AORTIC VALVE REPAIR

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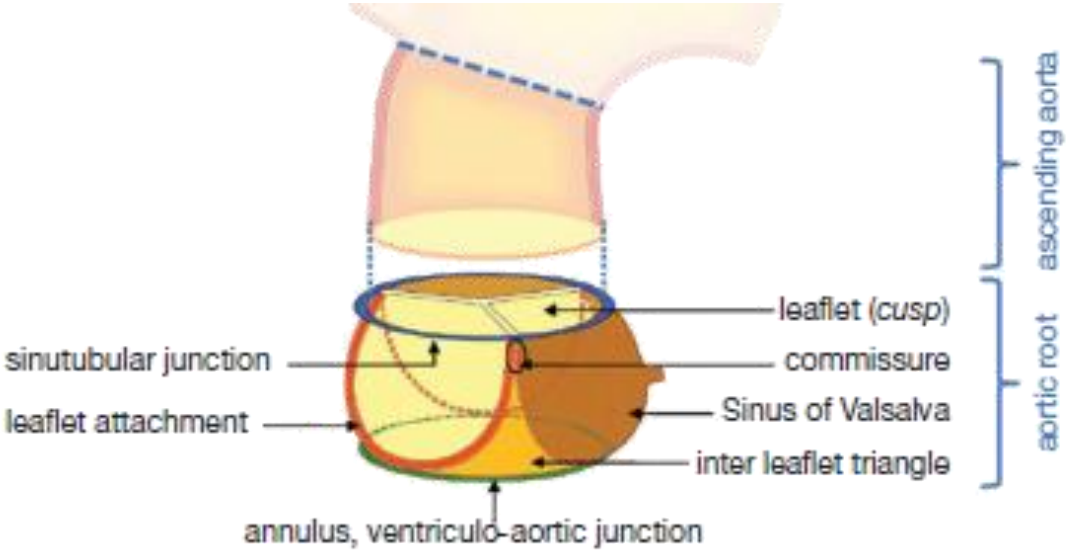
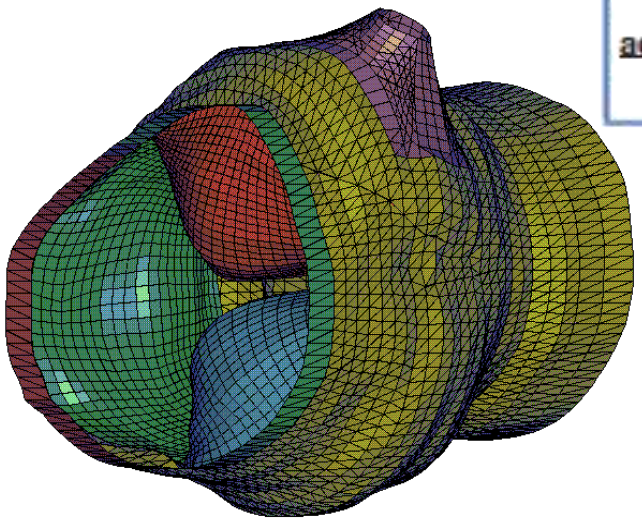
Anatomo-functional Unit



NORMAL YOUNG AORTIC VALVE
Time = 0



aortic valve: Three leaflets only

aortic root: All components *(Sinuses of Valsalva, inter leaflet triangles, sinutubular junction, leaflet attachments, leaflets, annulus)*

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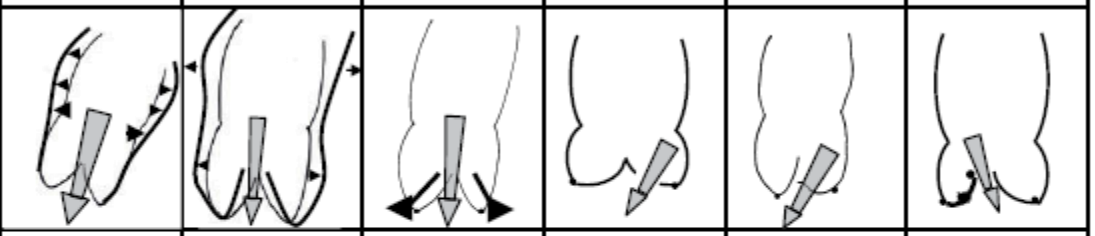
Repair-oriented classification of aortic insufficiency: Impact on surgical techniques and clinical outcomes

Munir Boodhwani, MD, MMSc, Laurent de Kerchove, MD, David Glineur, MD, Alain Poncelet, MD, Jean Rubay, MD, Parla Astarci, MD, Robert Verhelst, MD, Philippe Noirhomme, MD, and Gébrine El Khoury, MD

AI Class	Type I Normal cusp motion with FAA dilatation or cusp perforation				Type II Cusp Prolapse	Type III Cusp Restriction
	Ia	Ib	Ic	Id		
Mechanism						
Repair Techniques (Primary)	STJ remodeling *Ascending aortic graft*	Aortic Valve sparing: *Reimplantation or Remodeling with SCA*	SCA	Patch Repair *Autologous or bovine pericardium*	Prolapse Repair *Plication* *Triangular resection* *Free margin Resuspension* *Patch*	Leaflet Repair *Shaving* *Decalcificatio* *Patch*
(Secondary)	SCA		STJ Annuloplasty	SCA	SCA	SCA

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The role of echocardiography in aortic valve repair

Jean-Louis Vanoverschelde, Michel van Dyck, Bernhard Gerber, David Vancraeynest, Julie Melchior, Christophe de Meester, Agnès Pasquet

Ann Cardiothorac Surg 2013;2(1):65-72

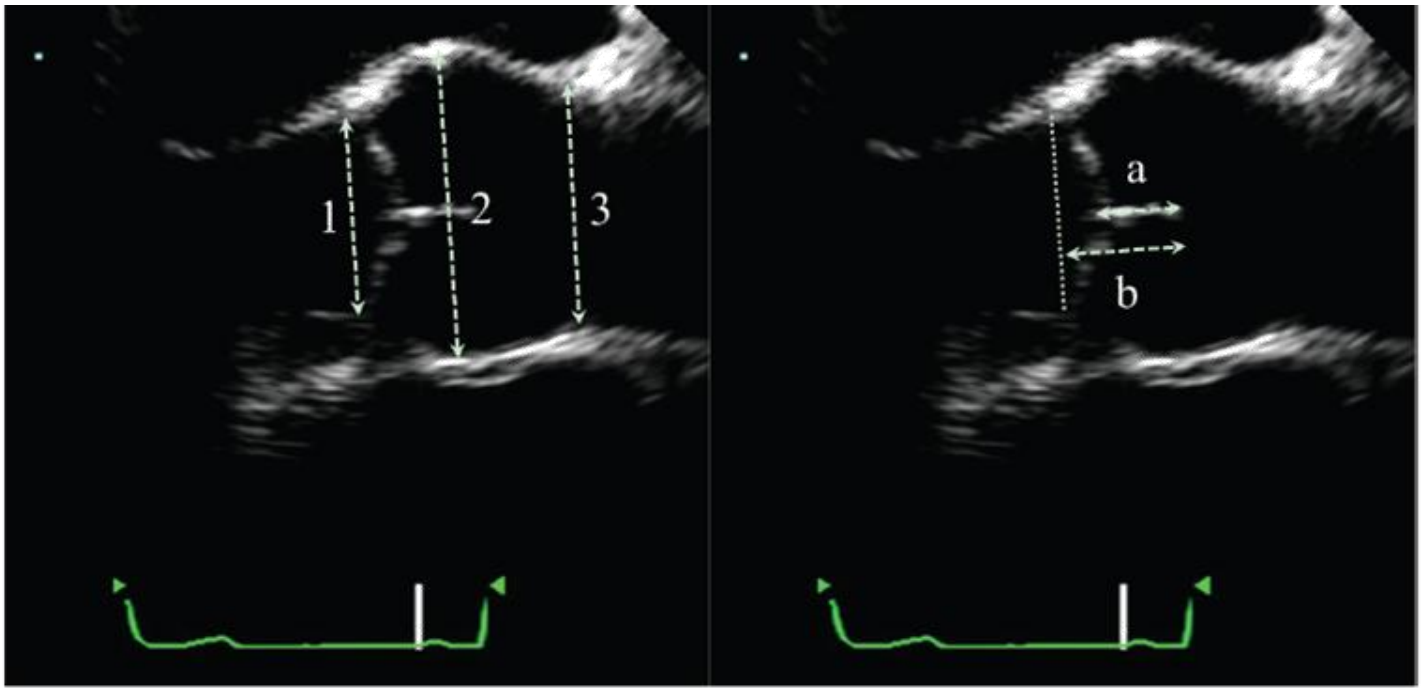
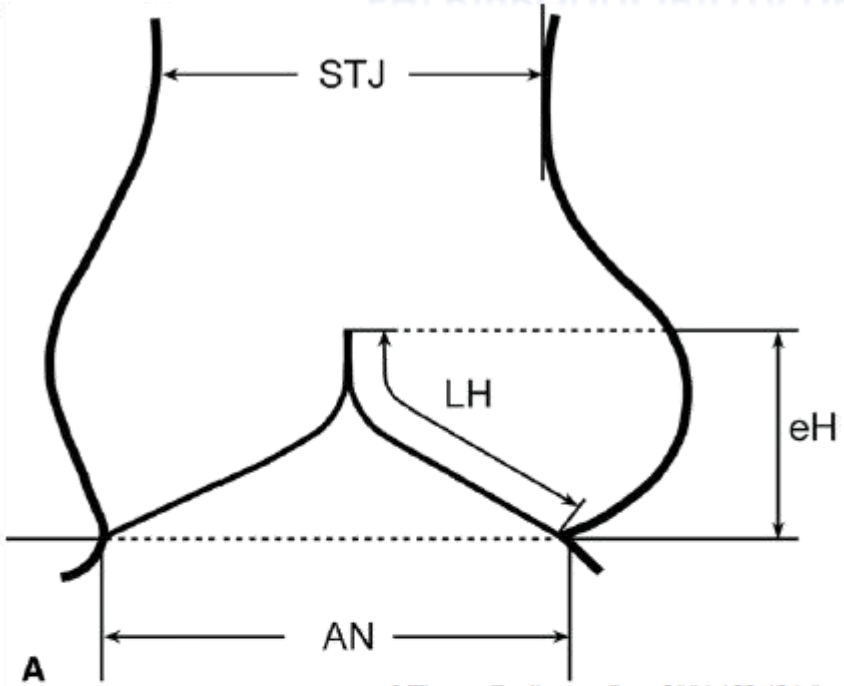
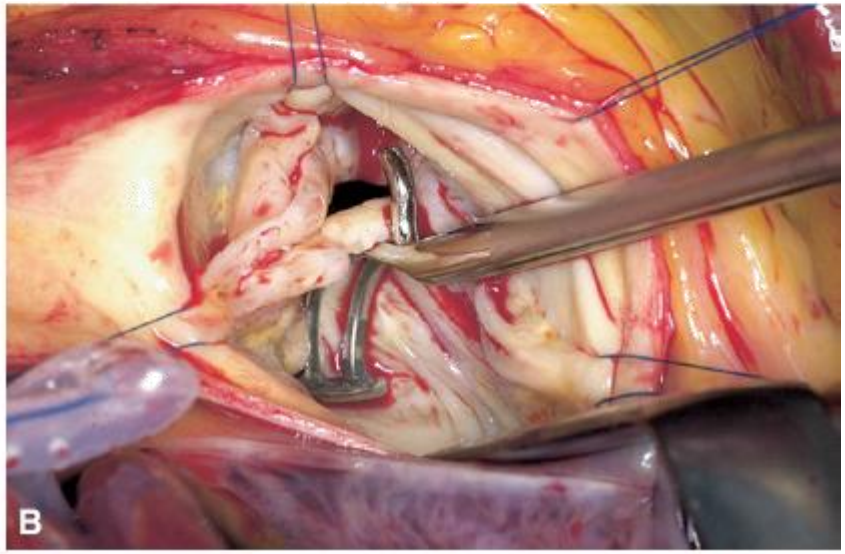


Figure 1 Mid-esophageal long-axis TEE view showing the aortic valve and root in end-diastole. Measurements are made at the level of the aortic annulus (1), the sinuses of Valsalva (2) and the sino-tubular junction (3). The length of cusp apposition (a) at the effective height (b) can also be measured

STABILIZZAZIONE ANELLO AORTICO
EH: RIPRODUCIBILITÀ DELLA TECNICA CHIRURGICA



J Thorac Cardiovasc Surg 2006;132:436-8



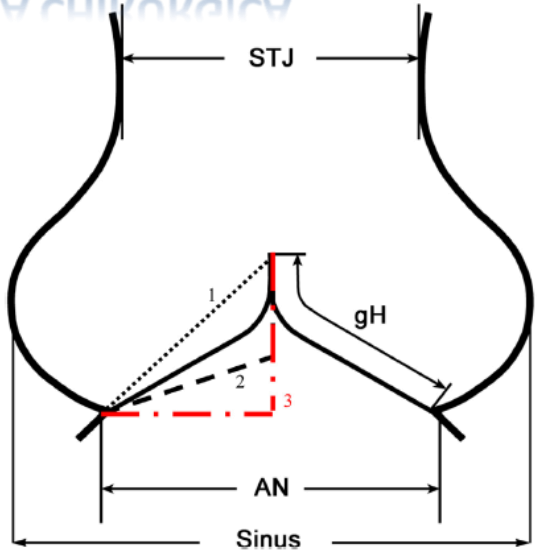


FIGURE 1. Schematic drawing of the aortic root with graphic description of geometric height. *AN*, Aortoventricular junction; *gH*, geometric height; *STJ*, sinotubular junction; *sinus*, maximal sinus diameter; *1*, shortest distance from aortic insertion to coaptation line; *2*, distance assuming a straight course of the cusp and a coaptation height of 4 mm; *3*, maximum geometric height assuming the effective height is equal to the coaptation height.

(J Thorac Cardiovasc Surg 2013;146:269-74)

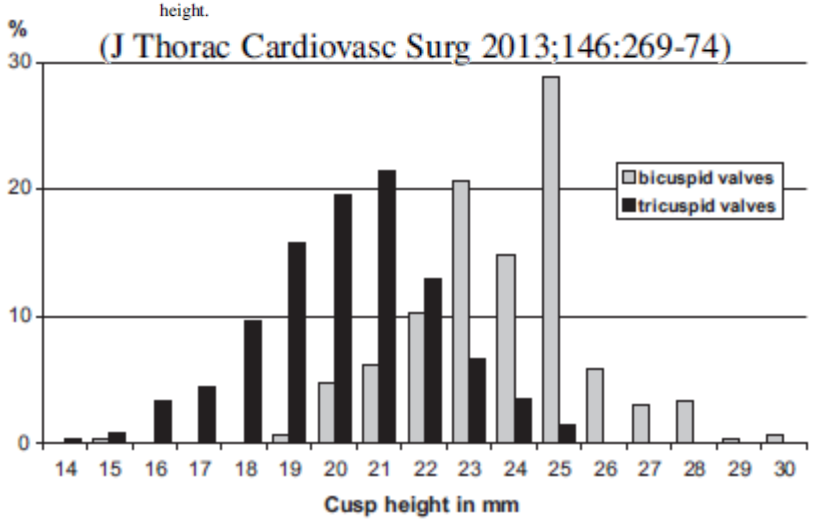


FIGURE 3. Distribution of geometric height in bicuspid (n = 289; nonfused cusps) and tricuspid (n = 332; mean of all 3 cusps) aortic valves.

TYPE II
AORTIC CUSP PROLAPSE CLASSIFICATION

FLAIL (eversion of the cusp into LVOT)

PARTIAL OR DISTAL CUSP PROLAPSE

WHOLE PROLAPSE

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AORTIC CUSP PROLAPSE

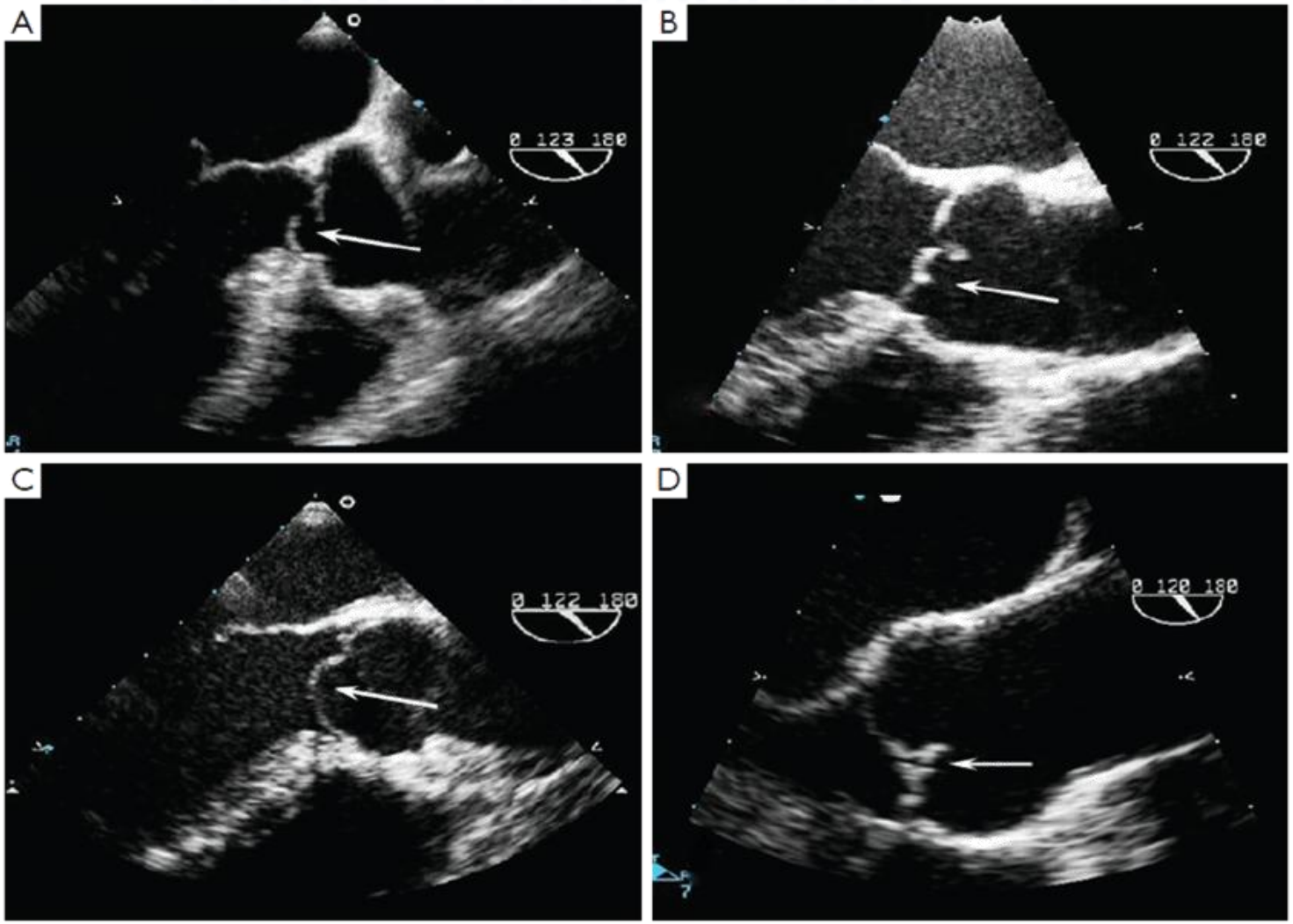

Figure 8 TEE examples of 4 subtypes of Type 2 aortic regurgitant lesions. A. anterior aortic cusp flail; B. partial cusp prolapse with mid-cusp bending; C. whole cusp prolapse; D. free edge fenestration

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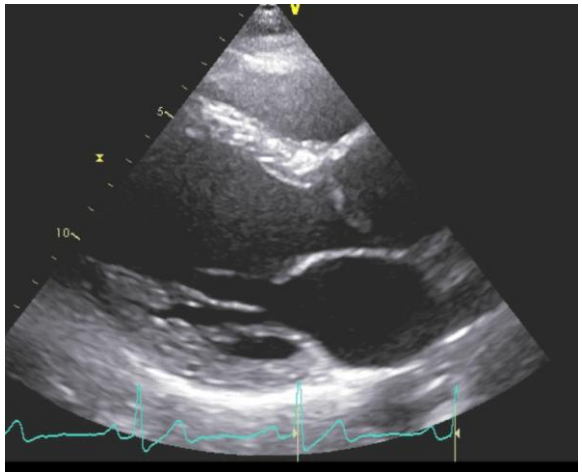
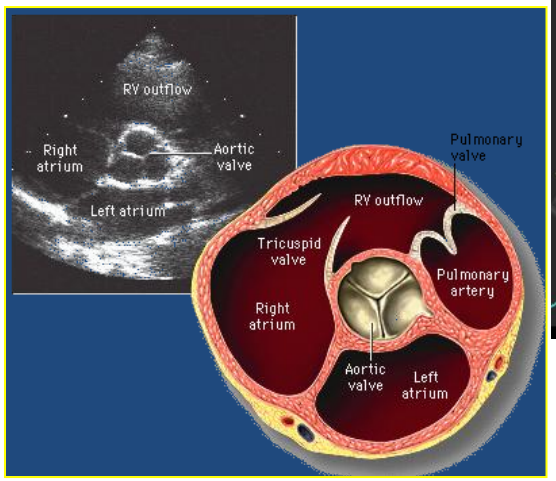
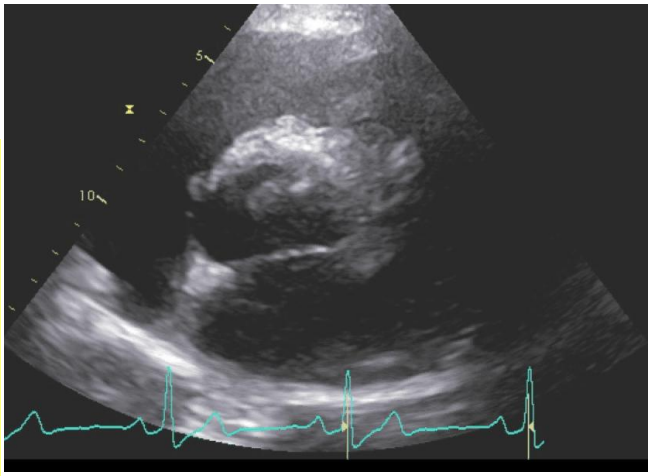
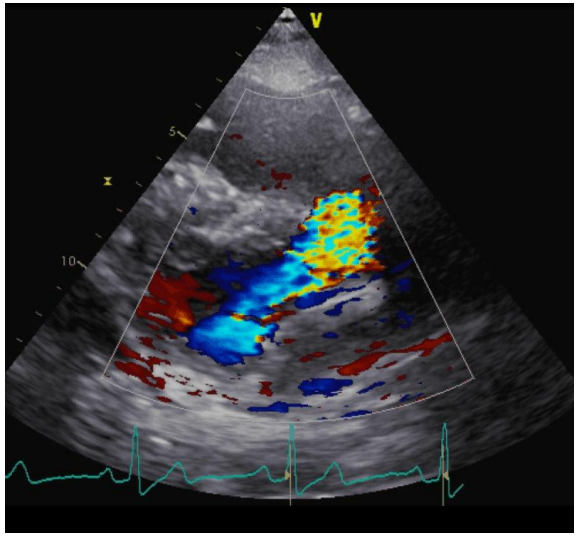
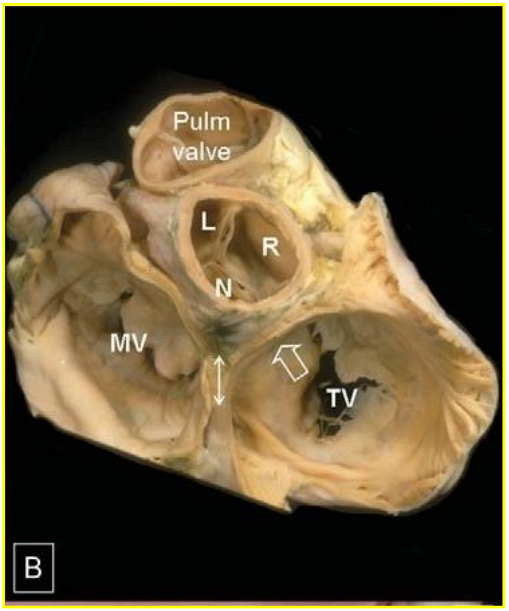
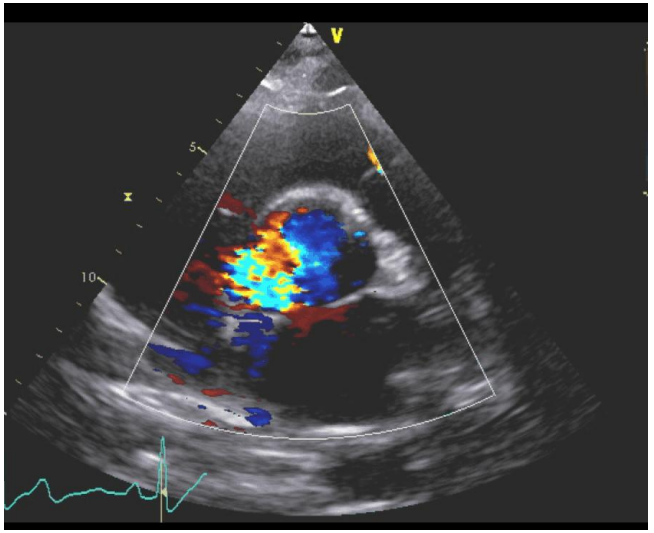


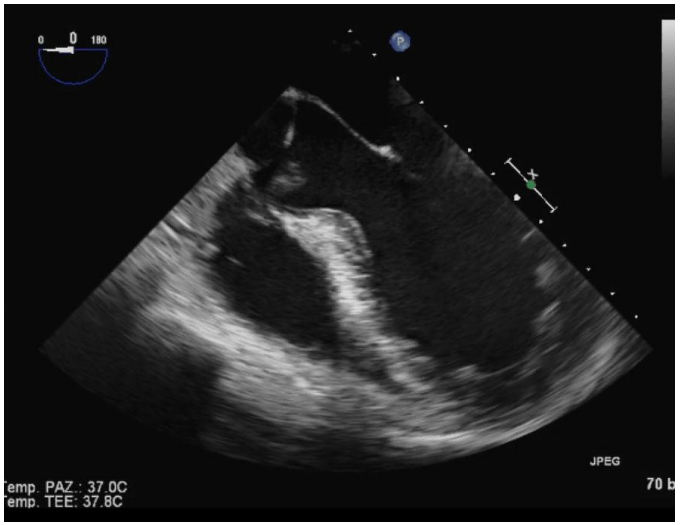

RV outflow
Right atrium
Aortic valve
Left atrium
Pulmonary valve
RV outflow
Tricuspid valve
Pulmonary artery
Right atrium
Aortic valve
Left atrium






Pulm valve
L
R
N
MV
TV
B

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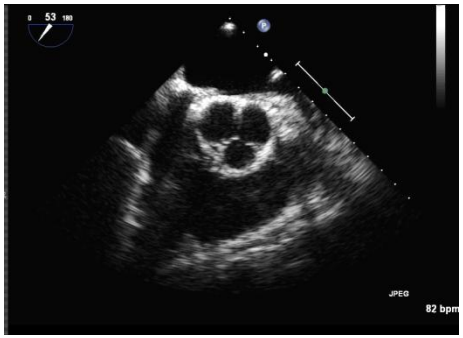
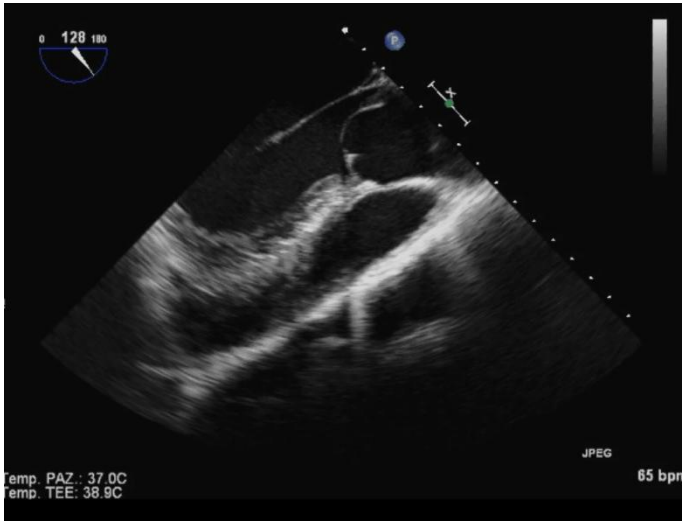
Temp. TEE: 37.8C


0 53 180
JPEG
82 bpm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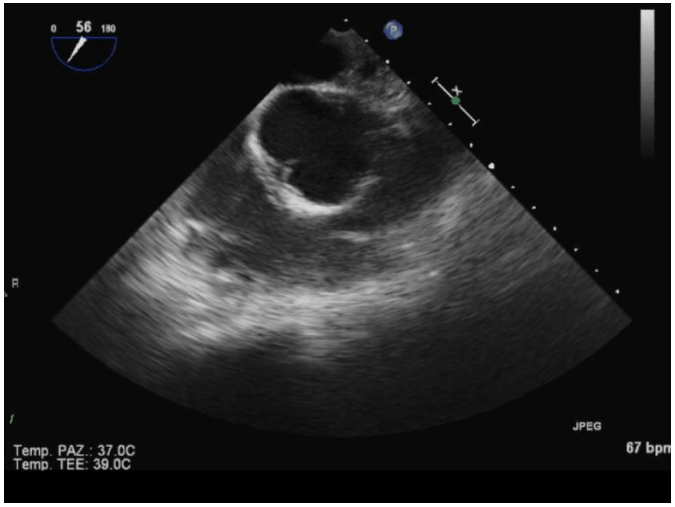
Temp. TEE: 38.9C
65 bpm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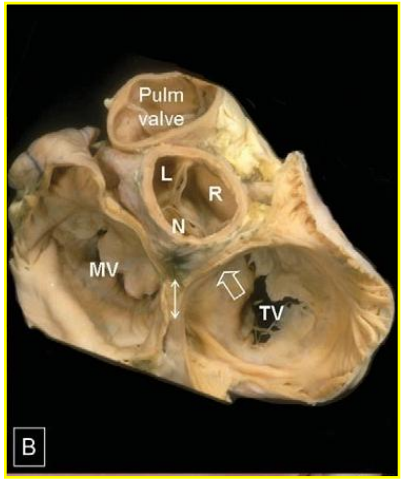
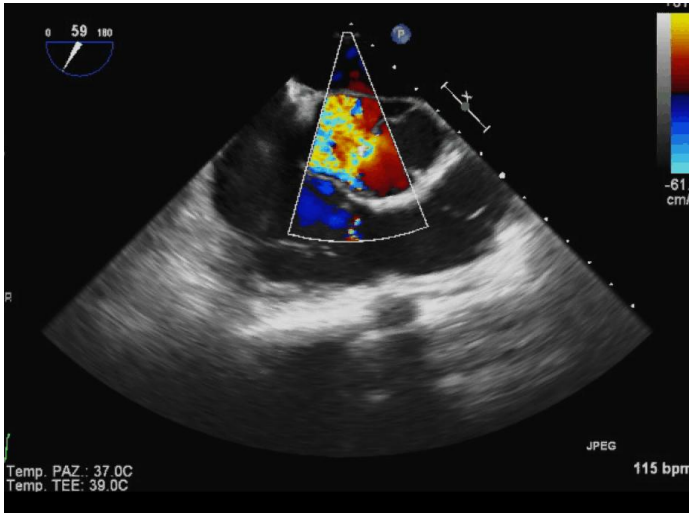
Temp. TEE: 39.0C
67 bpm


Pulm valve
L
R
N
MV
TV
B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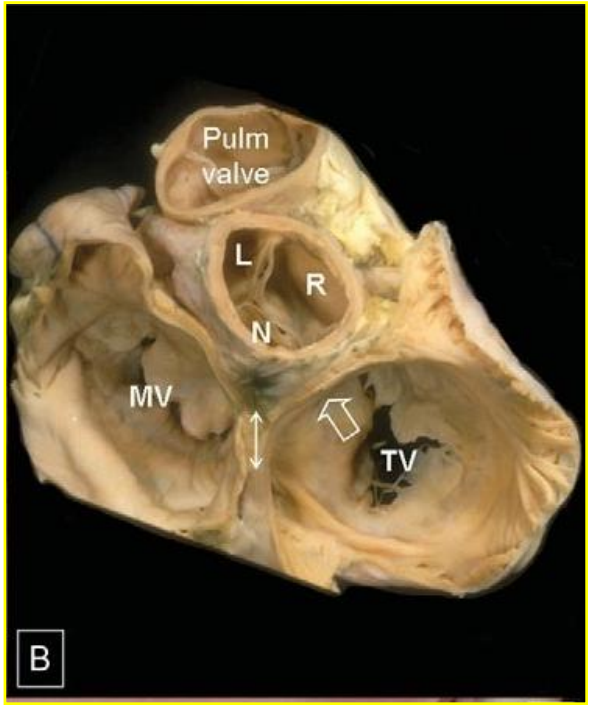
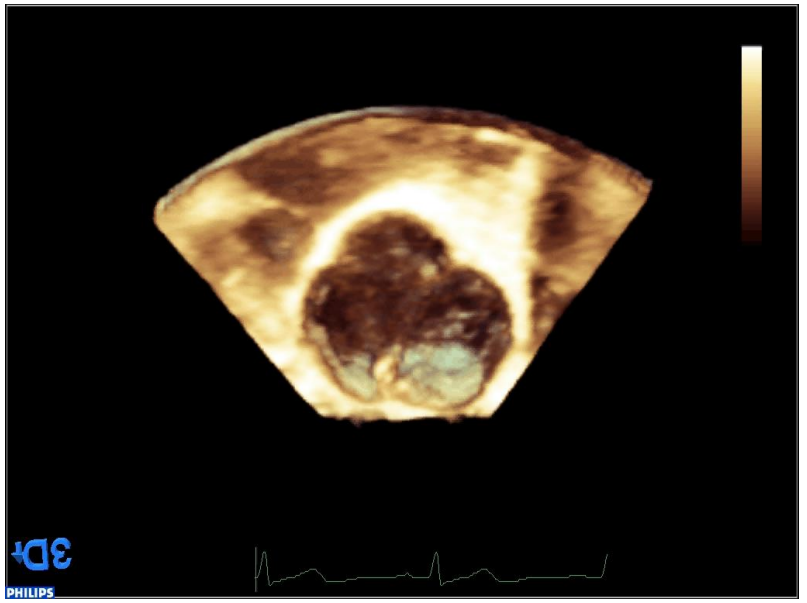
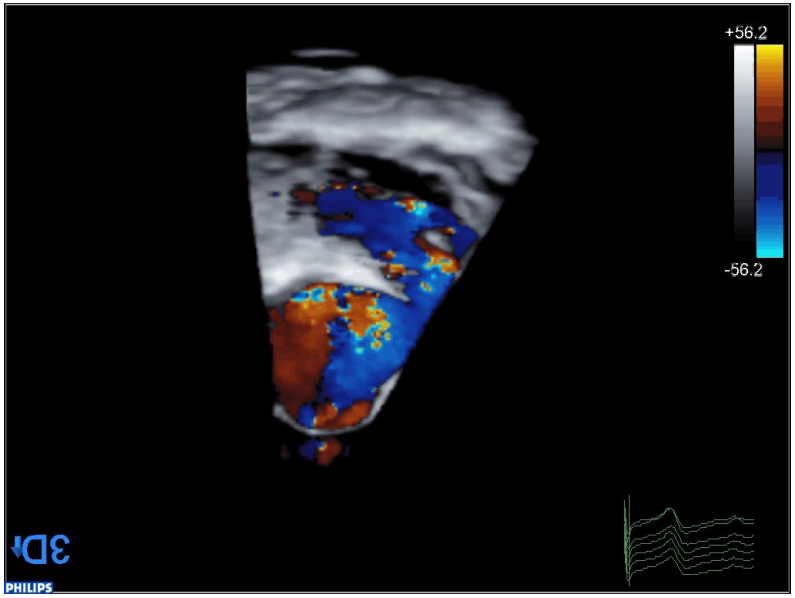
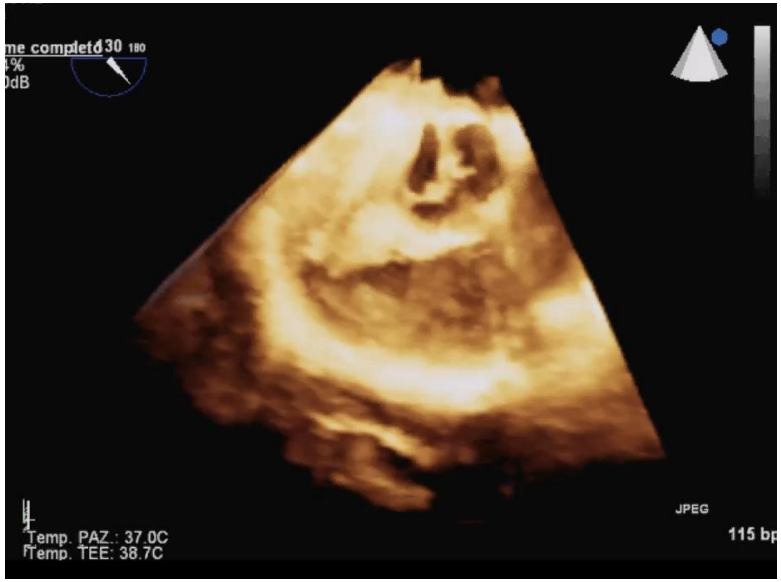
115 bpm


Pulm
valve
L
R
N
MV
TV
B


3D
PHILIPS


+56.2
-56.2
3D
PHILIPS


30 180
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Temp. TEE: 38.7C

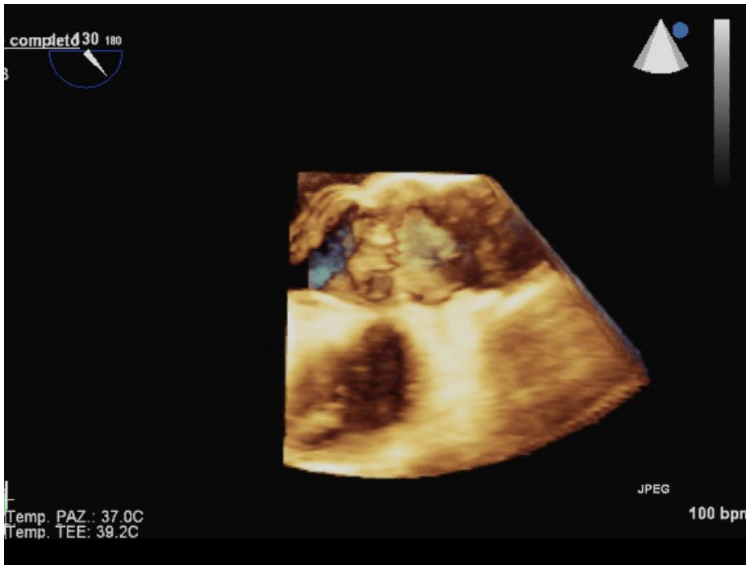
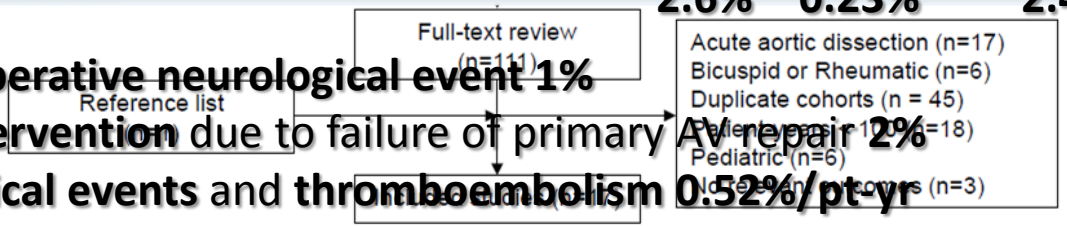

30 180
JPEG
Temp. PAZ.: 37.0C
Temp. TEE: 39.2C

Table 2 Operative approach and outcomes

Author (Reference)	Year	Cusp repair (%)	Valve sparing root replacement technique (%)		Early mort. (%)	OVE (%/pt-yr)	Reop. (%/pt-yr)‡	Late mort. (%/pt-yr)
			Reimplantation	Remodelling				
Aicher (4)	2010	83	NR	NR	3.44	0.16	1.2	NR
Lansac (6)	2010	58.4	NR	100	2.8	0.32	2.5	1.6
Lansac (7)	2006	6.2	NR	100	3.6	NR	4.2	0
Boodhwani (8)	2009	†	NR	NR	1.14	0.10	0	1.1
DePaulis (9)	2010	9	100	NR	1.80	NR	1.4	0.42
Settapani (10)	2009	5	100	NR	1.67	NR	3.5	1.4
Urbanski (11)	2010	9.4	1	NR	0	NR	0	NR
Doss (12)	2010	100	25.8	NR	0	0.30	0	3.0
Badiu (13)	2010	60.8	72.5	27.5	0.98	NR	2.4	0.40
Cameron (14)	2009	NR	53	47	0	NR	0.47	0.16
Svensson (15)	2010	42	100	NR	0	0.78	1.0	0.26
David (16)	2010	38.1	78.9	21.1	1.73	0.14	0.33	1.2
Izumoto (17)	2006	80	NR	NR	2.5	NR	3.5	NR
Tanaka (18)	2011	8.4	88.3	11.7	0	NR	0	1.5
Oka (19)	2011	50.5	99	1	0	NR	1.9	2.0
Kallenbach (20)	2005	6.3	100	NR	3.17	0.41	1.5	2.1
Minakata (21)	2004	100	NR	NR	0.63	0	2.4	2.4

†, tailored to specific etiology; ‡ composite endpoint: late AVR and re-repair; NR, not reported; pt-yr, patient-year; mort., mortality; OVE, operated valve endocarditis

2.6% **0.23%** **2.4%** **1.3%**



- Median **perioperative neurological event 1%**
- **Early AV reintervention** due to failure of primary AV repair **2%**
- **Late neurological events** and **thromboembolism 0.52%/pt-yr**
- Freedom from **AV re-intervention at 5 years 92%** (range, 87-98%)
- Freedom from **late recurrent AI >2+ at 5 years 88%** (range, 87-100%)

Durata ed efficacia

- Insufficienza residua → assente o trivial
- Coaptazione sopra anulus virtuale
- Coaptazione >7mm
- **Misura eH>9-10mm**
- **Annuloplastica**