【2016년 로봇수술연구회 학술대회】

Port Placement: Is There Any Difference According to Patient or Disease

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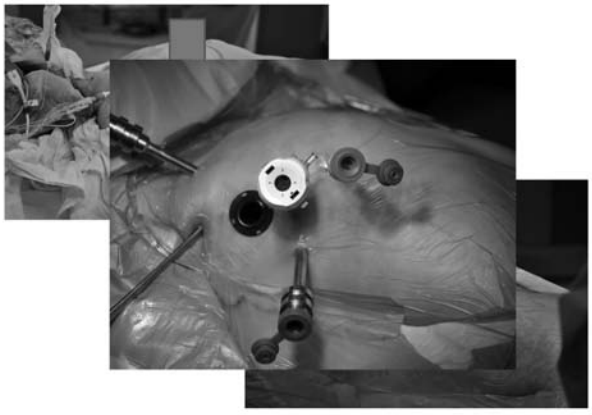
정 성 호

Port planning checklist

- Pleural based densities
- Heart location and orientation in the chest skeleton
- Measurement: chest wall thickness
  skin to cardiac target
- Diaphragm position
- Position of breast implants



Port placement

- Port placement is paramount in reducing the degree of difficulty and ensuring the success of the procedure
- Knowledge about the range of motion and kinetics of the remote manipulators is essential
- The assessment of potential interferences between arms and the patient's body is important to determine the optimal placement of ports

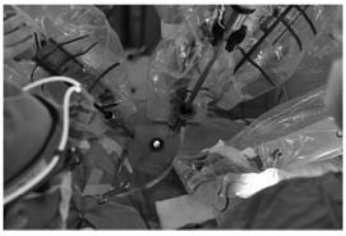
Tips and Pitfalls for Port insertion

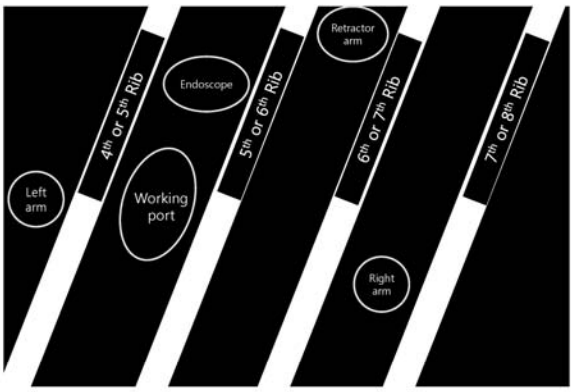
- Minimal dissection
- Mid portion between ribs
- Considering the direction of port
- Bleeding control before heparinization

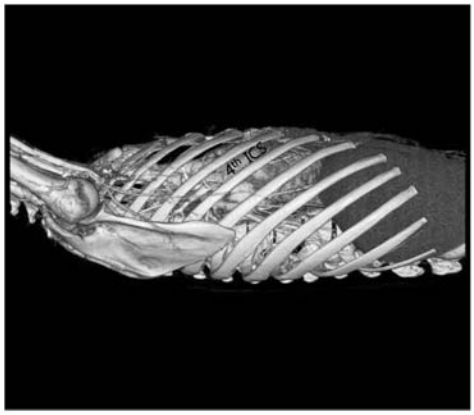
- Rigid rib cage prevents unlimited expansion and limits potential access to all intercostal spaces

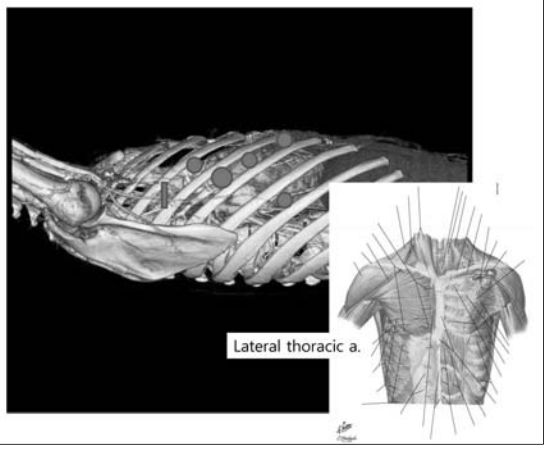
Right minithoracotomy

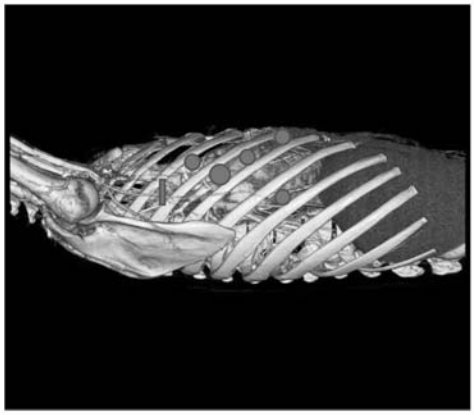
- Working port – incision
- Endoscopic approach

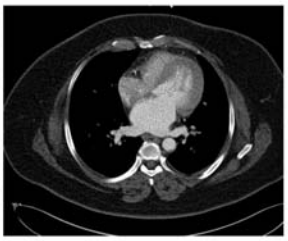




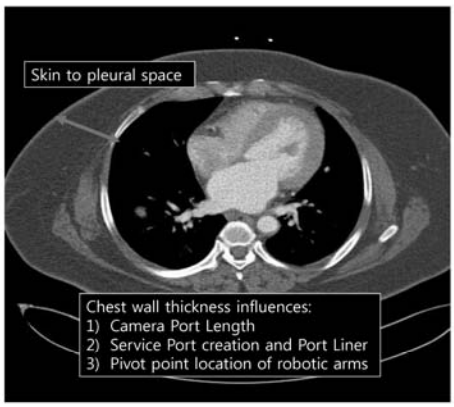




Obese patients

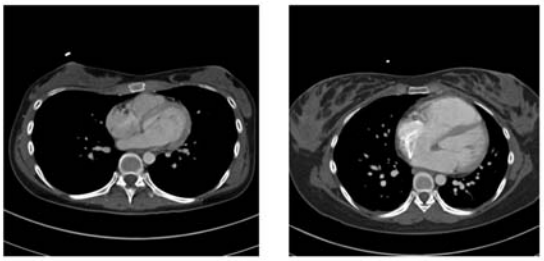



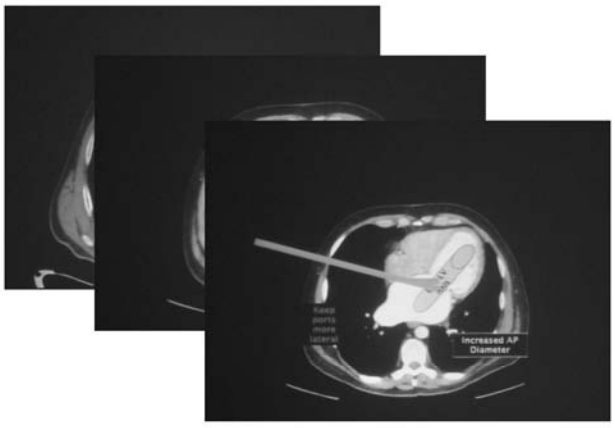
Position: right arm

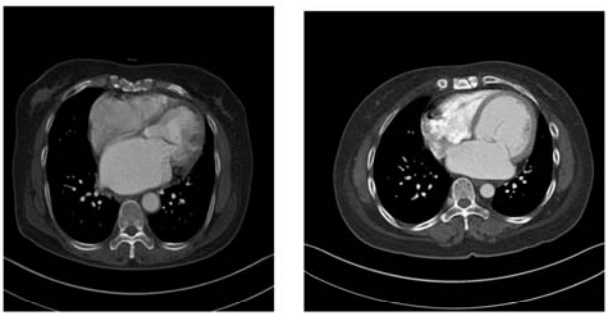


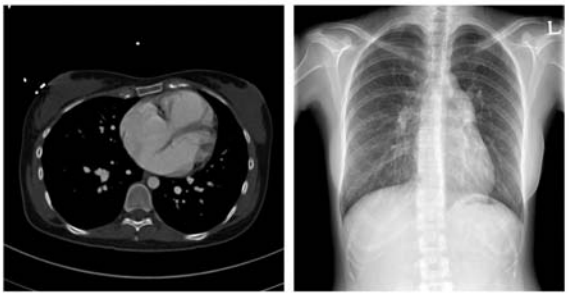
Skeletal anomalies

- Scoliosis
- Increased AP diameter
- Oblique rib
- Horizontal rib

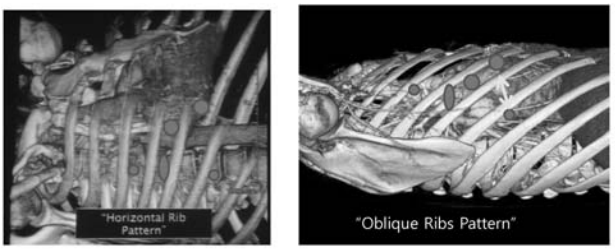


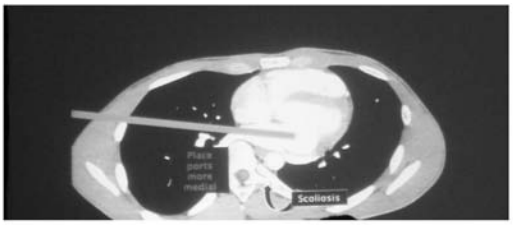


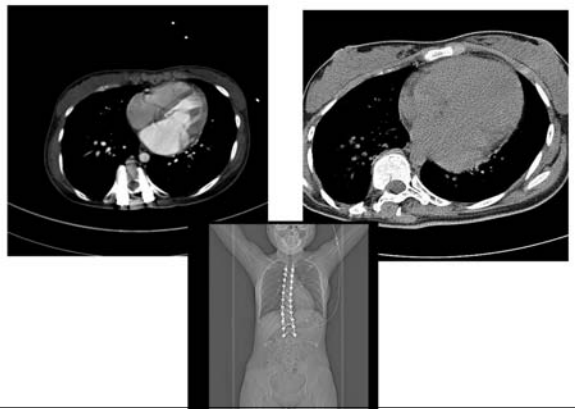




External morphology looks normal, but skeletal asymmetry may be present

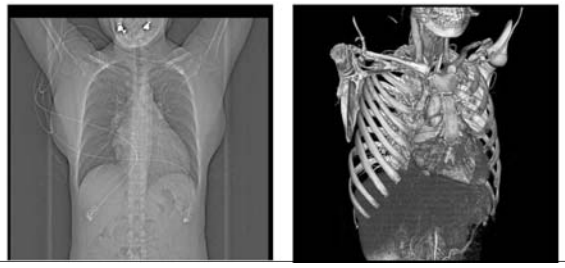






High Right Diaphragm

- Pre-op chest PA (X)
- Chest CT (O)



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- Pre-op chest PA (X)
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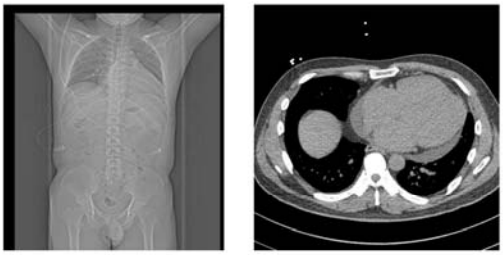

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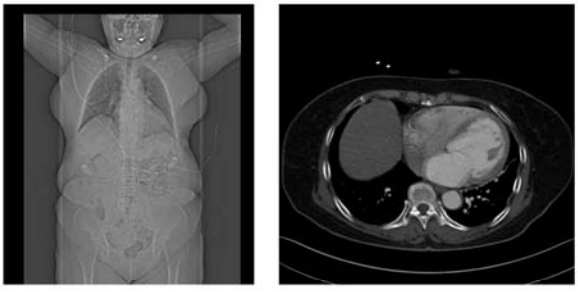
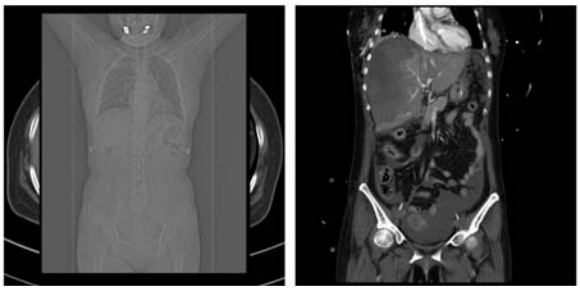


Subcapsula hematoma after diaphragm traction stitch



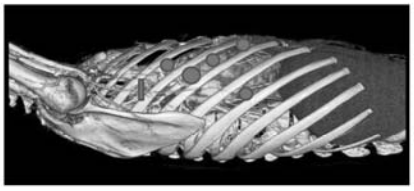
Position of operating table

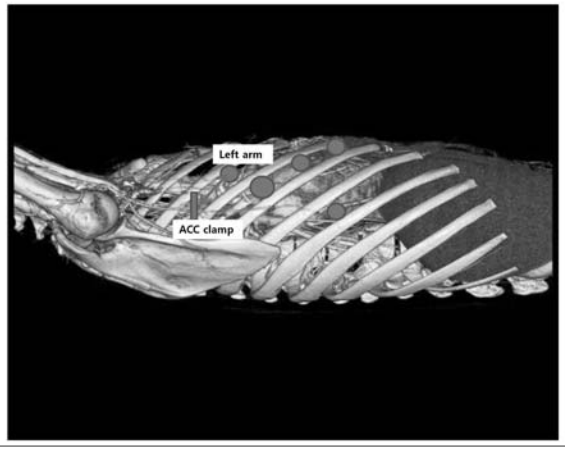
- Reverse Trendelenburg position
  : for better drainage
- Left side down
  : for better view
  : Left ASIS
- Better for de-airing and right ASIS injury

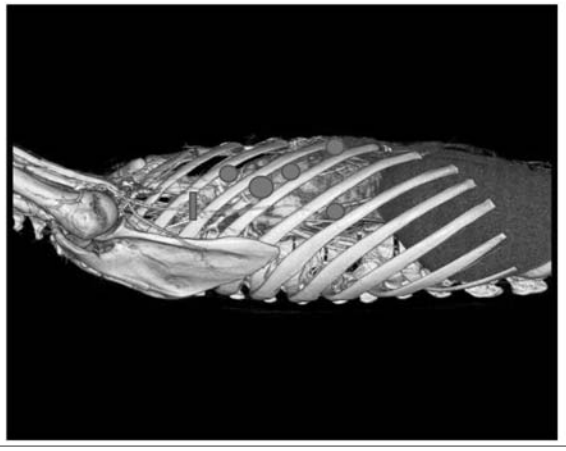
Conflict of arm

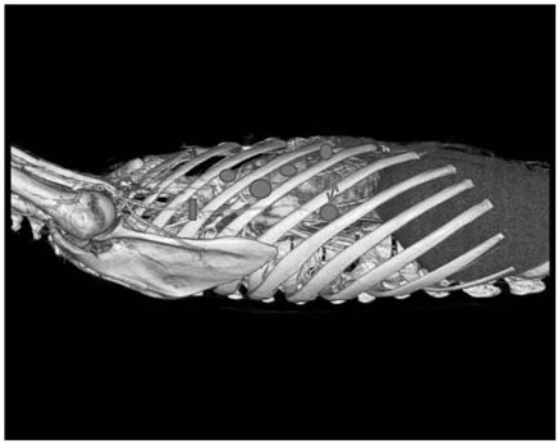
- Left arm vs Chitwood clamp
- Right arm vs Retractor arm

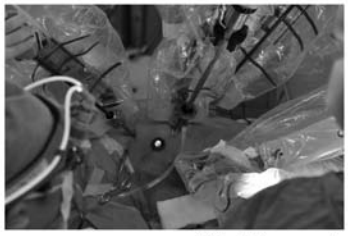
- Right arm vs right ASIS
- Retractor arm vs Scope











- Left arm
  - breast tissue in female
  - muscle tissue in male
- Right arm
  - right diaphragm injury
  - right ASIS
  - retractor port
  - medial commissure of MV
- Working port and scope port
  - thoracic cage shape
- Retractor port
  - RIMA
  - transverse or oblique rib
  - scope port

How to Manage the Root Cannula?

세종병원 흉부외과

유 재 석

Technical tips and Pitfalls in Annuloplasty using Various Types of Rings

분당서울대학교병원 흉부외과학교실

임 청

Leaflet Procedure in Mitral Valve Repair - What is Different in Open Surgery and Robot Surgery

The Department of Thoracic and Cardiovascular Surgery,
Asan Medical Center, Seoul, Korea

Jae Won Lee, MD, PhD

- Every patient wants
  → *less pain, faster recovery, & better cosmesis after surgery*

- Every patient wants
  → *less pain, faster recovery, & better cosmesis after surgery*

- And also wants
  → *complete correction of disease, safety, & best outcomes*

Advantages of Robotic Cardiac Surgery

- High resolution magnified 3D vision
- Ambidextrous capability
- Wrist-like angulation
- Tremor elimination

✚

- Less pain/trauma
- Blood loss ↓
- Risk of complication ↓
- Cosmetic appeal
- Shorter hospital stay
- Faster recovery
- Patient's satisfaction

Limitations specifically related to the use of robotic techniques in cardiac surgery

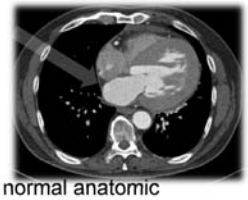
- Incomplete and delayed motion tracking
- Lack of tactile feedback
- Cost
- Learning curve
- Additional operative time

Early MV Repair in Sx(-) Patients

→ *Asymptomatic or minimally symptomatic patients may seek to avoid traditional surgical incisions when less invasive options are available*

Anatomic Consideration

- Posteriorly positioned mitral valve

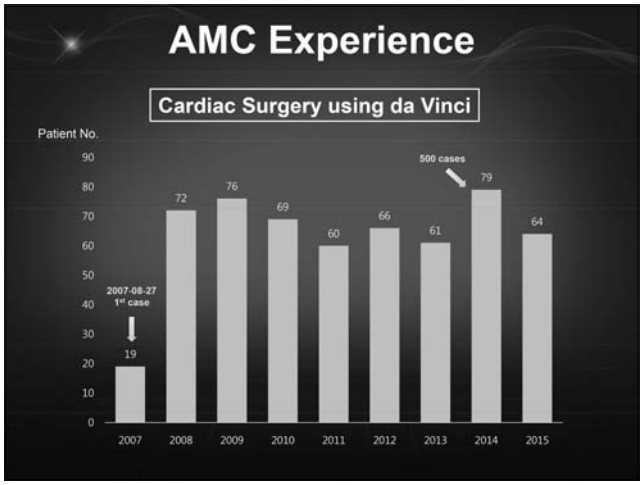


- Right thoracotomy
  → exposure of the MV in its normal anatomic position (without distortion)
  → ***easy to repair***

Reduced Postop Afib

- Right thoracotomy
  → small left atriotomy & minimal manipulation of surrounding atrial tissue
  → ***low occurrence of postop AF***

Glower et al. Eur J Cardiothoracic Surg 1998;14 Suppl 1:143-7.
Mihaljevic et al. J Thorac Cardiovasc Surg 2011;141:72-80.



Yoo et al Acquired Cardiovascular Disease

Mitral durability after robotic mitral valve repair: Analysis of 200 consecutive mitral regurgitation repairs

Jae Suk Yoo, MD,[a] Joon Bum Kim, MD, PhD,[a] Sung-Ho Jung, MD, PhD,[a] Dae-Hee Kim, MD, PhD,[b] Suk Jung Choo, MD, PhD,[a] Cheol Hyun Chung, MD, PhD,[a] and Jae Won Lee, MD, PhD[a]

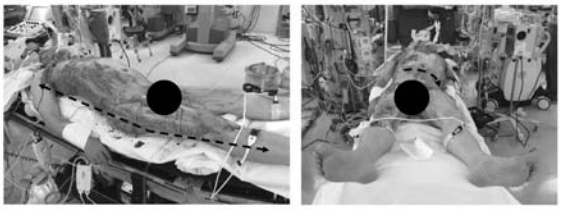
Objectives: The study objective was to review a single-center experience on robotic mitral valve repair to treat mitral regurgitation, with a specific focus on midterm echocardiographic mitral durability. No data assessing the quality or durability of repaired mitral valves are currently available.

Methods: A total of 200 patients who underwent robotic mitral regurgitation repair using the da Vinci system (Intuitive Surgical, Inc, Sunnyvale, Calif) between August 2007 and December 2012 were evaluated. Serial echocardiographic results and operative and procedural times were analyzed.

Results: Mitral regurgitation repairs were successfully performed, and no or mild residual mitral regurgitation developed in 98.0% of patients, with no conversion to sternotomy. No in-hospital deaths occurred. Follow-up was completed in 96.5% of patients with a median of 31.4 months (interquartile range, 12.4-42.3 months). During follow-up, 4 late deaths, 2 strokes, 1 low cardiac output, 1 newly required dialysis, and 1 reoperation for mitral regurgitation occurred. Freedom from major adverse cardiac events at 5 years was 87.7% ± 5.1%. Regular echocardiographic follow-up (>6 months) was achieved in 187 patients (93.5%). At a median of 29.6 months (interquartile range, 14.9-45.8 months), 21 patients (10.5%) demonstrated moderate or greater mitral regurgitation. Freedom from moderate or greater mitral regurgitation at 5 years was 87.0% ± 2.6%. Mean cardiopulmonary bypass and crossclamping times were 182.9 ± 48.4 minutes and 110.9 ± 34.1 minutes, respectively, demonstrating a significant decrease in both times according to the chronologic date of surgery.

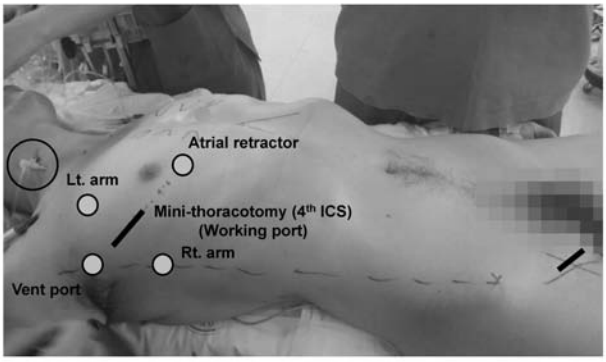
Conclusions: Robotic mitral regurgitation repair is technically feasible and efficacious, demonstrating favorable midterm mitral durability and improved procedural times as experience increases. (J Thorac Cardiovasc Surg 2014;148:2773-9)

Patient Preparation

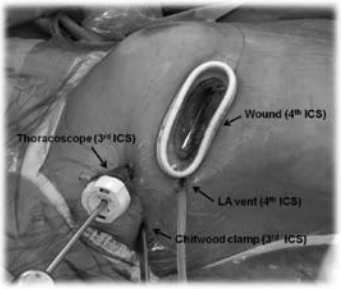


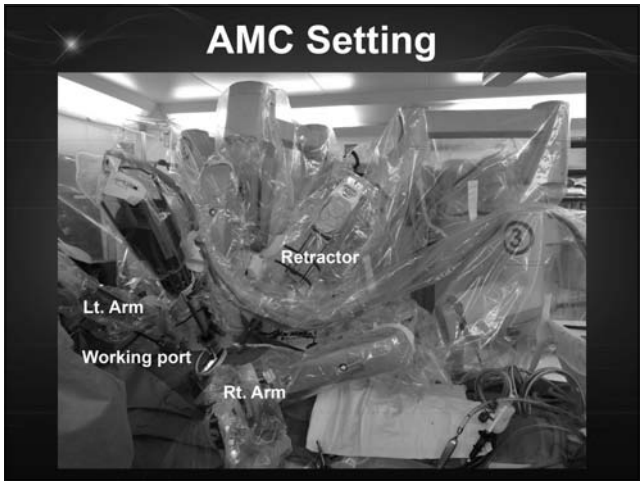
- Left semi-lateral decubitus position
- Prevention of air embolism
  - Head-up, Left side-down

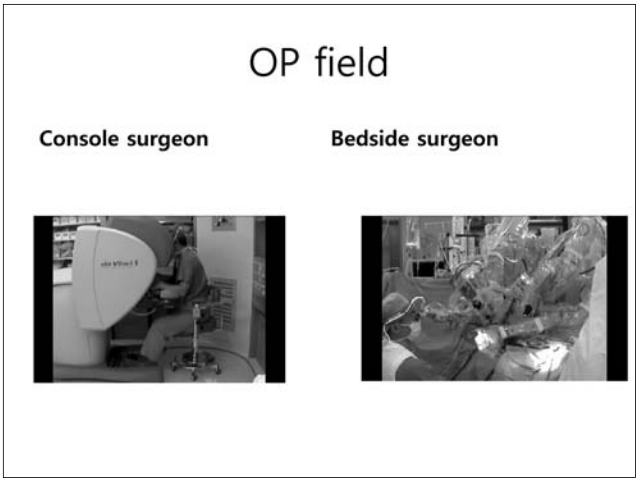
AMC Setting

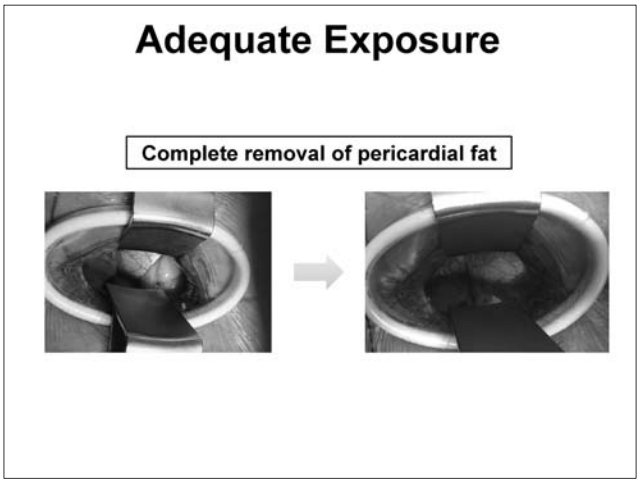


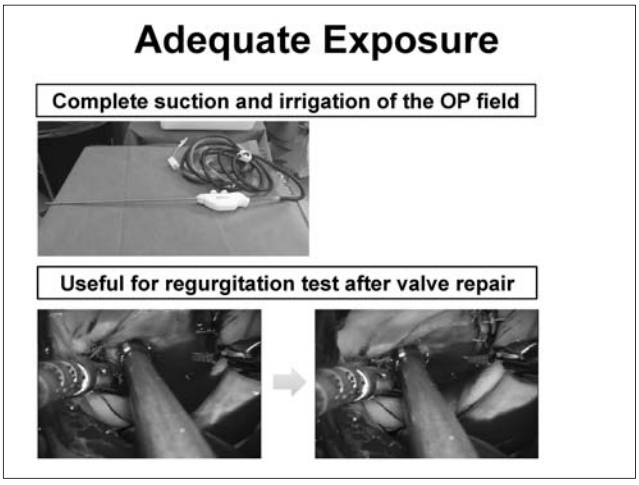
AESOP in AMC

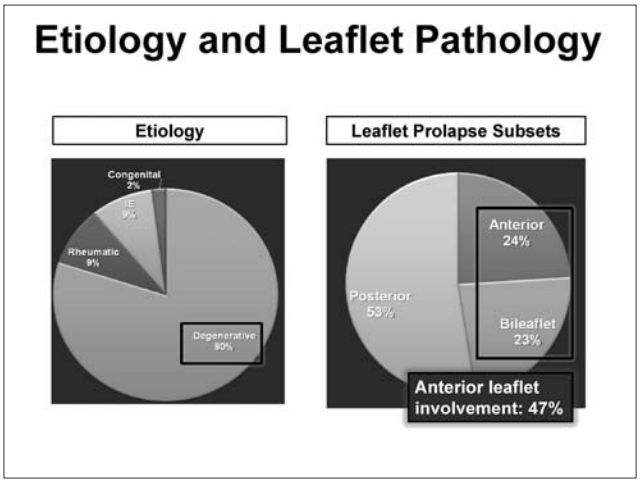



AMC Setting
Retractor
Lt. Arm
Working port
Rt. Arm


OP field
Console surgeon
Bedside surgeon

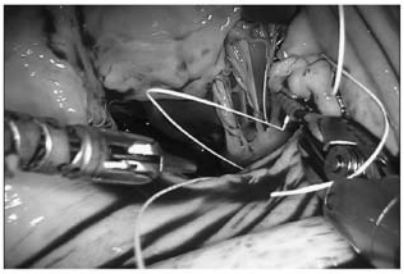

Adequate Exposure
Complete removal of pericardial fat


Adequate Exposure
Complete suction and irrigation of the OP field
Useful for regurgitation test after valve repair


Etiology and Leaflet Pathology
Etiology
Leaflet Prolapse Subsets
Congenital 2%
IE 9%
Rheumatic 9%
Degenerative 80%
Anterior 24%
Posterior 53%
Bileaflet 23%
Anterior leaflet involvement: 47%


Every Repair Is Feasible
99 (99.5%)
PM repositioning
1 (0.5%)

Robotic Valve Repair



-Virtually identical to the conventional repair via sternotomy or thoracotomy
-More than feasible in sub-valvular procedure.

Repair Results and Follow-up

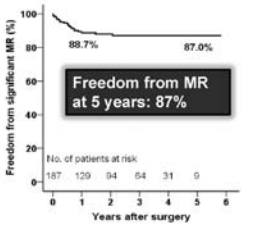
Repair Rate

98 %

Conversion to Open Mitral Stenosis

0 %

Echo follow-up



Conclusions

- Robotic mitral surgery can be certainly operated in almost all patients if wanted by the patient.
- Sub-valvular procedure more feasible in Robotic surgery than conventional surgery.
- Short and long-term outcomes are similar to conventional surgery