Department of CVTS

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MINIMALLY INVASIVE

CARDIAC SURGERY (MICS)

A DAWN OF NEW ERA AT DPU

Introduction

- Heart surgery performed through several small incisions instead of the traditional open-heart surgery that requires a median sternotomy approach.

History

- Minimally invasive cardiac surgery (MICS) started with mitral valve procedures and then gradually expanded towards other valve procedures, coronary artery bypass grafting and various types of simple congenital heart procedures.
- In the mid 1990's , Cosgrove and Cohn independently described the first minimally invasive MVS (MIMVS).
- Carpentier et al. in February of 1996 performed the first video-assisted mitral valve repair (MVR) through a mini thoracotomy using ventricular fibrillation.
- In 1998, Mohr et al. reported the Leipzig University experience of MIMVS using ports.
- The next major leap in the evolution of MICS was the development of robotic surgery.

- In 1998, Carpentier et al. performed the first completely robotic mitral
- valve repair using the Da Vinci Surgical System (Intuitive Surgical, Inc.,
- Sunnyvale, CA) .

- MICS CABG was invented by Dr Joseph T McGinn, Jr. performed in the United states on January 21,2005 at the Heart Institute at Staten Island University Hospital, New York.

- This technique is much less invasive and is an off-pump coronary artery
- bypass surgery.

MICS LEVELS

Level 1

Direct Vision : Limited (10-12cms) incisions.

Level 2

Direct vision/video assisted : Mini (4-6cms) incisions.

Level 3

Video directed and robotic assisted : Micro (1.2-4cms)

incisions.

Level 4

Robotic (computer tele manipulation) : Port (< 1.2cm)

incisions

TRADITIONAL APPROACH

- **Advantages –**

- Has withstood the test of time.

- All surgeons are comfortable with it.

- Provides ideal operating conditions.

- Provides full access to heart for :
- - CABG
- - Valve surgery
- - Intracardiac repair
- - Pericardial / Extracardiac repair.

- Allows full control on circulation and oxygenation

Disadvantages –

- Painful
- Increased blood loss
- Comparative Prolonged healing times
- Sternal wound complications.
- Cosmetically non- appealing.

MICS

- **Advantages -**
- Cosmetically better
- Less pain.
- Less blood loss.
- Rapid wound healing.
- Minimization of sternal wound complications
- Reduced postoperative ICU and Hospital stay.
-

- **Disadvantages –**

- Technically demanding.

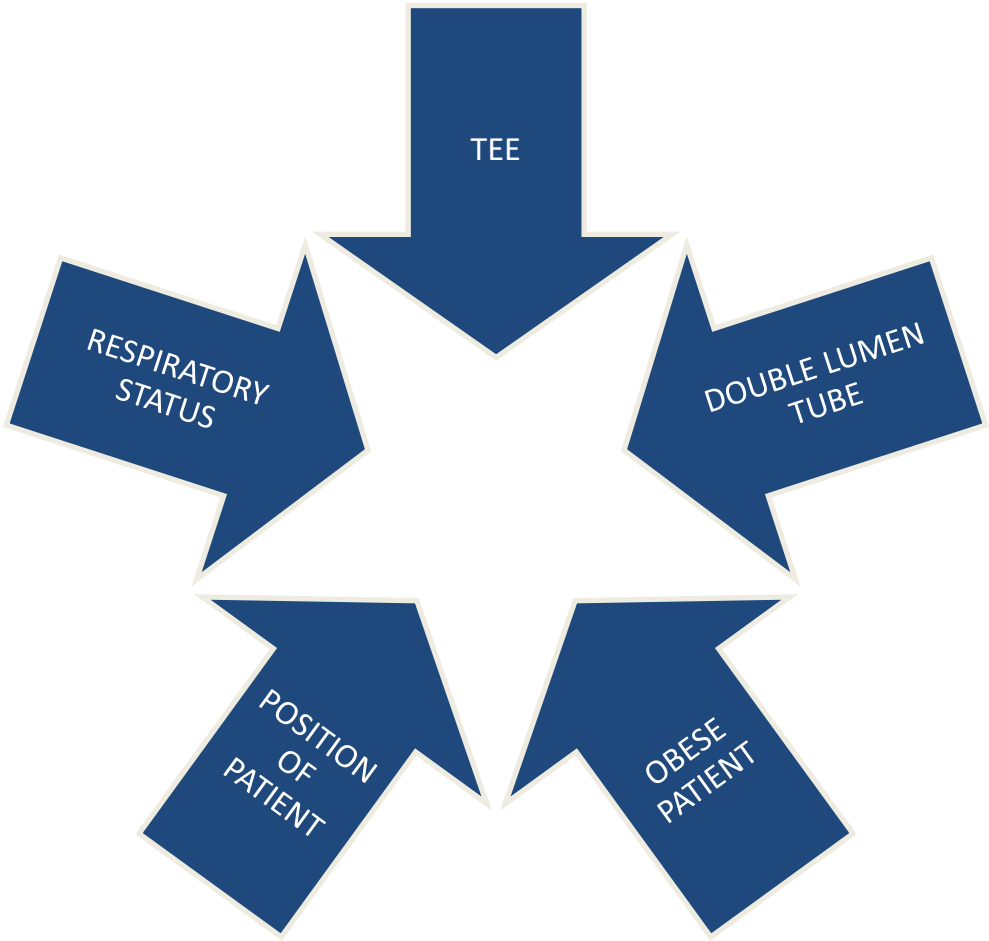
- Requires specialized training at dedicated Centre’s.

- Not appropriate for every patient.

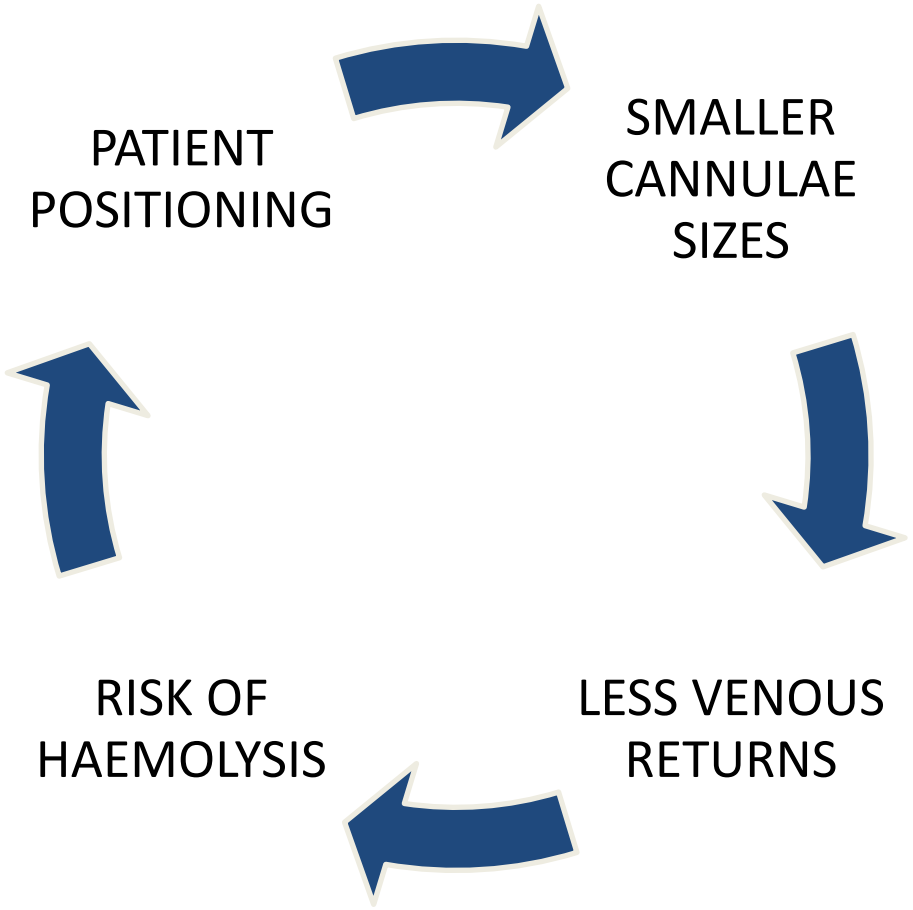
- **Contraindications**

- Morbid obesity.
- Previous lung surgery or infection.
- Severe LV dysfunction.
- Associated other valve or coronary problem.

ANAESTHESIA CHALLENGES



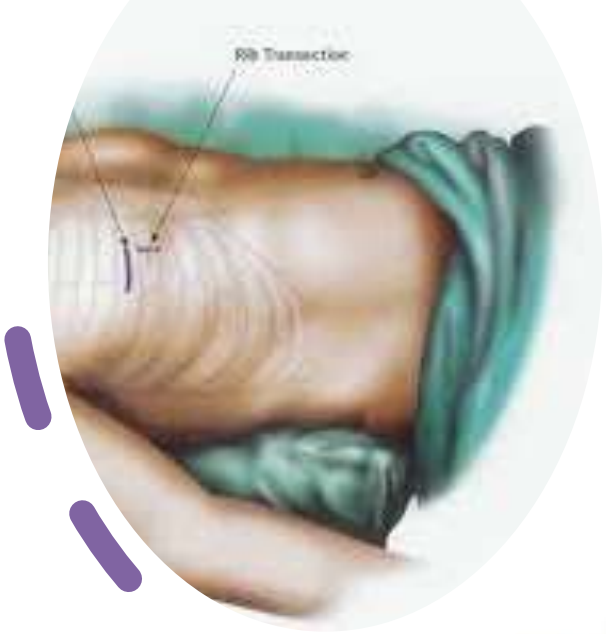
PERFUSION CHALLENGES

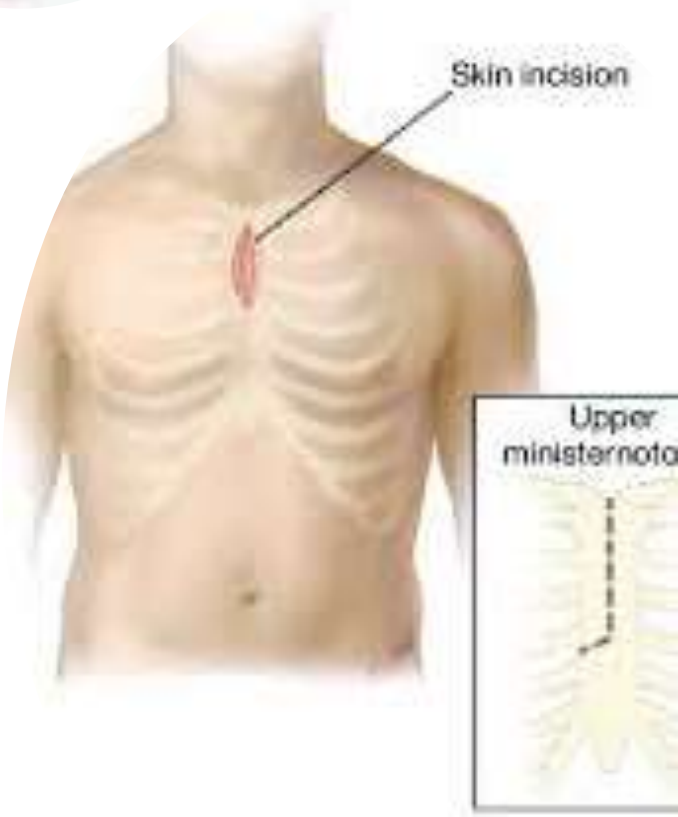


Surgeries Performed

- Via Right Antero-lateral mini thoracotomy.
  - Mitral valve surgery
  - Tricuspid valve surgery
  - ASD closure
  - Atrial tumor resection (eg: Myxoma)

- Via upper Partial mini sternotomy or 2nd
- ICS anterior thoracotomy.
  - Aortic valve surgery
  - PFO closure
  - Thymectomy





- Via Lower partial mini Sternotomy
- - Mitral valve surgery
- - Tricuspid valve surgery
- - ASD Closure

- Via left antero- lateral mini thoracotomy
- - MIDCAB
- - MICS

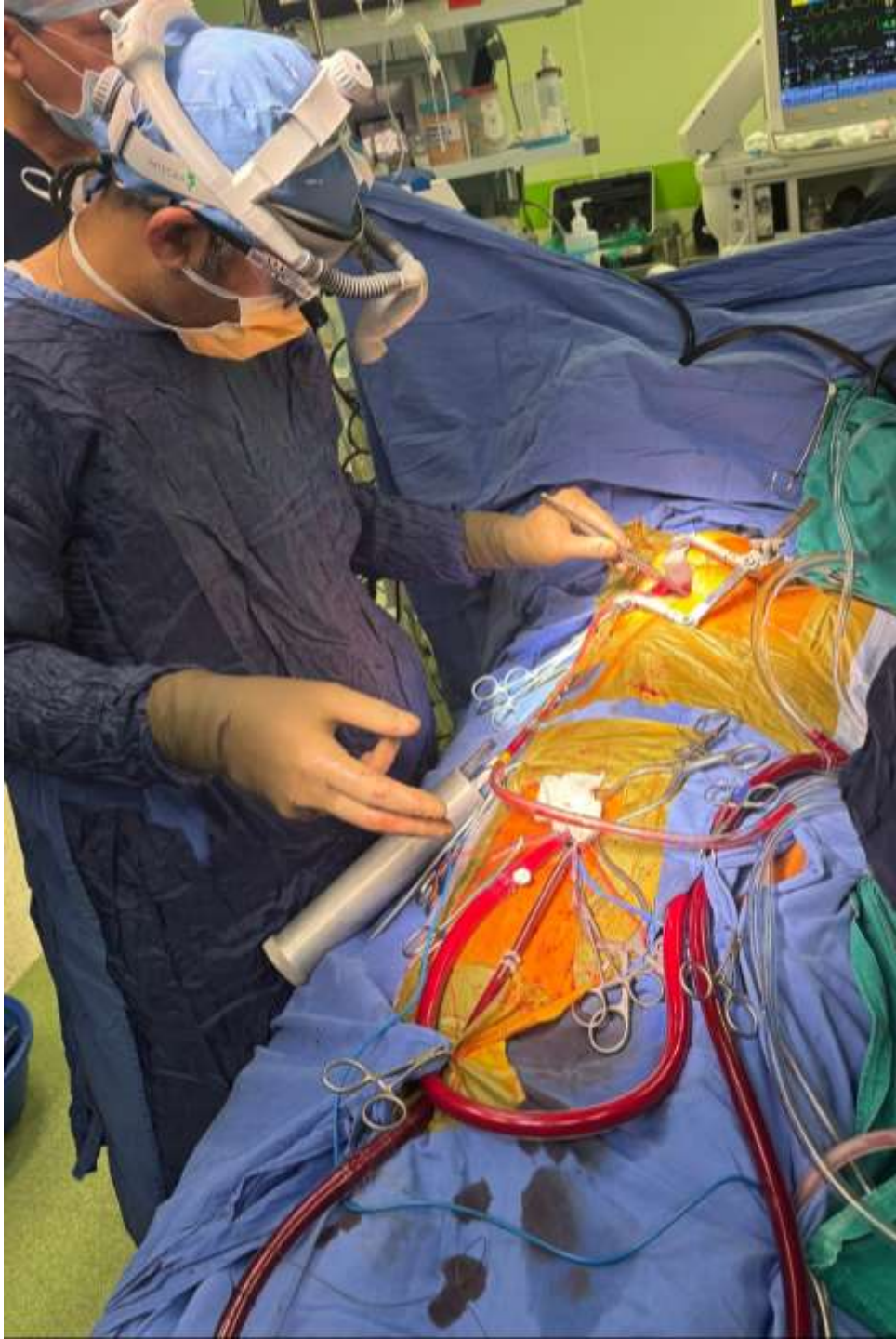
- Via Subxiphoid incision
- - Access to posterior descending artery and distal OM vessels
- - Pericardial window
- - Access in reoperative cases of epicardial ablation

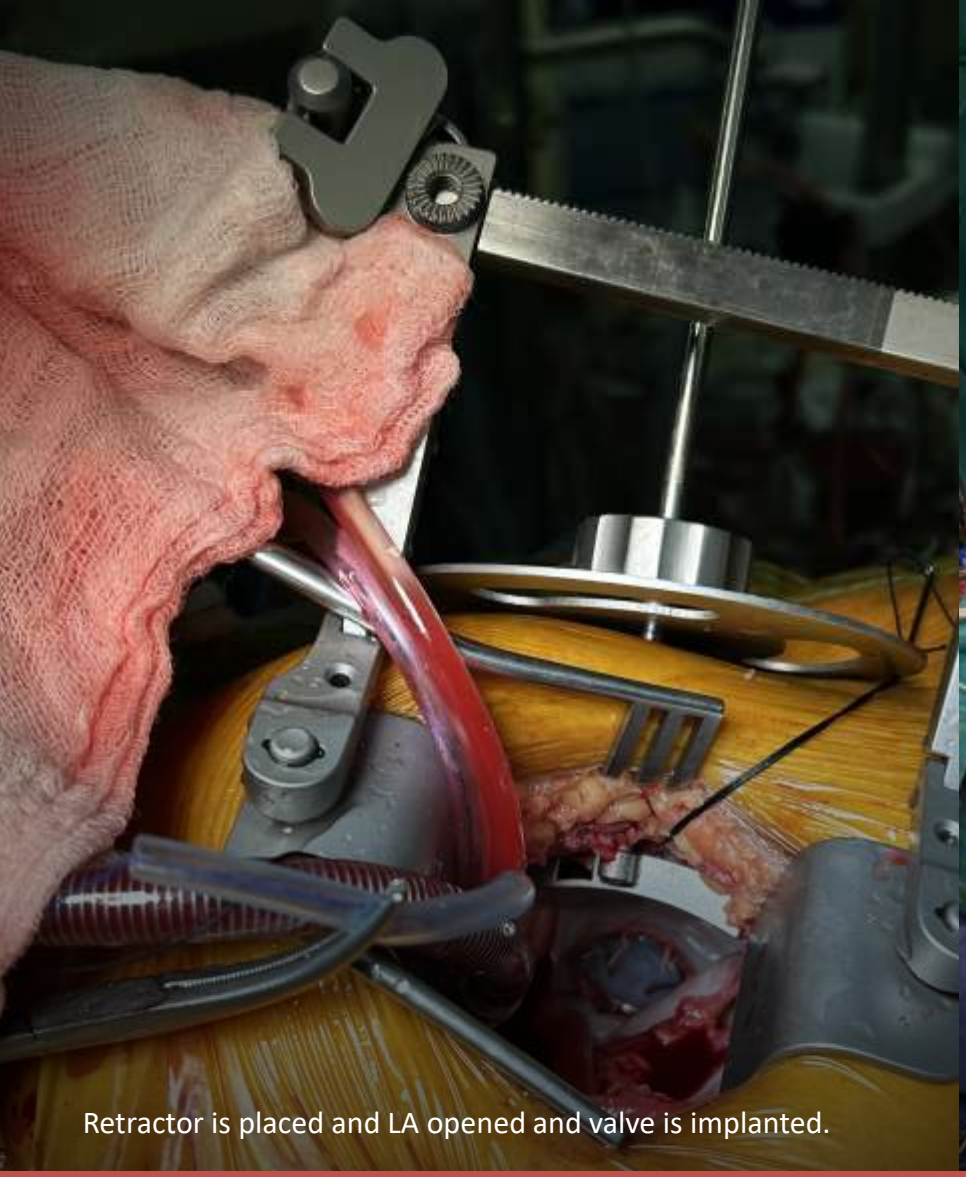
Right Minithoracotomy

- A 6-10cm incision is made along the 4th rib space extending from the level of the nipple to the anterior axillary line, or following the breast crease.

- Pectoralis major is divided or split and the intercostal muscle raised off the inferior rib anteriorly to 1cm lateral to the sternum (avoiding the RIMA) and laterally round to the costal angles to mobilize the rib space.

Going on bypass (Heart lung Machine)



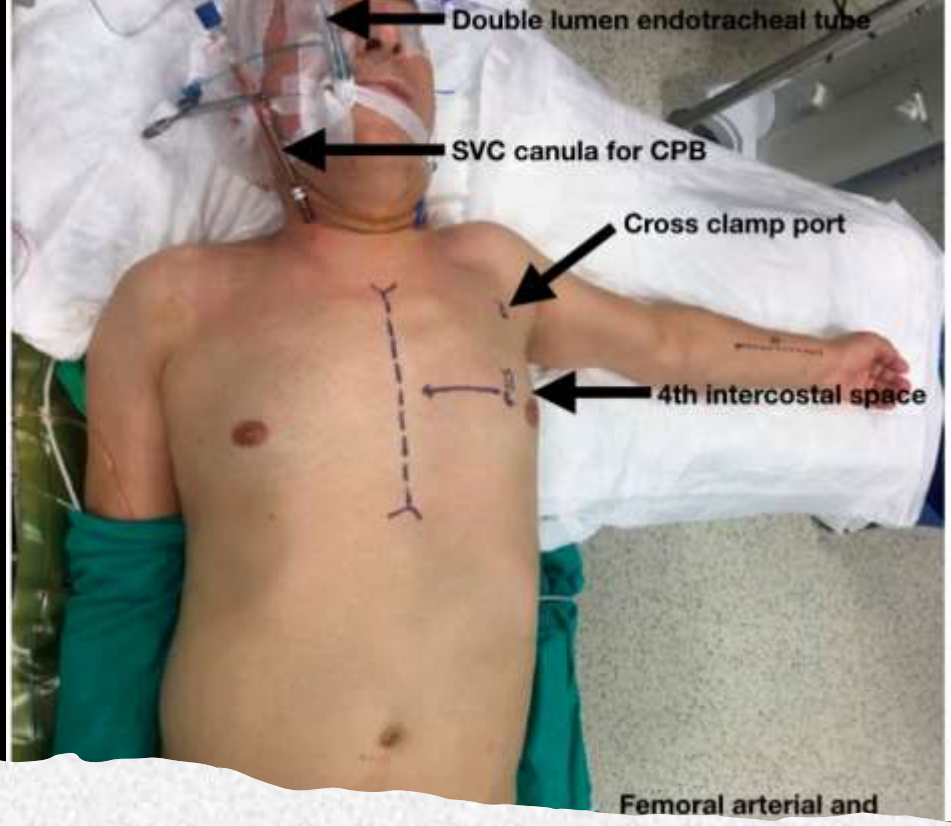


Retractor is placed and LA opened and valve is implanted.

Paediatric cases we use transaxillary approach

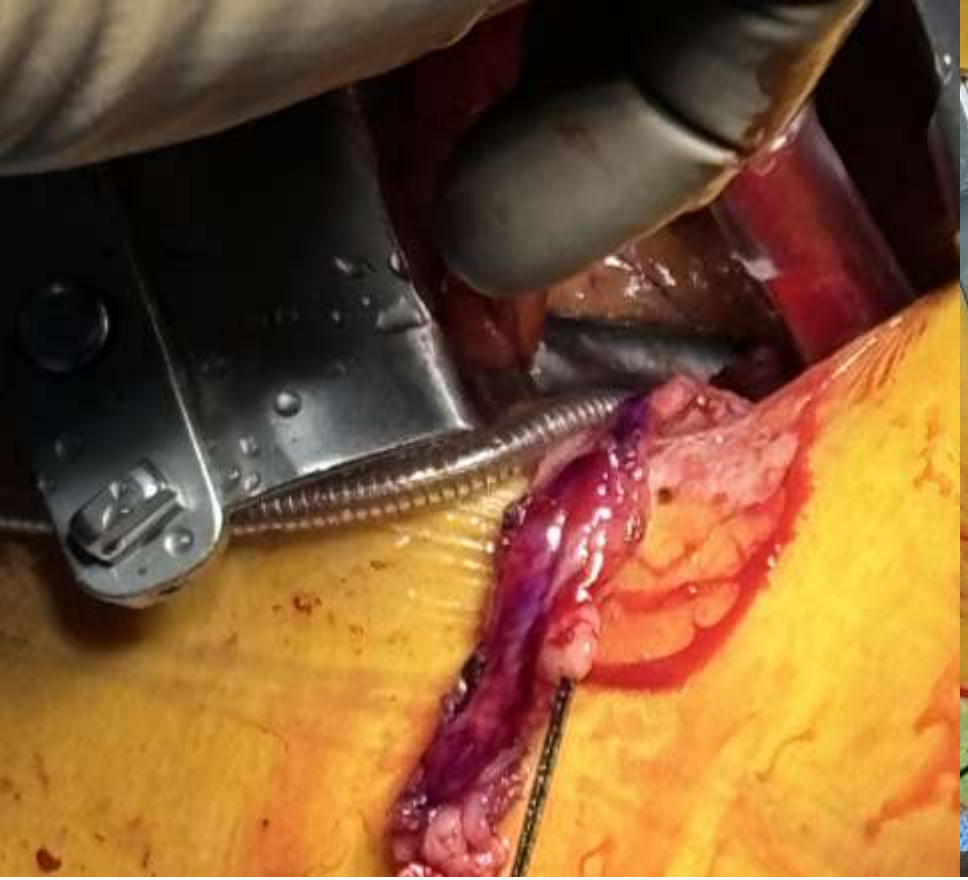
- We use regular cannulation method
- Aorto bicaval cannulation.
- Opening right atrium.
- Closing ASD/VSD.


End result



FOR CABG ON PUMP
OR OFF PUMP

6-10 cm incision from the left border of the sternum over the 4th rib which may be resected



INTERNAL MAMMARY ARTERY HARVESTED AND GRAFTED

LARGER INCISIONS

GRADUALLY CAME DOWN IN SIZE

PAEDIATRIC HAPPY FACES AND SMALL SCARS

OUR JOURNEY

- TOTAL CASES : 23
- MVR
- ASD
- CABG

- PAEDIATRIC CASES RIGHT TRANSAXILLARY :

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FUTURE

PLANNING FOR LEVEL 3 CASES (ENDOSCOPIC ASSISTED MICS)

AND GRADUALLY PROGRESS TO ROBOTIC ASSISTED OPEN HEART SURGERIES.

Thank you