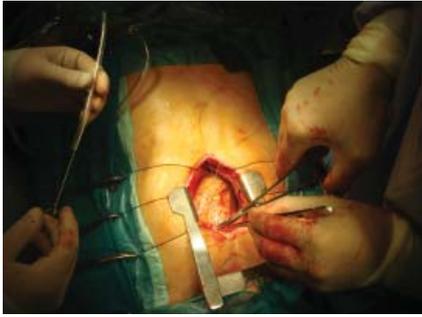


Figure 1: Size of incision

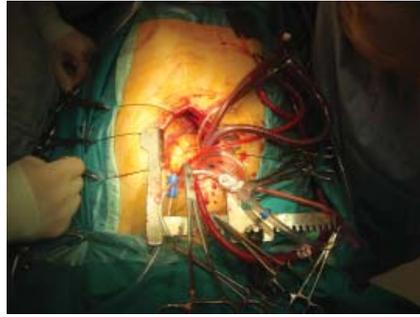


Figure 2: Surgery in Progress

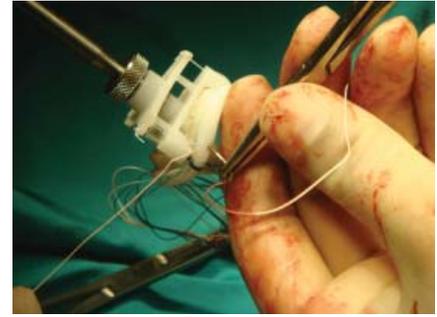


Figure 3: Implantation of Valve

cision in the right atrium is also closed with the same suture.

After the patient is weaned off the cardiopulmonary bypass the cannulae are removed. The wound is closed in layers with stainless steel wires for the sternum and absorbable suture for the fascia and skin.

#### Post-operative course

He had an uneventful recovery with the post-operative echocardiogram showing the prosthesis was well seated without any leak. The wound healed well with less pain and less blood and blood product requirement.

#### Discussion

In the last several years cardiac surgical techniques have evolved with the intension of less surgical trauma and quick recovery<sup>3</sup>. The upper partial sternotomy that we have described has a relatively short learning curve. The mitral valve replacement can be performed with outstanding results without compromising the quality of the procedure through this small incision. Although our experience is very limited this procedure has been performed at other institution with excellent results. More than 2000 patients had mitral

valve and aortic valve surgery at the Cleveland Clinic (USA) with good results<sup>4</sup>. The impact of minimally invasive surgery is substantial with decreased in the recovery time, blood loss, transfusion requirement, shorter ICU and hospital stay, reducing hospital cost without compromising the surgical efficacy.

#### Conclusion

This is the first time mitral valve was replaced through upper partial sternotomy in Pakistan. It opens the doors for other heart surgeries that can also be performed through minimally invasive means like aortic valve replacement, closure of atrial septal defect, removal of cardiac tumors, atrial fibrillation surgery and some coronary artery bypass grafting.

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