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Minimal Invasive Cardiac Surgery- 3 Years of our Experience

Medical Science

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ABSTRACT

We present 3 years experience and follow up of minimally invasive cardiac surgery cases.

Aims and objectives: To determine the efficacy, safety, advantages, limitations and short term follow up of MICS.

Material and methods: 55 cases were done.

- *Mitral Valve replacement with or without tricuspid valve repair, ASD closure- Right anterior thoracotomy -4th ICS.*
- *Aortic valve replacement - Upper mini-sternotomy or Right 2nd ICS.*
- *Coronary Artery Bypass (off pump) - left anterolateral thoracotomy -4th ICS.*

Surgery was done through a small incision 5-8 cm using regular or specialized instruments. Other than CABG, patients were put on bypass using either aorto-bicaval or femoro-femoral cannulation.

Results: Our mean extubation time was of 6 hrs and mean ICU stay of 36 hrs. 6 days of hospital stay with no postoperative complications.

Conclusion: MICS is a safe approach with excellent results, less pain, decreased ICU and hospital stay and fast recuperation.

Introduction:

Minimally invasive surgery is done through a small incision 5 to 8 cm as compared to traditional 20 to 25 cm incision using regular as well as specialized instruments.

Benefits of minimally invasive cardiac surgery are:

- Smaller incision.
- Less pain.
- Early extubation.
- Shorter ICU and hospital stay.
- Lower risk of wound infection.
- Early recovery and return to normal activity.

Risks and limitations of minimal invasive cardiac surgery are:

- Access is restricted.
- Difficult to handle unexpected complications.
- Difficult to control bleeding from remote areas.
- Difficult to control bleeding once patient is off bypass.

How is it different?

Instead of total midline sternotomy either mini-sternotomy or thoracotomy incisions were used. CABGs are performed on beating heart. For other surgeries patient is put on bypass using either aorto-bicavalcannulation or femoro-femoral cannulation.

It has been three years now since we started the program of minimally invasive cardiac surgery in our institute at KEM Hospital Mumbai. Here we present our experience and follow up of our cases.

Aims and Objectives:

1. To determine the efficacy and safety of MICS.
2. To determine the advantages, disadvantages and limitations of this approach..
3. To determine post operative outcome and short term follow up of operated patients

Materials and methods:

55cases were done during this period of 3 years from 2013. The cases that were done were:

- Mitral Valve replacement with or without tricuspid valve repair.
- ASD closure
- Aortic valve replacement
- Coronary Artery Bypass

Mitral valve replacement with or without tricuspid valve repair

- Incision- Right anterior thoracotomy through 4th ICS 5 to 7 cm lateral to right sternal border
- Femoro-femoral bypass
- LA and RA incisions
- All valve sutures taken after valve excision.

Minimally invasive Aortic valve replacement

- Incisions- upper mini-sternotomy (J shaped) or Right anterior thoracotomy through 2nd ICS
- Direct aortic cannulation with RAA cannulation
- Or femoro-femoral cannulation
- To improve access in thoracotomy, we can cut the third rib at sternocostal junction
- Aortic incision taken o the most accessible part of aorta
- Rest of the procedure performed in the usual manner

Minimally invasive CABG- we have performed single vessel bypass surgery and double vessel bypass

- Incision- left anterolateral thoracotomy through 4th ICS
- Beating heart
- LIMA harvested through the same incision
- Cardiac stabilizer introduced through the same incision
- Anastomosis performed using long needle holder

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For initial cases we used regular instruments. Later we started using specialized instruments made specifically for minimally invasive surgeries.

Progress of patients was recorded in immediate post -operative period till discharge from wards. Patients were followed up regularly after discharge with clinical examination and 2 D Echo at 2wks, 6wks, 6months and1 year.

Results:
Out of 55 cases:
(Table no 1.)

MVR	25 cases
MVR with TVA	9
AVR	6
ASD	7
CABG (OFF PUMP)	8

Following data was tabulated: (table no 2)

Mean time of extubation post surgery	6 hrs
Mean ICU stay	36 hrs
Mean hospital stay	6 days
Mean scar size	6.2 cm
Conversion to sternotomy	2 (3.3%)
Re-exploration	Nil
Mortality	2 (3.3%)
Decreased LV function	1 (1.81%)
Patient satisfaction in pain relief	81.81 %
Mean cross clamp time	82 min
Mean bypass time	122 min
Post operative 2D Echo findings	All valve patients had good prosthetic valve function with no abnormal movements Good EF and no RWMA for CABGpatients. No decrease in EF

Discussion:
Mean cross clamp time for ASD closure in our study was 38 min and bypass time of 94 min as compared to 22.29 min and 49.62 min reported by Baharestani et al who reported 77 cases of MI-ASD.

Mean cross clamp time of MI-AVR was 100 min and bypass time of 152 min as compared to 80 min and 117min reported by Glauber et al and 93 and 137 min by Semsroth et al.

3 cases were operated through mini sternotomy and 3 cases were operated through right anterior thoracotomy. One patient operated through thoracotomy succumbed to aortic dissection.

Mean cross clamp time for MI-MVR was 86 min and bypass time of 138min as compared to 72 +/-10 min and 130 min reported by Mazine et al. 1 patient operated through thoracotomy required conversion to sternotomy.

1 patient had moderate AR detected on table after cardioplegia was given. Patient developed LV distension while coming off bypass and had LV dysfunction post operatively and expired after 48 hours.

Our study showed mean ventilation time of 6hrs, ICU stay 36 hrs, hospital stay 6 days, slightly more as compared to Glauber et al at mean scar length 6 cm.

No patient had any wound infection or bleeding.

In post operative follow up upto 3 years, no patient showed LV dysfunction or diastolic dysfunction.

No patient showed any prosthetic valve dysfunction.

Difficulties and problems:
In our initial cases cross clamp time and bypass time are quite long.

Long learning curve.
LV cannot be approached for massage.

Cardioplegia cannula site bleeding is difficult to control once patient is off bypass.

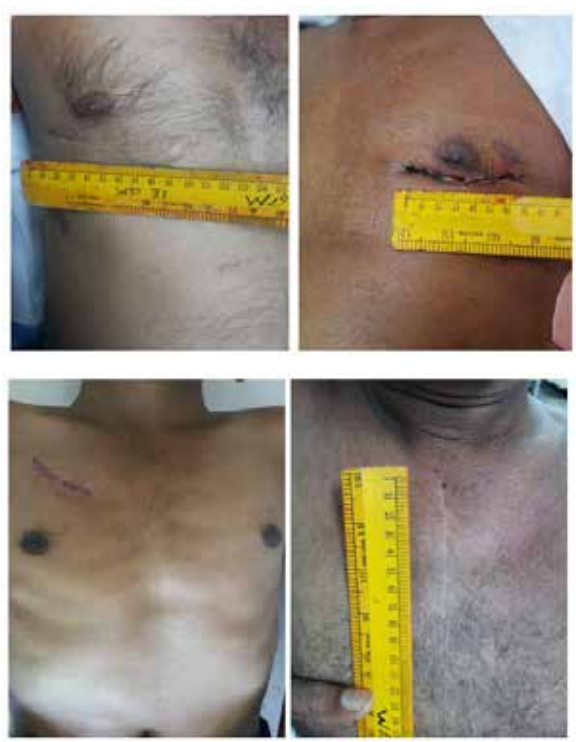
Aortic suture line bleeding on pulmonary artery side is difficult to control once patient is off bypass in thoracotomy approach.

Use of internal shock paddles is difficult.

Conclusion:
MICS is a novel and safe approach. It c an be used for various procedures in cardiac surgery with excellent results. It gives better cosmesis, much less pain, decreased ICU and hospital stay and fast recuperation. There are less chances of post operative wound infection, bleeding and morbidity. One has to choose patients wisely and cautiously.

Learning curve is longer. Initial longer cross clamp and bypass time will reduce as the learning curve gets over and skills improve.

MICS is the way to go for the future in cardiac surgery.



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