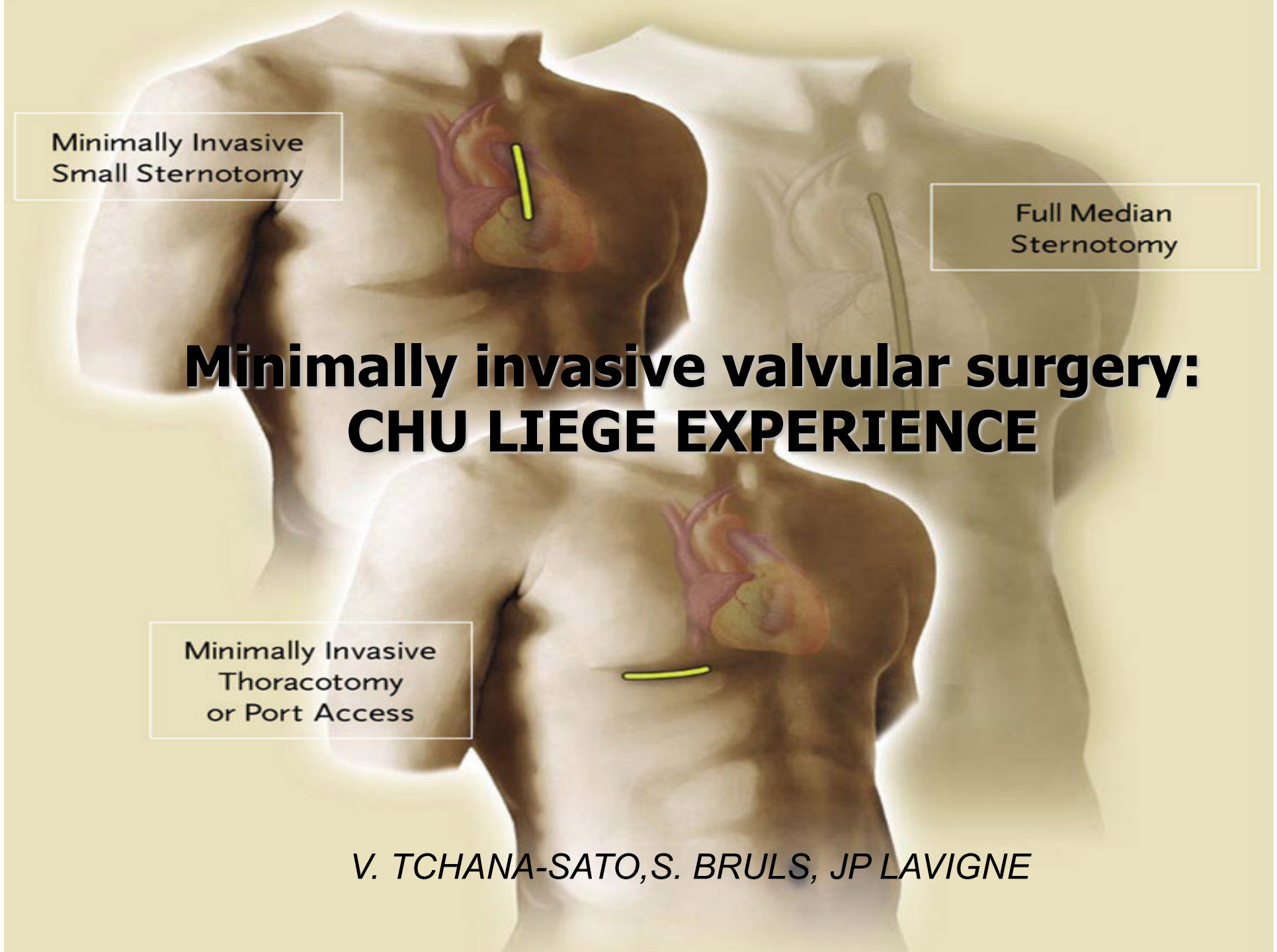
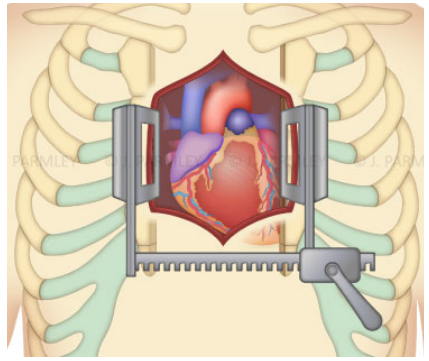


Minimally invasive valvular surgery: CHU LIEGE EXPERIENCE

V. TCHANA-SATO,S. BRULS, JP LAVIGNE

Full median sternotomy:



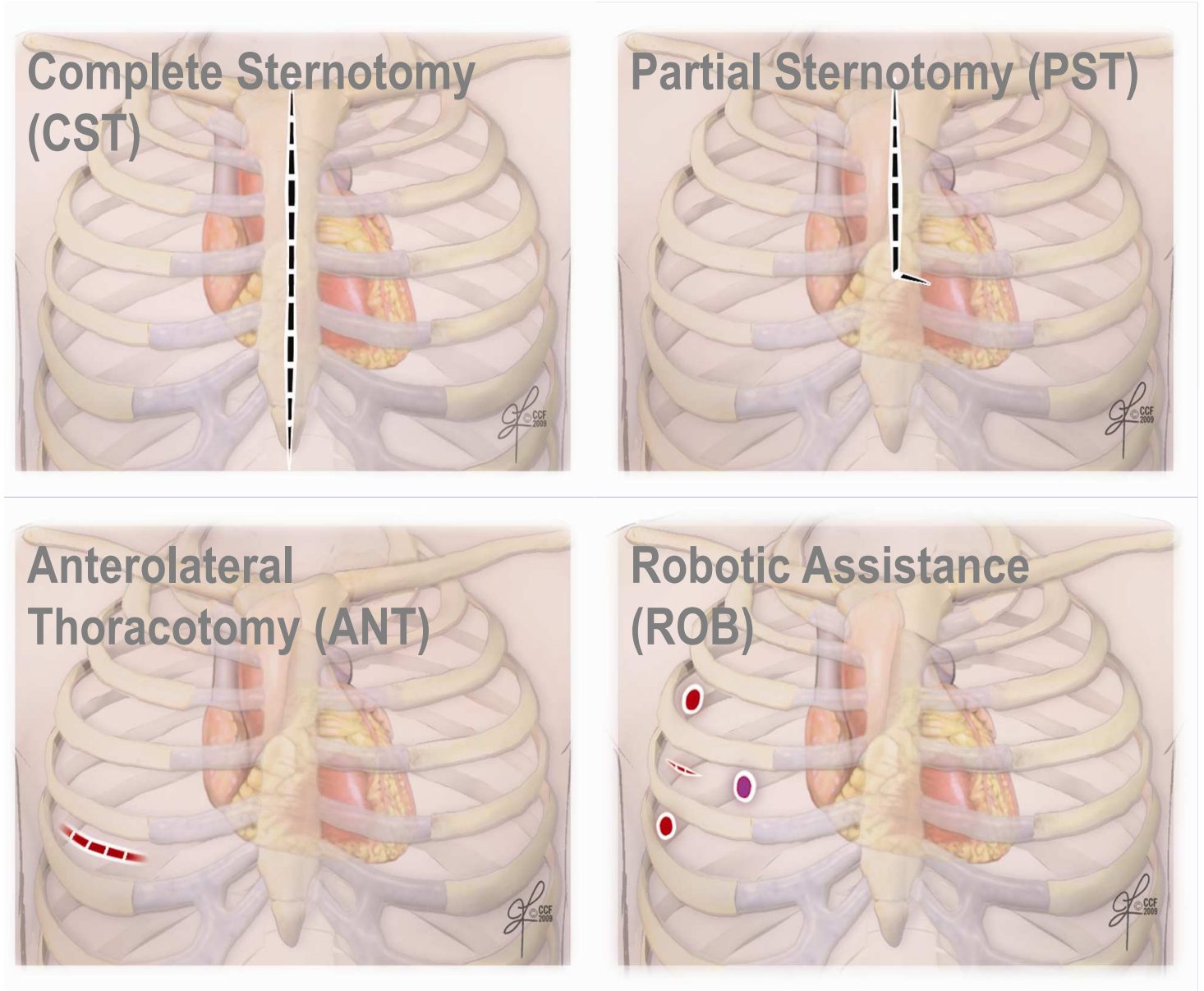
- ❖ Large access to the heart
- ❖Central CPB canulation
- ❖Combined surgery

Why minimally invasive surgery?

Prevent FMS complications

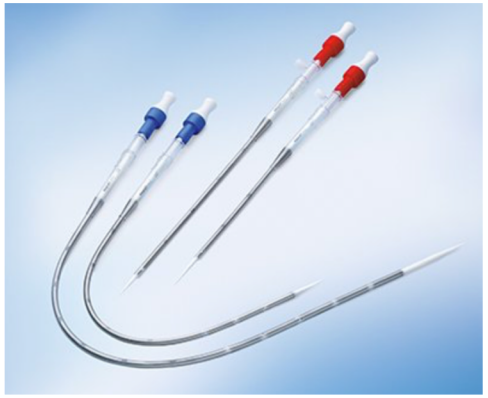
- Pulmonary dysfunction
- Sternal section
- Incisional pain
- Esthetic consideration
- Infection

Types of minimally invasive Incisions ?

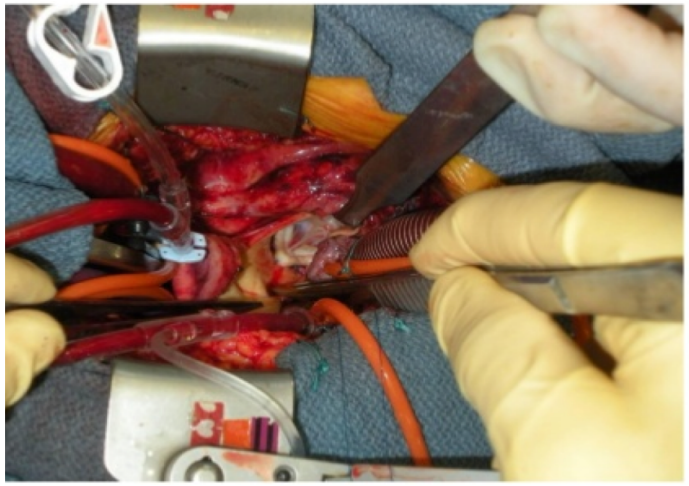


CPB

Peripheral femoral canulation

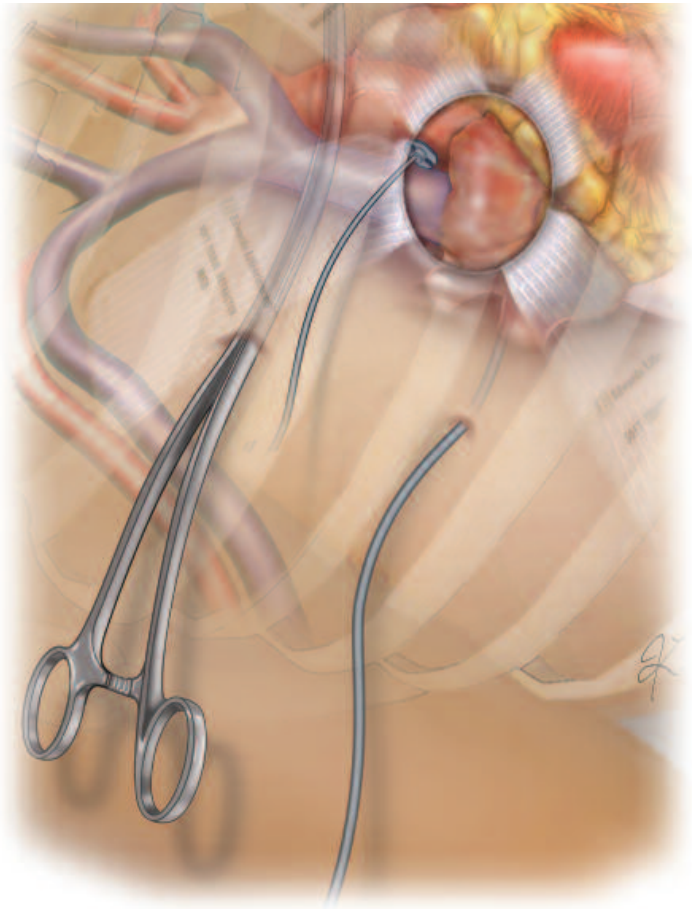


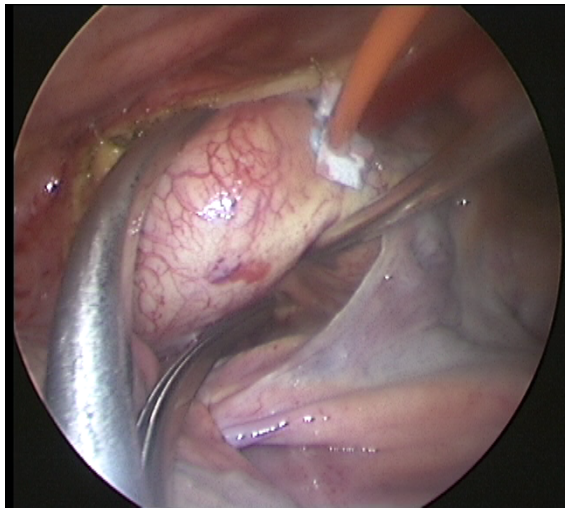
Central Canulation



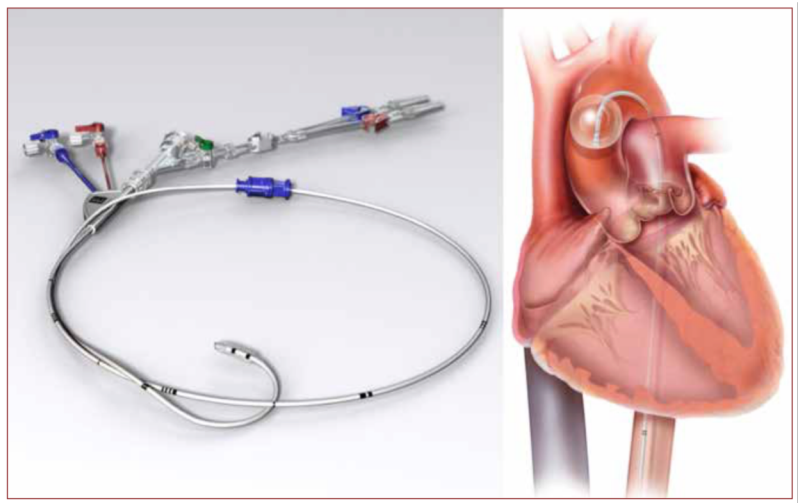
Aortic cross clamping:

TRANSTHORATIC





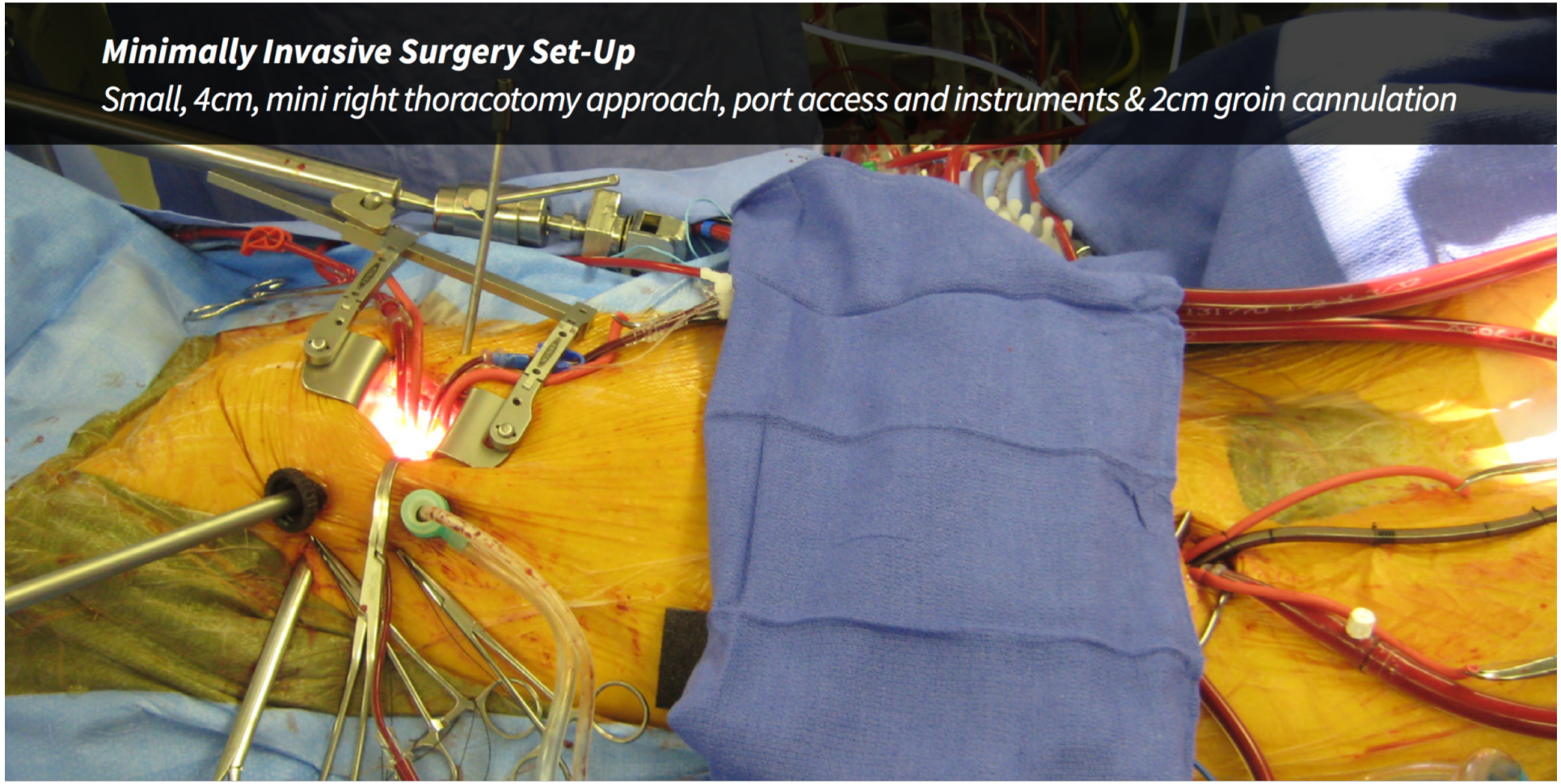
ENDOBALLON



Instrumentation

Minimally Invasive Surgery Set-Up

Small, 4cm, mini right thoracotomy approach, port access and instruments & 2cm groin cannulation



Minimally invasive procedures?

- AVR
- Mitral surgery
- Tricuspid surgery
- CABG
- Left ventricular epicardial lead
- ASD
- Benign intracardiac tumors (Myxoma, ...)
- Afib (MAZE)

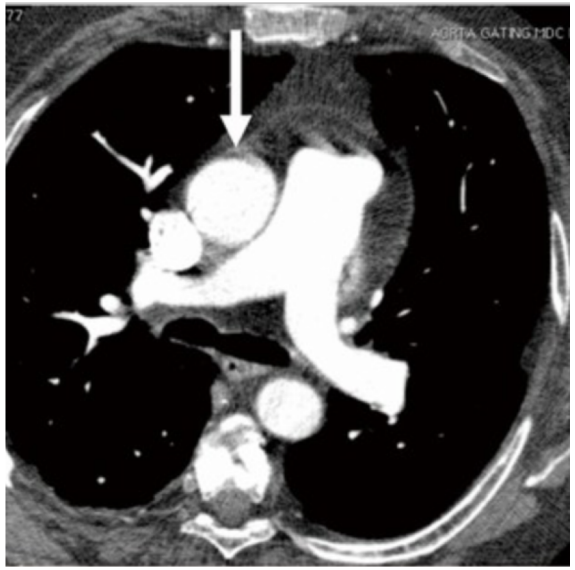
Contra-indications?

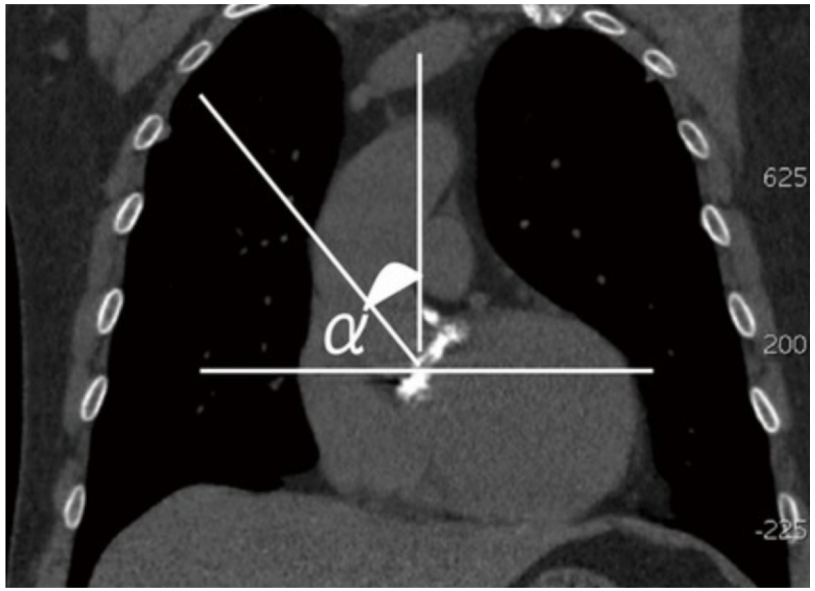
- Prior right thoracotomy
- Peripheral vasculopathy
- Porcelain aorta

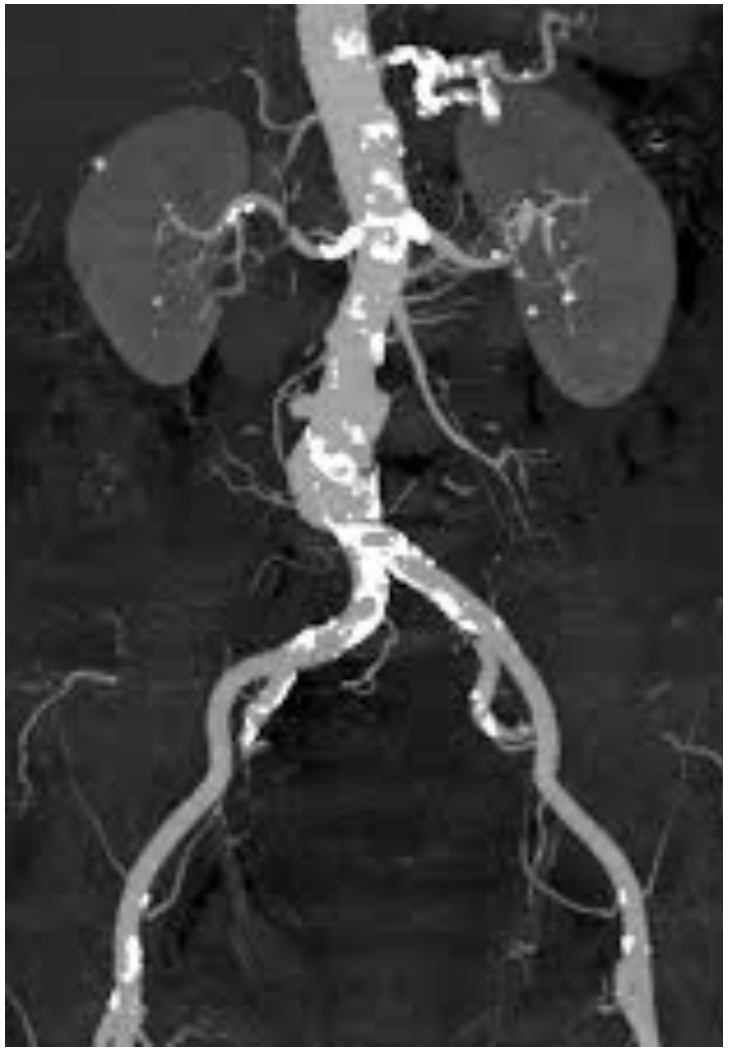
MICS complications

- Peripheral canulation complications:
  - Vascular
  - Neurological
  - Groin infection
- Phrenic nerve

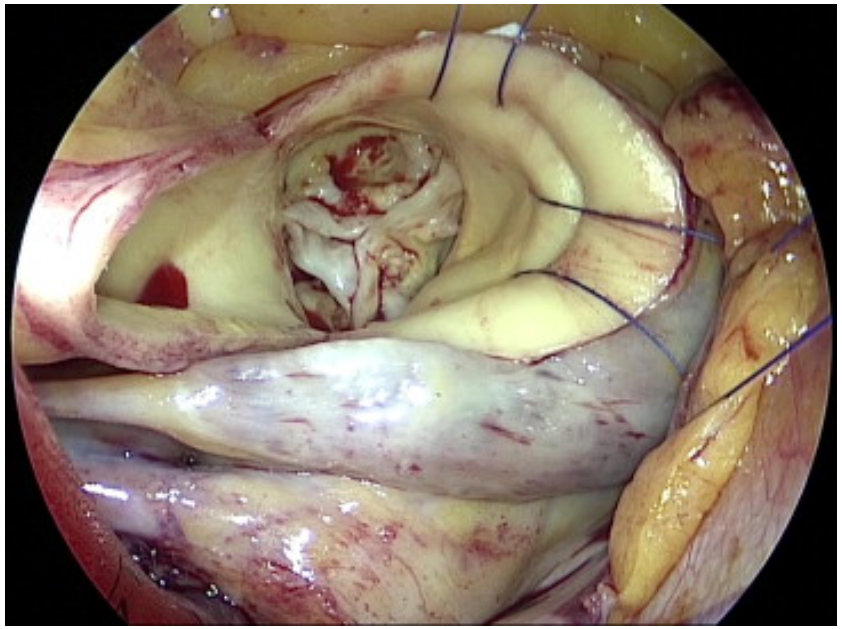
Preoperative investigations







Minimally invasive aortic valve surgery

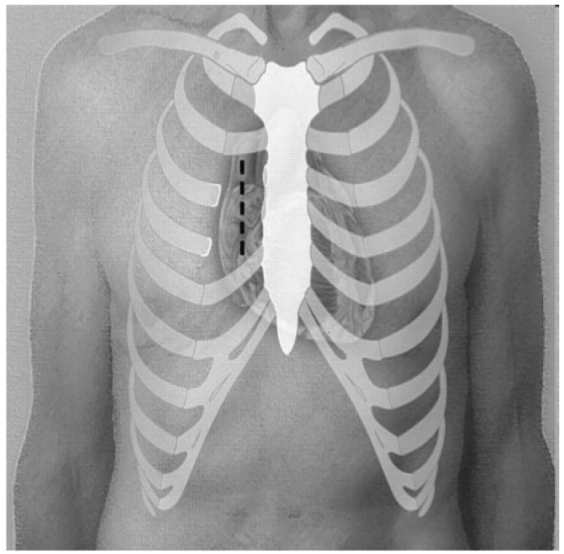


Minimally Invasive Approach for Aortic Valve Operations

Delos M. Cosgrove III, MD, and Joseph F. Sabik, MD

Department of Thoracic and Cardiovascular Surgery, The Cleveland Clinic Foundation, Cleveland, Ohio

Ann Thorac Surg 1996;62:596–7

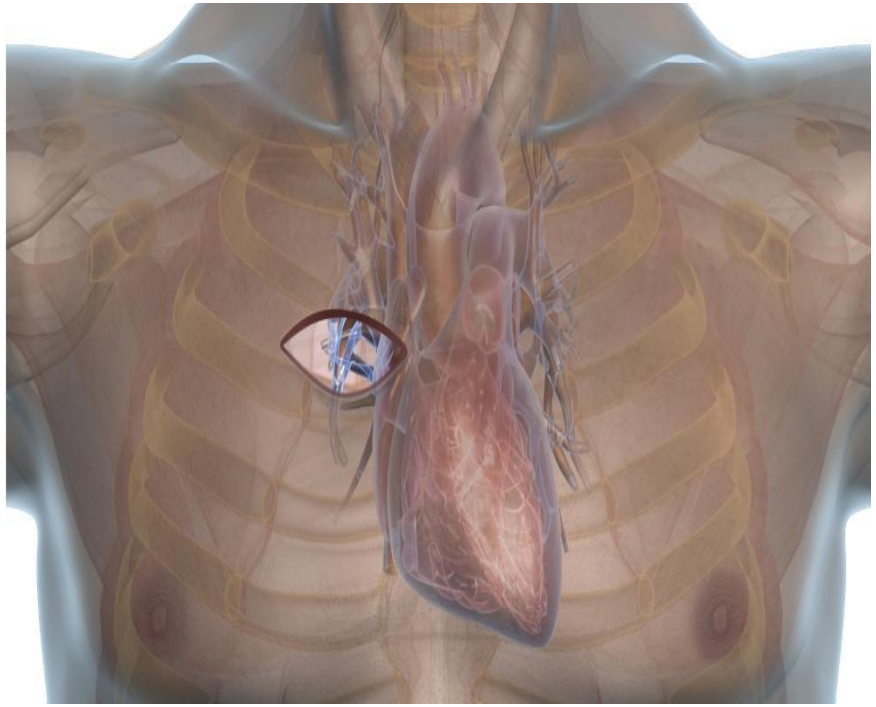


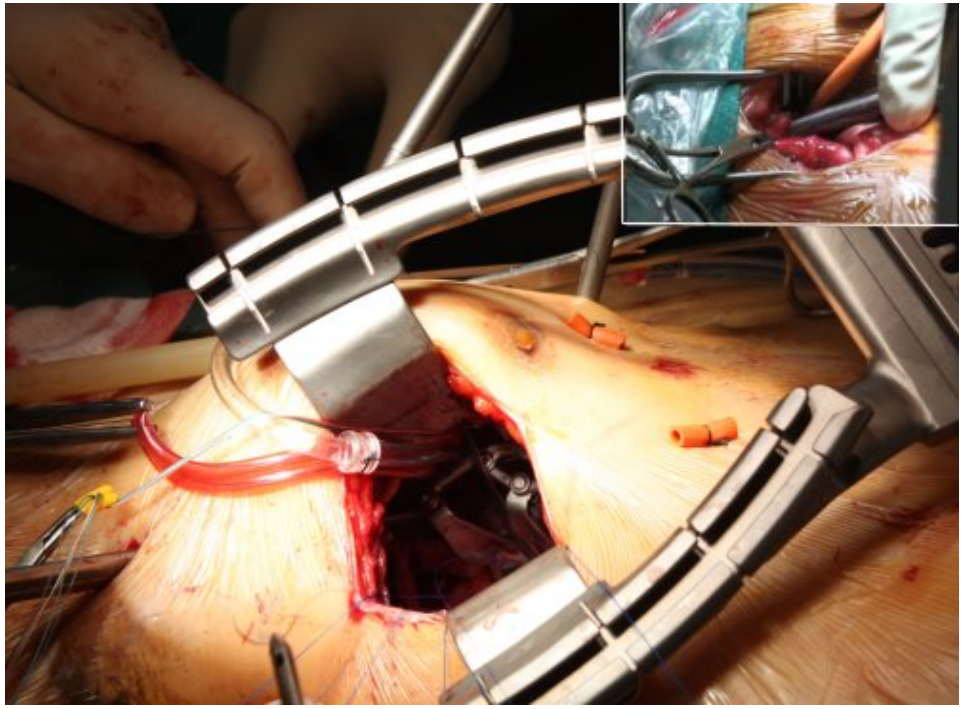
Right anterior minithoracotomy for aortic valve replacement: 10-year experience of a single center

Mattia Glauber, MD, Daniyar Gilmanov, MD, Pier Andrea Farneti, MD, Enkel Kallushi, MD, Antonio Miceli, MD, Francesca Chiaramonti, MD, Michele Murzi, MD, and Marco Solinas, MD

Conclusions: Minimally invasive AVR is a safe procedure, with low perioperative morbidity, and low rates of reoperation and death at late follow-up. Excellent outcomes can be achieved with minimally invasive AVR via right anterior minithoracotomy. Sutureless prostheses facilitate minimally invasive AVR and are associated with reduced operative times. (J Thorac Cardiovasc Surg 2015;150:548-56)

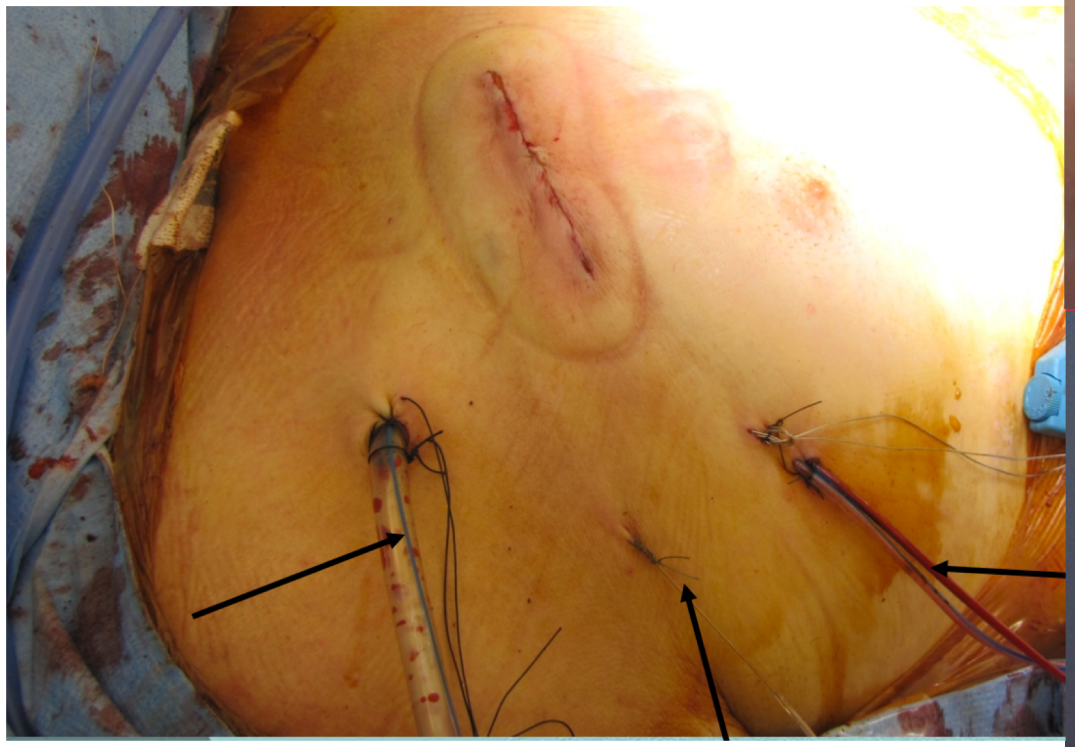
Minimally invasive AVR



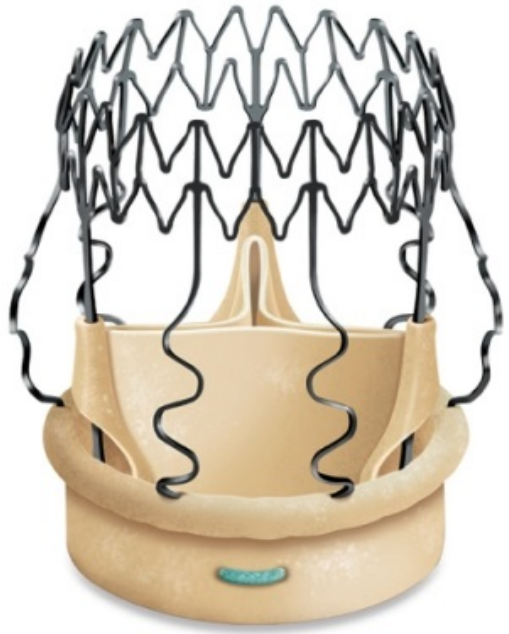


- Femoral A+V canulation
- Supine position
- 2nd Or 3rd ICS
- Video assisted but direct vision
- Antegrade cardioplegia
- Venting (RSPV)
- Aortic cross clamping (Chitwood)

Minimally invasive AVR



MiniAVR: *type of prosthesis?*



RESULTS…

COMPARED TO FMS, MINIAVR OFFERS SEVERAL ADVANTAGES:

- Similar survival
- Less pain
- Better postoperative respiratory function
- Reduced mechanical ventilation
- Less bleeding, less blood transfusion
- Reduced ICU and Hospital LOS
- Faster recovery

But… Prolonged CPB and Aortic cross clamp times!

MiniAVR through RAMT: CHU LIEGE initial experience

✓ **Nombre de patients (03/17- 01/2/19): 35**

→ Sténose VA(33)

→ Fibroélastome (1)

→ Endocardite (1)

Conversion en sternotomie: 7

→ Ventilation (1)

→ Vision (2)

→ Plastie Manougian (2)

→ Canulation fémorale (2)

28 patients:

→ Temps de clampage moy : 72 min (33-109)

→ Temps de CEC moy: 105 min (89-162)

→ Durée chirurgie moy: 260min (188-330)

→ Séjour USI moy: 1.7J (1-5)

→ Séjour H: 6.8J (6-10)

→ Transfusion: N=2 (11%)

→ FA résolutive: N=2 (11%)

Expérience initiale de remplacement valvulaire aortique par minithoracotomie antérieure droite

Ghislain Malapert[1], Roger Brenot[1], Olivier Bouchot[1*]

Centre Hospitalier Universitaire Dijon Bourgogne

	N (%)	Temps de clampage (minute ± SD)	Temps de CEC (minute ± SD)
Tous les RVA (incluant les valves stentées ou non stentées)	348	95 ± 38	127 ± 53
RVA isolé	277	84 ± 29	114 ± 45
RVA avec valve stentée sans COR-KNOT®	163	93 ± 30	126 ± 50
RVA avec valve stentée avec COR-KNOT®	28	76 ± 14	104 ± 17

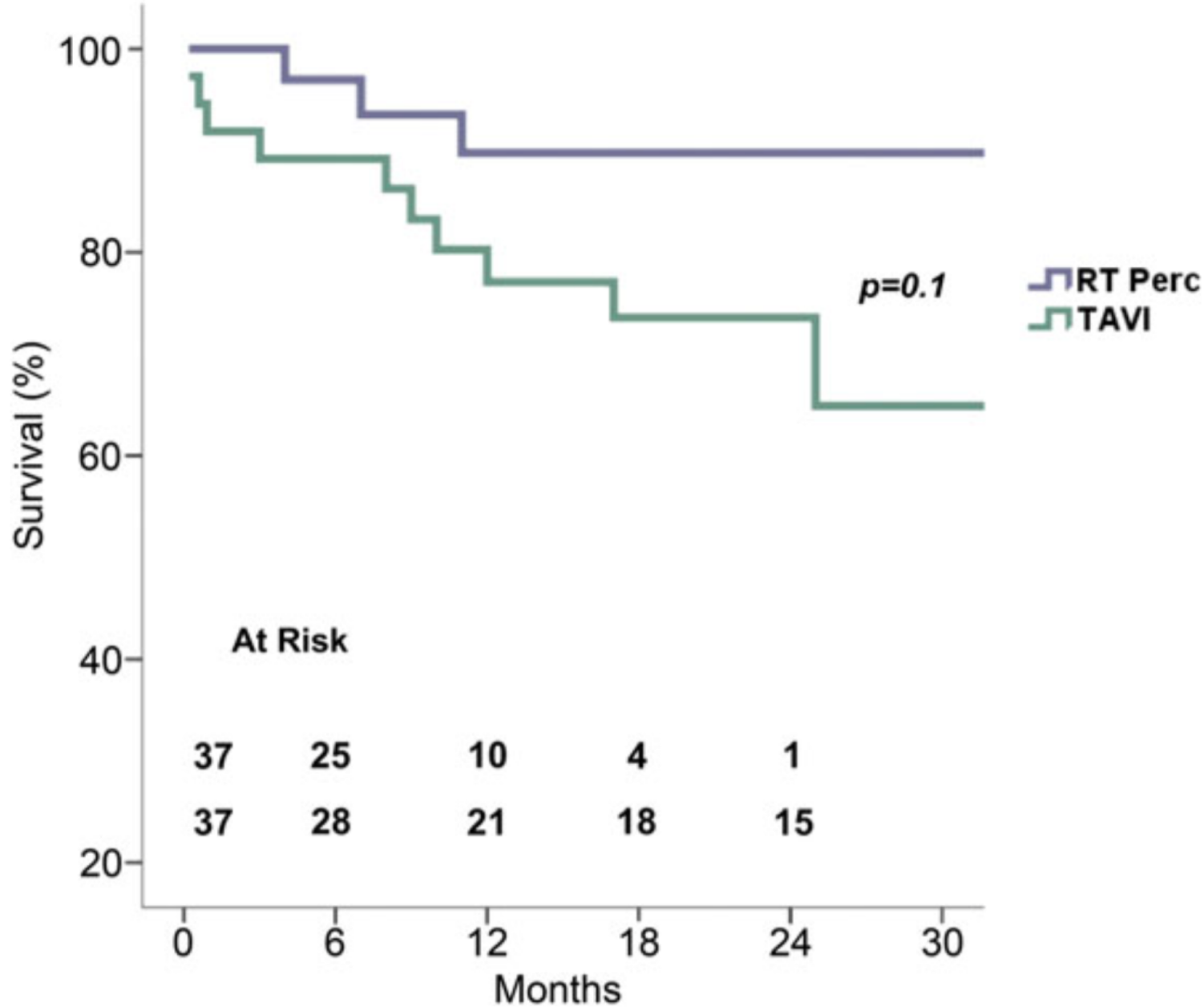
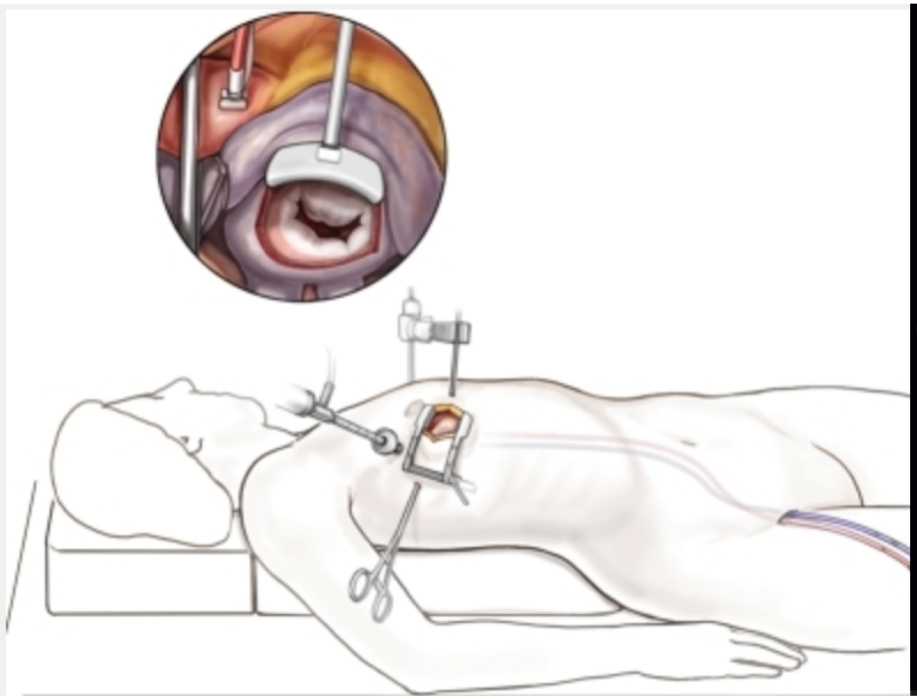
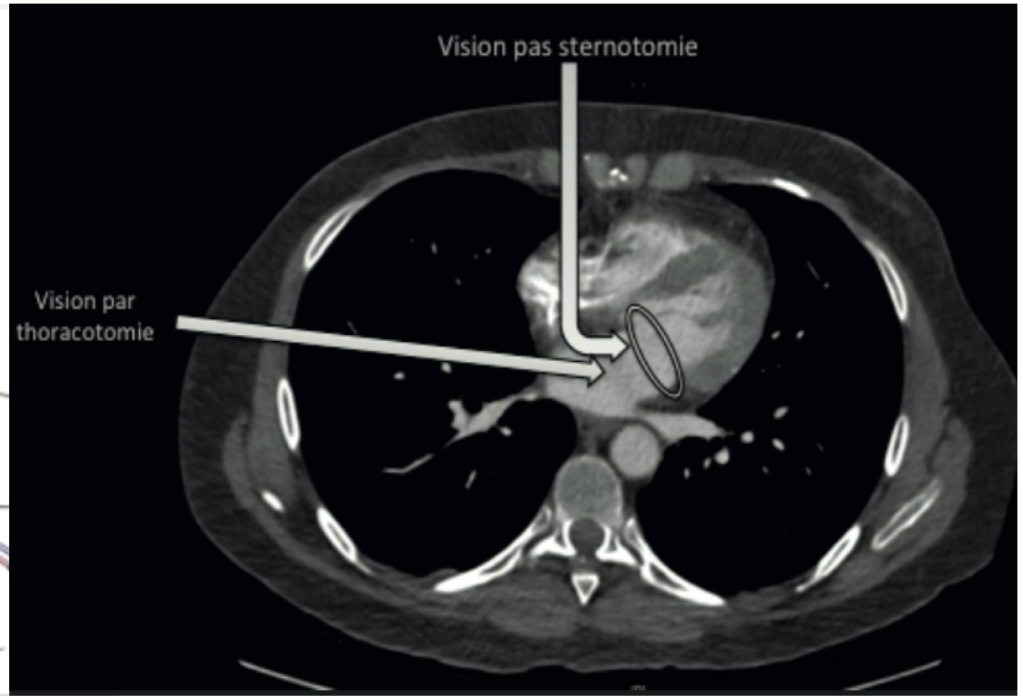


Figure 1: Survival between two matched groups. TAVI: transcatheter aortic valve implantation; RT: right anterior minithoracomy.

Minimally invasive Mitral valve surgery





C. R. Acad. Sci. Paris, Sciences de la vie/Life sciences, 1996; 319: 219-23
Sciences médicales/*Medical sciences*

Chirurgie à cœur ouvert par vidéo-chirurgie et mini-thoracotomie Premier cas (valvuloplastie mitrale) opéré avec succès

First open heart operation (mitral valvuloplasty) under videosurgery through a minithoracotomy

ALAIN CARPENTIER, DIDIER LOULMET, ALEXANDRE CARPENTIER, EMMANUEL LE BRET, BÉATRICE HAUGADES, PATRICK DASSIER, PIERRE GUIBOURT

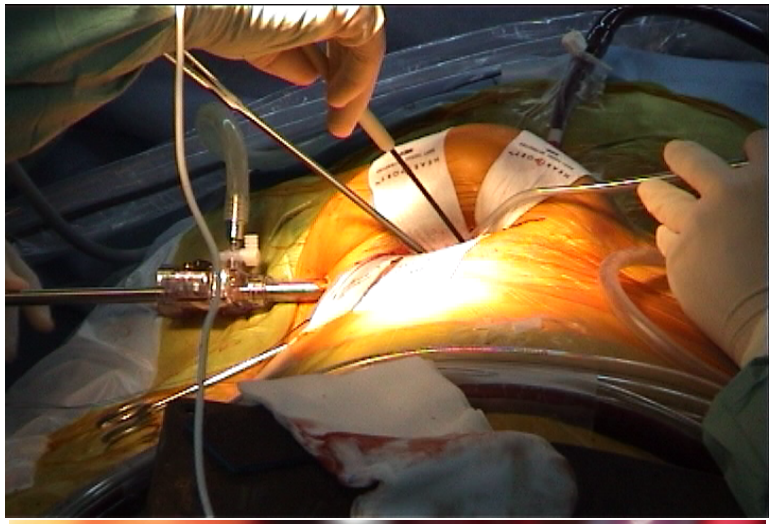
Département de chirurgie cardio-vasculaire et de transplantation d'organes, Hôpital Broussais, 96, rue Didot, 75674 Paris Cedex 14, France

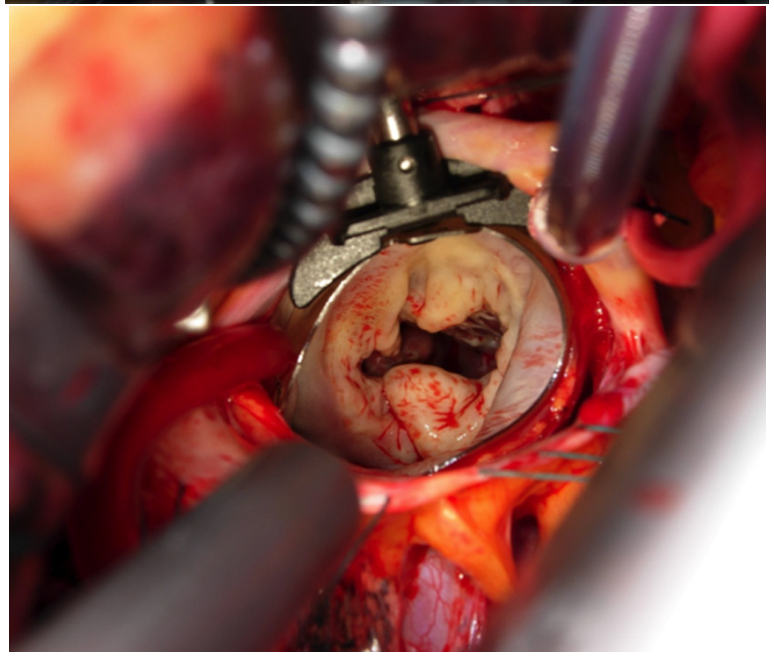
Perfusion 1998; **13**: 249–252

Port-access mitral valve surgery

H Vanermen, Y Vermeulen, F Wellens, R De Geest, I Degrieck and **F Van Praet** Department of Cardiovascular and Thoracic Surgery, OLV Clinic, Aalst

Video Assisted Mitral Valve Surgery





- Peripheral femoral canulation
- Supine positioning
- 3rd or 4th ICS
- Video assisted but direct vision
- Antegrade cardioplegia
- Aortic cross clamping (Chitwood)

Contra-indication of Mini-mitral surgery

Mitral annular calcifications or combined surgery

Previous right thoracotomy
- Significant aortic root/ascending aortic dilatation
- Moderate or severe aortic valve regurgitation
- Fixed pulmonary hypertension (>60 mm Hg)
- Right ventricular dysfunction
- Severe generalized peripheral arterial disease
- Calcification of the aortic root/ascending aorta
- Mitral annular calcification

Coronary artery disease requiring CABG
- Severe pulmonary dysfunction
- Symptomatic cerebrovascular disease or recent stroke
- Severe liver dysfunction
- Significant bleeding disorder

Minimitral surgery through right lateral thoracotomy: CHU LIEGE INITIAL EXPERIENCE

- ✓ **Nombre de patients (01/18- 01/2/19): 7**
  - → CIA + IT 4/4 (1): anneau+patch
  - → CIA (1): fermeture directe
  - → IM 3-4/4 (4): 4 plastie avec anneau et cordages
  - → endocardite Mitrale: RVM

- ✓ **Résultats**
  - → Temps de clampage moy : 100 min
  - → Temps de CEC moy: 140 min
  - → Durée chirurgie moy: 215 min
  - → Séjour USI moy: 48h
  - → Séjour H: 10 J

Décaillotage (1); FA (1)

Meta analysis ➔ 21 studies / 13 000 pts

2 Randomized Control Trials

- *Dogan* (2005)
- *ElFiky* (2000)

19 Non-Random Cohort Studies		
Aklog 1998	Gersak 2005	Raanani 2010
Bolotin 2004	GJS 2010 (unpub)	Reichenspurner 00
Burfeind 2002	Glower 1998	Ruttmann 2006
Chaney 2000	Grossi 2001	Ryan 2010
Cohn 1997	Grossi 2001	Schneider 2000
Chitwood 1997	Karagoz 1999	Shinfeld 2003
Cosgrove 1998	McCreath 2003	Srivastava 1998
de Vaumas 2003	Mohr 1998	Suri 2009
Felger 2001	MT 2010 (unpub)	Walther 1999
Folliguet 2006	Nikolic 2000	Wang 2009
Galloway 2009	Onnasch 2002	Woo 2006

Video Assisted Mitral Valve Surgery

- Operative
- Mid-term
- Repair c
- Esthetic

Minimally Invasive Versus Sternotomy :

Longer

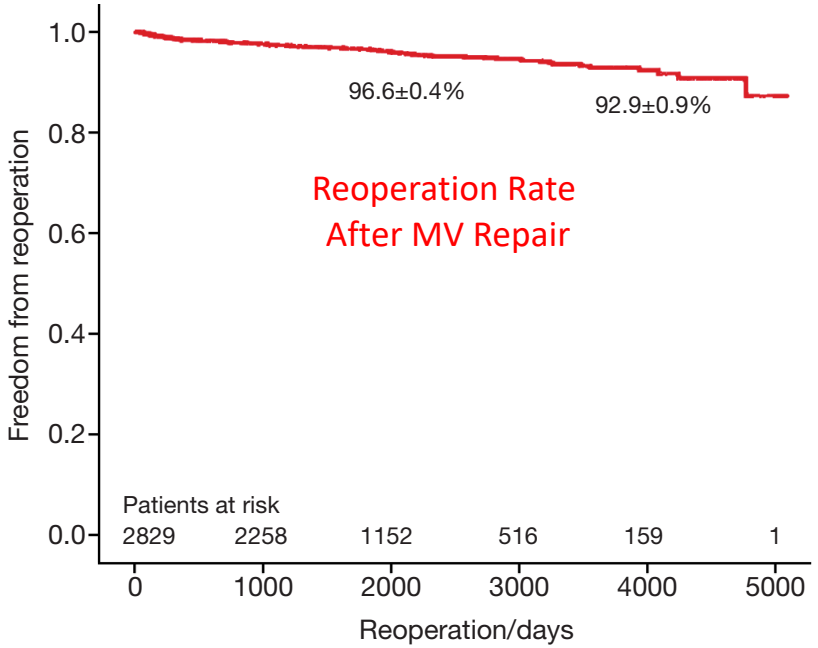
- **crossclamp time**, *WMD [95% CI] = 21 [10 - 33] min (overall of 27 studies). In sub-analysis, the increased XCL time was found mainly for repair, but not for replacement*
- **cardiopulmonary bypass time**, *WMD [95% CI] = 33 [19 - 47] min (overall of 30 studies).*
- **procedure time**, *WMD [95% CI] = 0.8 [0.4- 1.2] hours (14 studies)*

Shorter

- **ventilation time**, *WMD [95% CI] = -2.1 [-3.4, -0.8] hours (20 studies)*
- **ICU length of stay**, *WMD [95% CI] = -0.5 [-0.7, -0.3] days (20 studies)*
- **Hospital length of stay**, *WMD [95% CI] = -1.6 [-2.1, -1.1] days (28 studies)*

Long Term Results of MIS

"Minimally invasive mitral valve surgery:
<u>The Leipzig experience</u>
F. Mohr
Ann Cardiothorac Surg 2013;2(6):744-750"

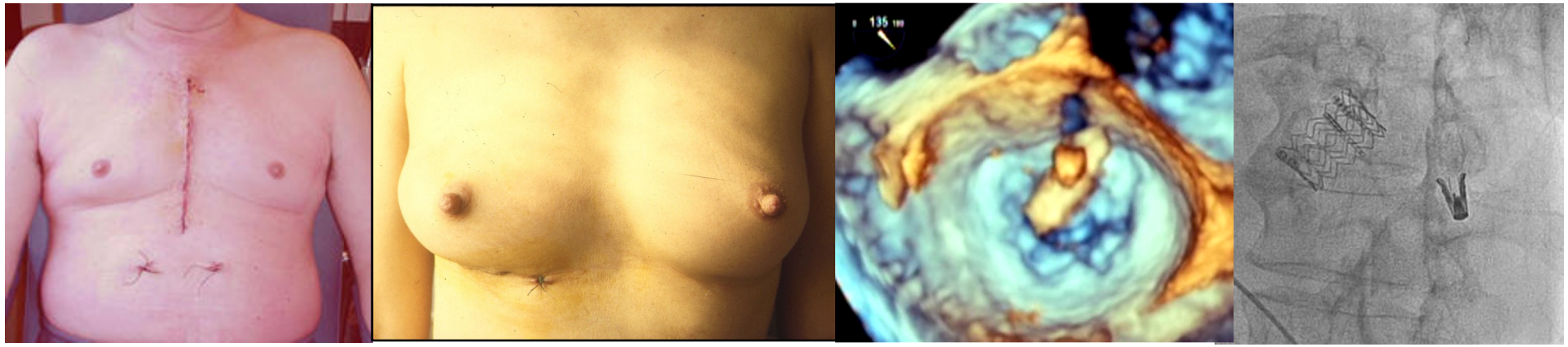


Preoperative variables	3438 Patients
Age in years	60.3±13
Male	1,733 (61.3)
Body-mass index (kg/m^2)	25.6±3.9
Preoperative cerebrovascular accident	90 (3.2)
Left ventricular ejection fraction (%)	56.8±18.9
Prior cardiac surgery	152 (5.4)
Active endocarditis	36 (1.3)
Timing of surgery	
Elective	2,632 (93)
Urgent/emergent	197 (7)
Log EuroSCORE (%)	4.9±6

Outcomes	n (%)
30-day mortality	23 (0.8)
Low output syndrome	31 (1.1)
Failed mitral valve repair	45 (1.6)
Re-exploration for bleeding	198 (7)
Myocardial infarction	18 (0.6)
Sepsis	24 (0.8)
Stroke	57 (2)
Postoperative new dialysis	87 (3.1)
Postoperative symptomatic neuropsychotic syndrome	71 (2.5)
Hospital stay, days	12.2±9.4

Conclusion

Less Invasive ➔ More Collaboration



- *Good results*
- *Patient selection*
- *Heart team*