Simpósio Conjunto da Sociedade Europeia de Cardiologia e Sociedade Brasileira de Cardiologia

- ESC Congress
- Munique, Alemanha, Setembro 2018

ESC Symposium

Joint with the Brazilian Society of Cardiology

SBC 1943 SOCIEDADE BRASILEIRA DE CARDIOLOGIA

Rheumatic valve disease at various stages in life

Complications and long term sequelae of rheumatic valve disease

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Universidade Federal de Ciências da Saúde de Porto Alegre

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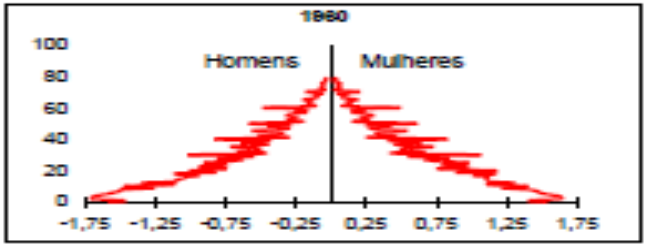
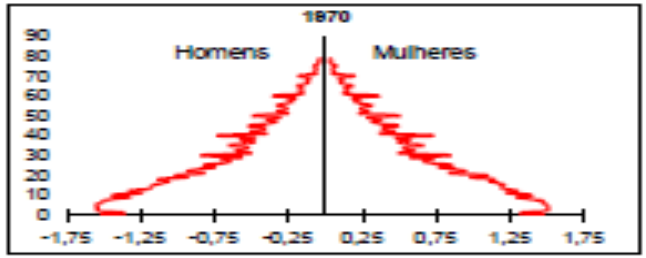
Age Pyramid Evolution 1960 - 2000

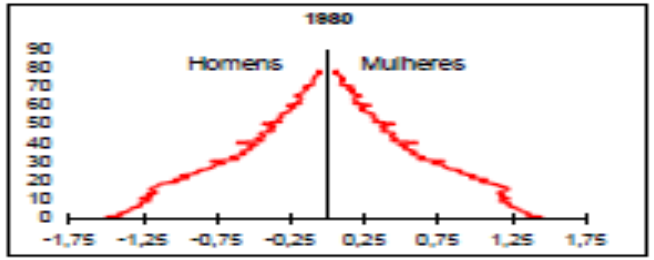
Brasil 1960- 1980

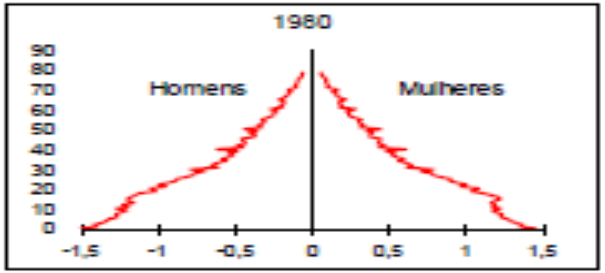
Brasil 1980-2000

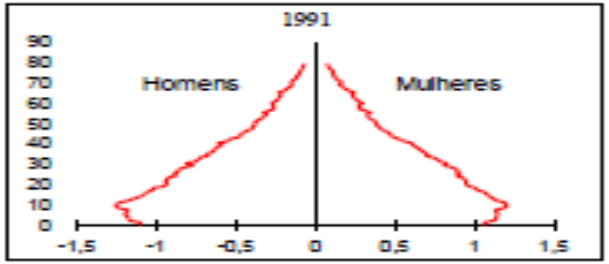
IBGE

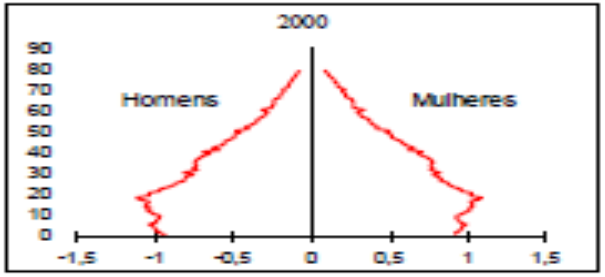












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ESC
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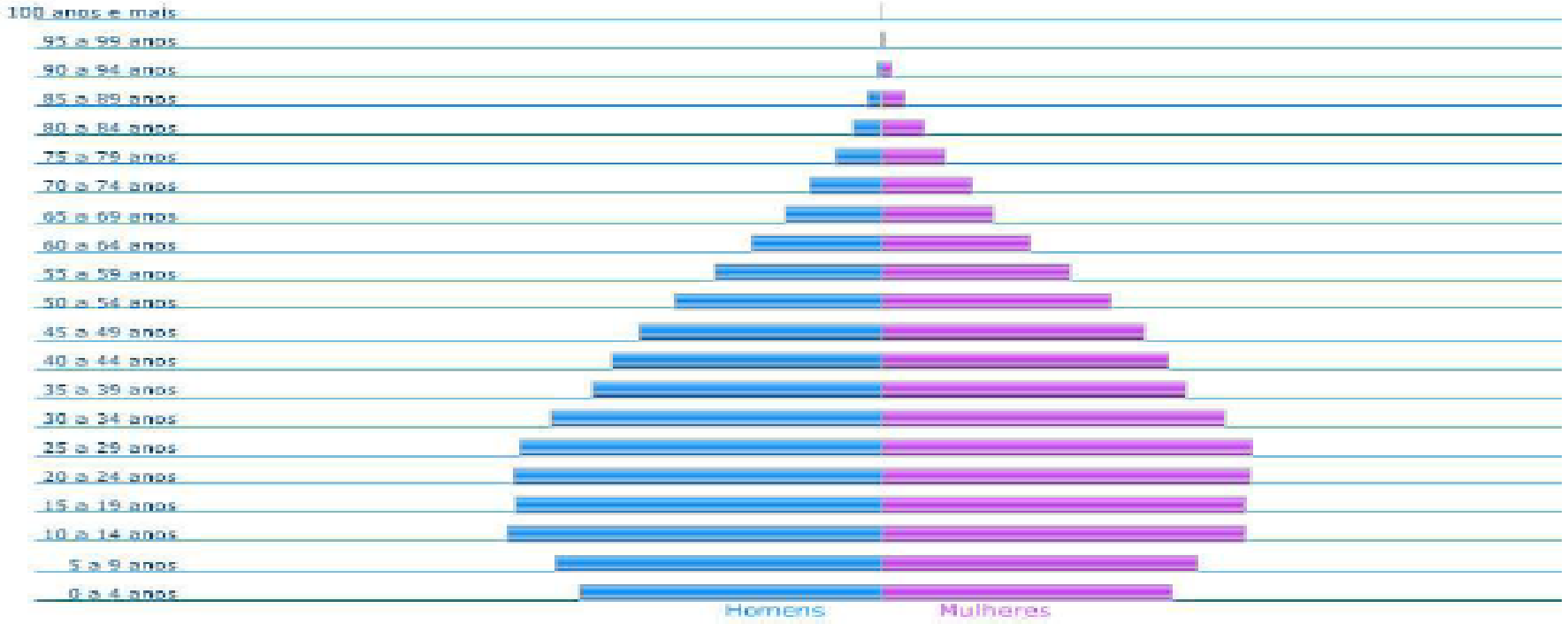
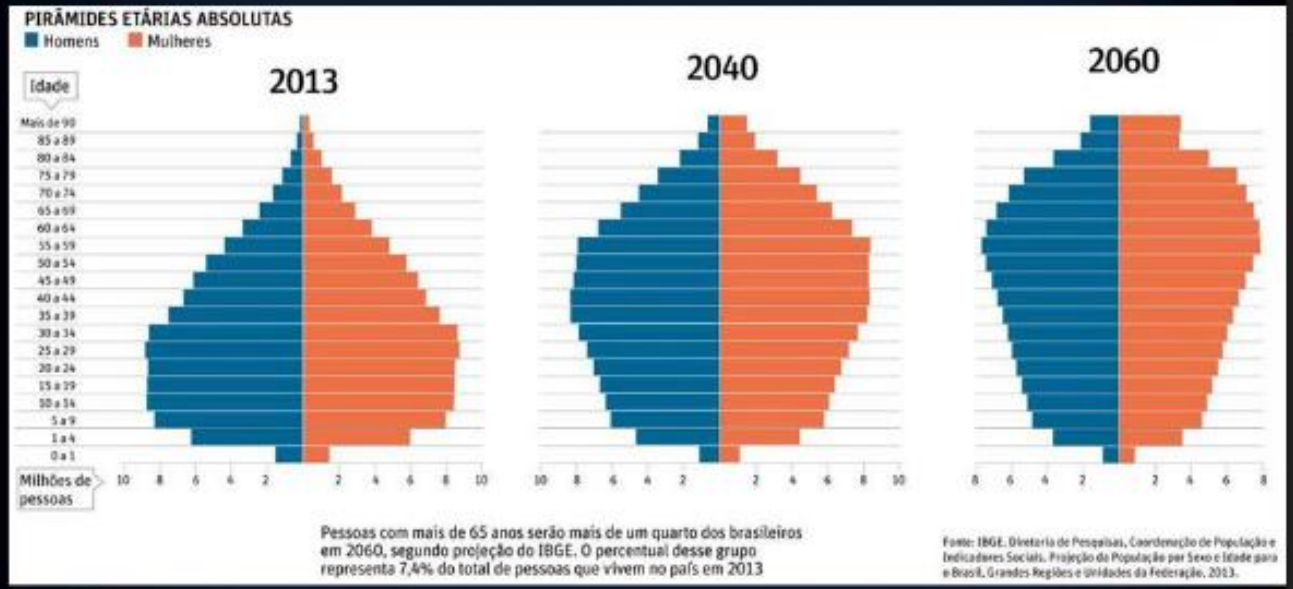
Age Pyramid in 2010 Census

Pirâmides Etárias

- Brasil

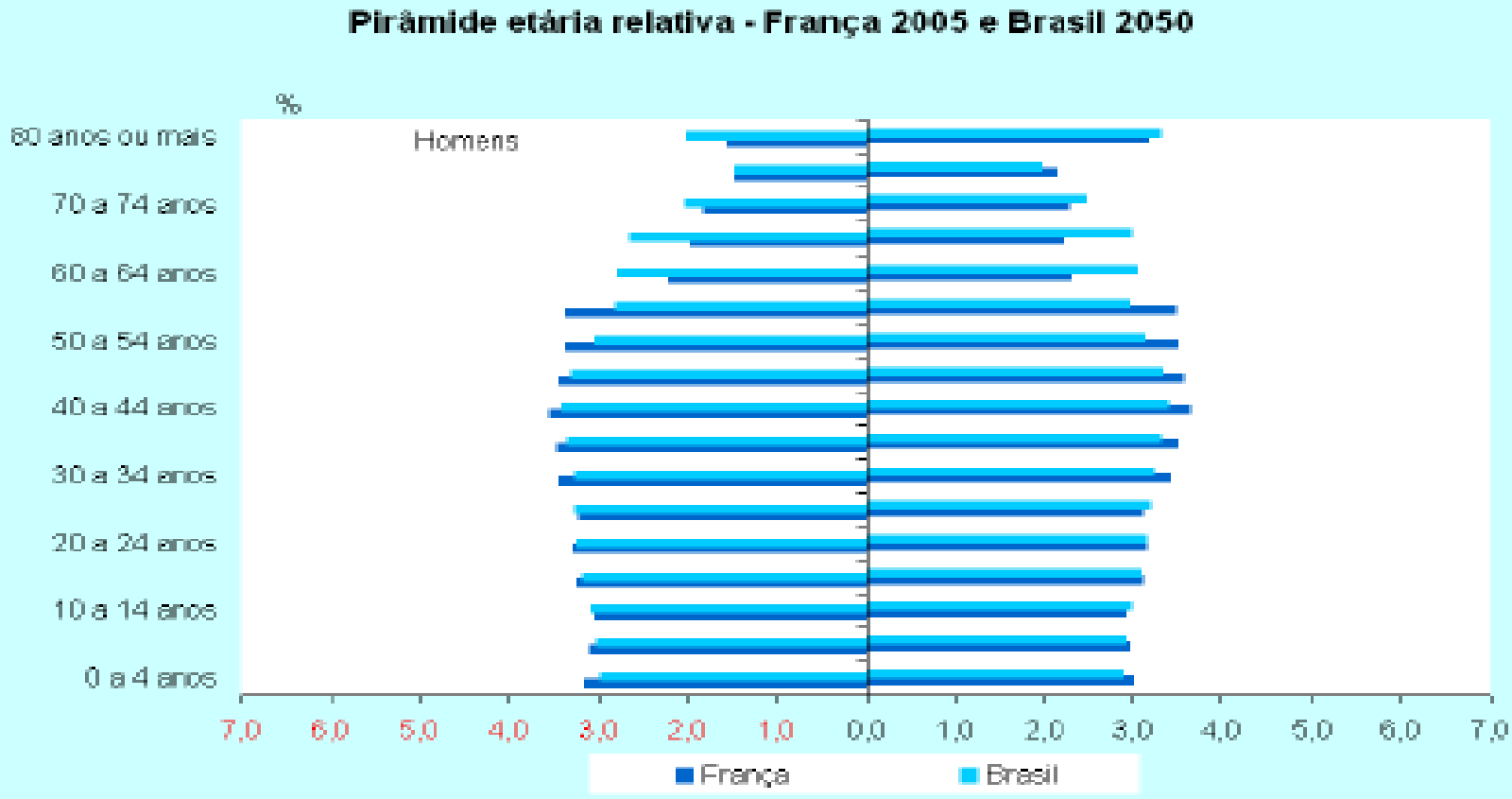


Evolução da pirâmide etária do BR



Prof Claudinei Perencin

Age Pyramid Comparizon: France 2005 & Brazil 2050



MITRAL STENOSIS

1969 – 1994

n = 1799

Age = 41+- 18 years

Gender = male 24%

female 76%

Rheumatic = 93%

Reoperations = 31%

MITRAL STENOSIS

1969 – 1994

n = 1799

Associated Lesions:			Hospital Mortality	
Isolated MS =	1444	80.3%	66	4.57%
Mi + Ao =	251	13.9%	21	8.37%
Mi + Tr =	90	5.0%	17	18.9%
Mi + Ao + Tr =	14	0.8%	1	7.1%

Instituto de cardiologia
Fundação Universitária de Cardiologia

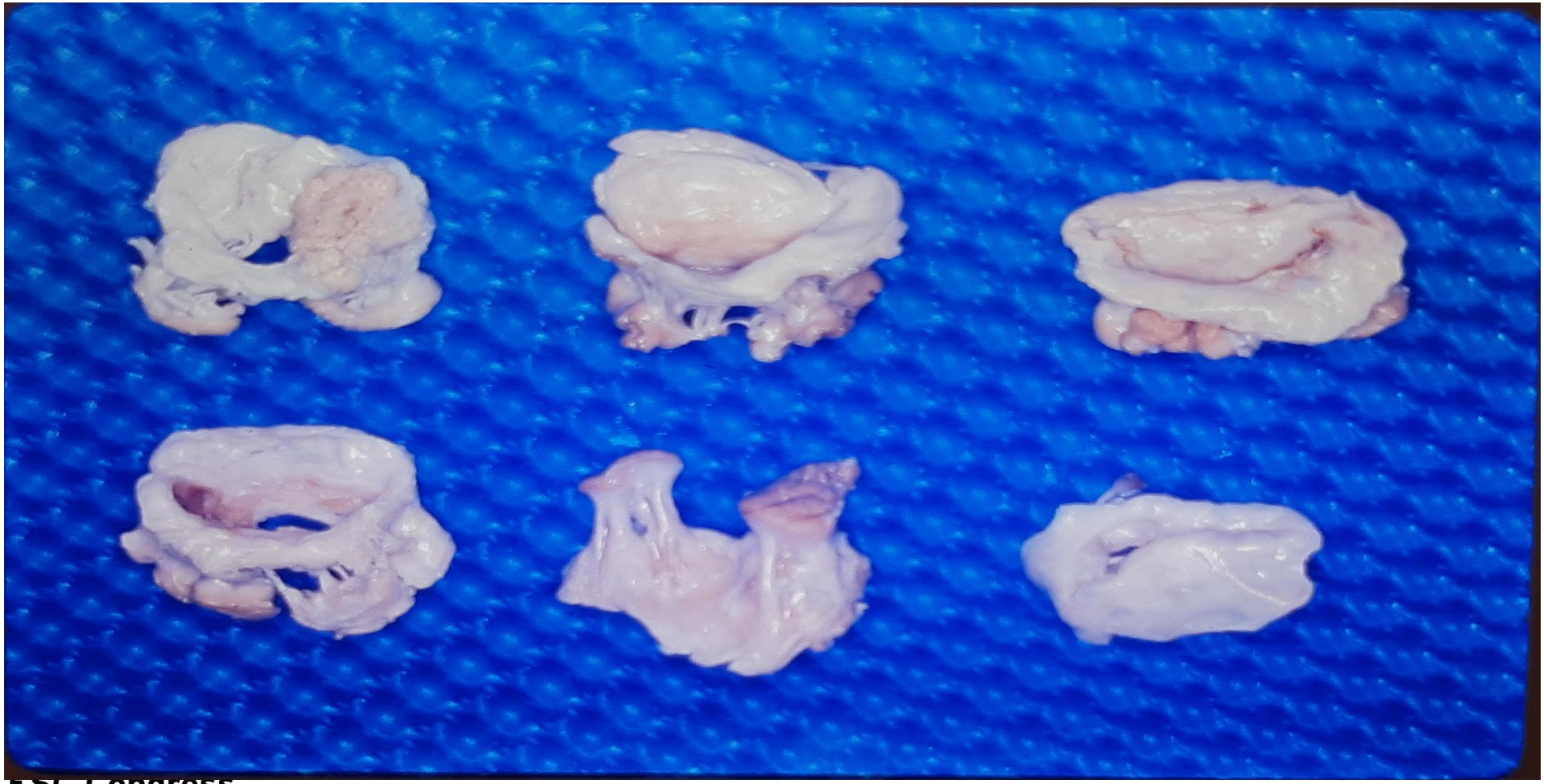
MITRAL STENOSIS

1969 – 1994

n = 1799

Results by Procedure

	n	Hospital Mortality	
Valvuloplasty	1022 (56.8%)	24	2.3%
Prosthesis	777 (43.2%)	84	10.8%

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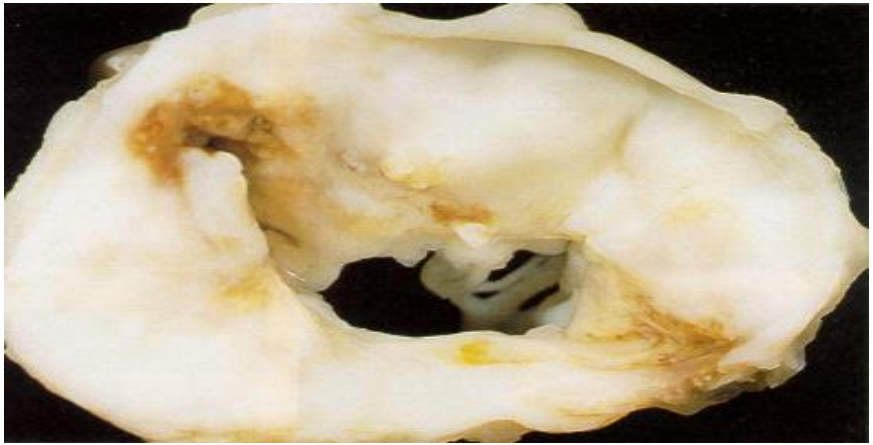


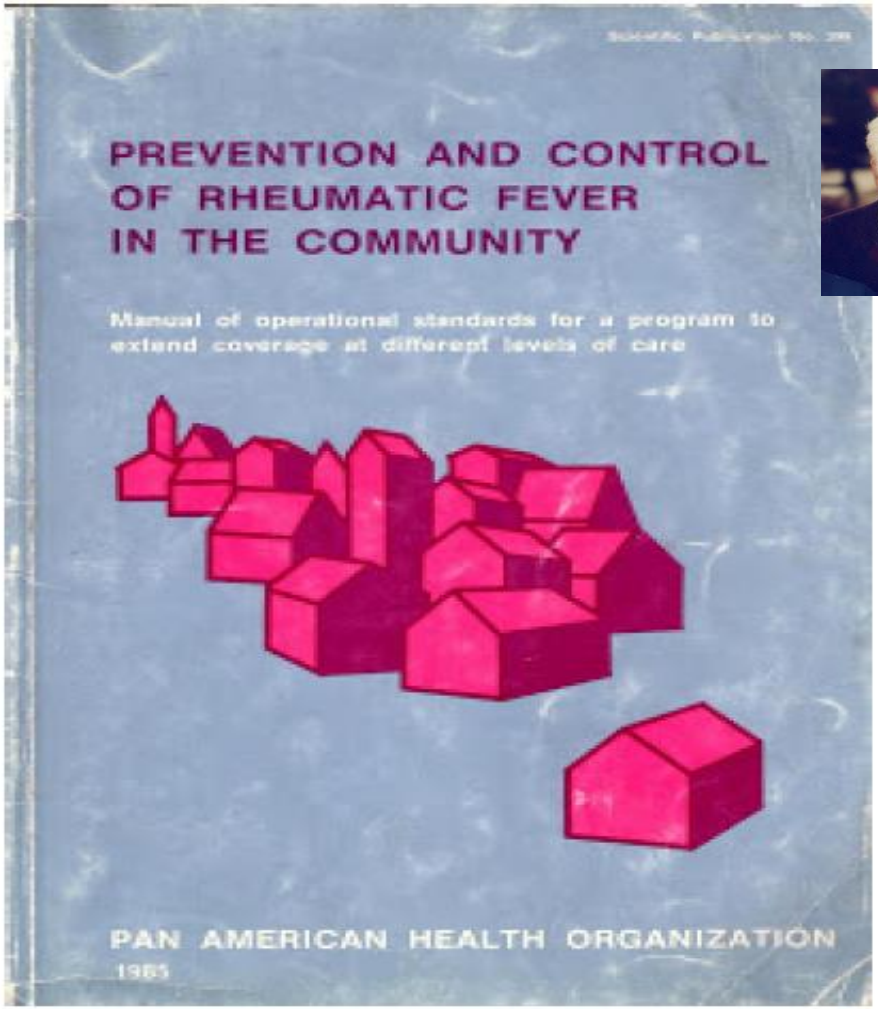
Case:
State of Rio Grande do Sul Prevention Program of Rheumatic Fever

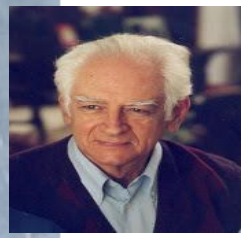
Stablished Feb 07, 1974

1954, WHO recognized importance of Secondary Prevention for RF

1973, A. Achutti & cols proposed a plan for RF Secondary Prevention,
Based on a previous Thomas Strasser's WHO plan for Mediterranean Countries
Observed by PAHO

*amicorextension.blogspot.com.br/2012/11/febre-reumatica.html





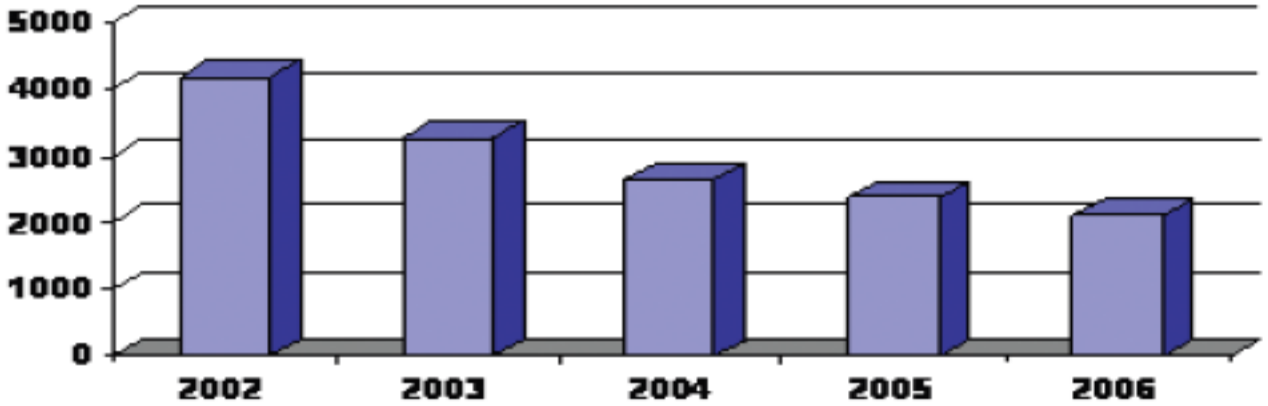
Rheumatic Disease

Prevalence of RHD in a Reference Hospital of South Brazil

jan 2012 – fev 2013

Procedures	**n**
Total open-heart	1,346
Valve repair/replacement	276
Rheumatic mitral lesion	**6**
Percutaneous baloon valvuloplasty	**8**

Rheumatic Fever Hospitalizations from 2002 to 2006



Fonte: Ministério da Saúde – Sistema de informações hospitalares do SUS (SIH/SUS).

Gráfico 1. Número de casos internados por Febre Reumática Aguda no Brasil

Spina GS. Rev Med (São Paulo). 2008 abr.-jun.;87(2):128-41.

Very heterogeneous country

North, Northeast & Center-West less developed than South and Southeast

Different resources

Different access to medical care

Brazilian Society CV Surgery data, 2009

Isolated Mitral Valve Surgery: The Society of Thoracic Surgeons Adult Cardiac Surgery Database Analysis

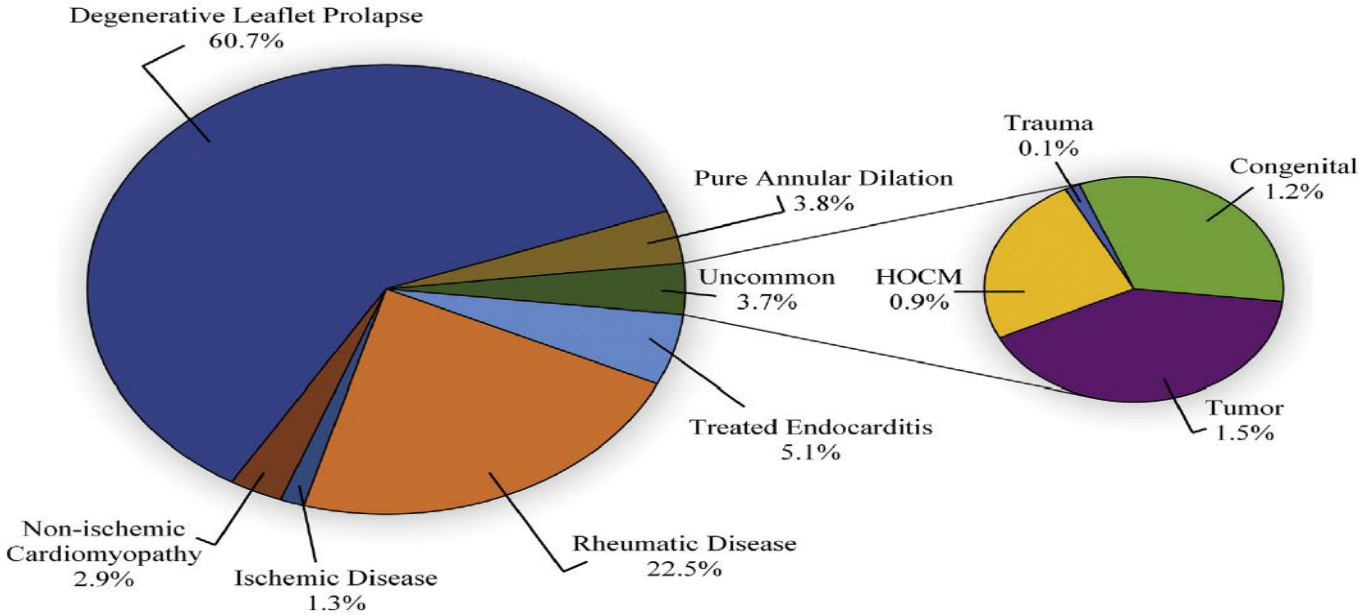


Fig 3. Proportion of patients undergoing isolated primary mitral valve operations (overall group) between 2011 and 2016 for each underlying etiology of mitral valve disease. The proportions were calculated from a subset of patients with known etiology (n = 60,185; unknown etiology = 31%; 27,029 of 87,214 patients). (HOCM = hypertrophic obstructive cardiomyopathy.)

Isolated Mitral Valve Surgery: The Society of Thoracic Surgeons Adult Cardiac Surgery Database Analysis

Table 1. Hierarchical Assessment of Etiologies Underlying Mitral Valve Disease and Proportion of Patients Undergoing Isolated Primary Mitral Valve Repair or Replacement Within Each Etiology Between 2011 and 2016

Etiology	Patients (n = 87,214)	Repair (%)	Replace (%)
Degenerative leaflet prolapse	36,554	82.7	17.3
Rheumatic disease	13,545	17.5	82.5
Endocarditis	3,085	48.1	51.9
Pure annular dilation	2,265	84.9	15.1
Uncommon diseases	2,219	68.2	31.8
Nonischemic cardiomyopathy	1,731	66.0	34.0
Ischemic disease	785	58.2	41.8
Unknown	27,029	67.0	33.0

Predictors of Very Late Events After Percutaneous Mitral Valvuloplasty in Patients With Mitral Stenosis

n=32
1987 - 2011

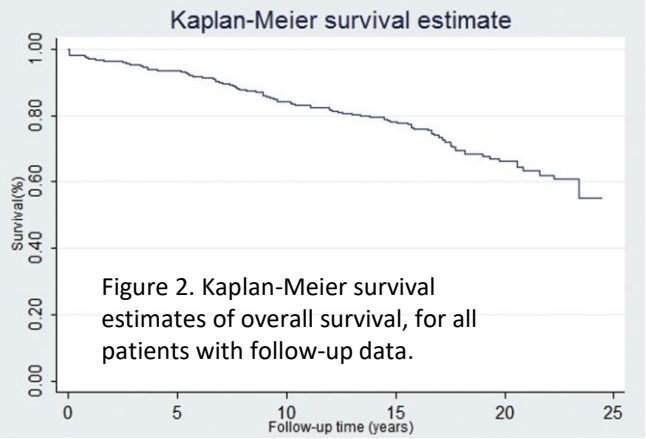


Figure 2. Kaplan-Meier survival estimates of overall survival, for all patients with follow-up data.

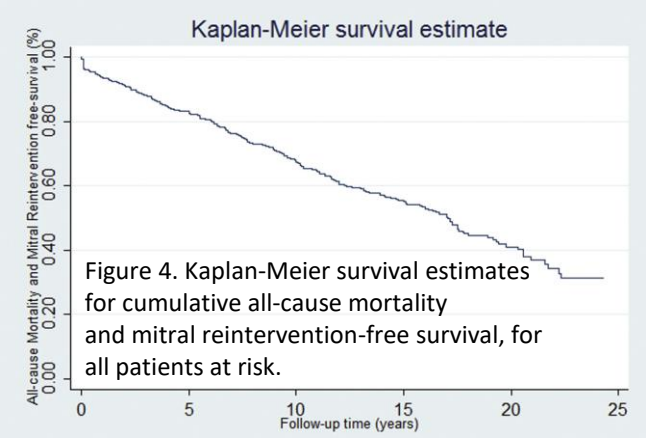


Figure 4. Kaplan-Meier survival estimates for cumulative all-cause mortality and mitral reintervention-free survival, for all patients at risk.

PMV for rheumatic MS maintain good clinical outcomes for as long as 2 decades and the most important predictors of long-term outcomes are unfavorable valve anatomy and the persistence of PH.

In addition, the most important determinant of persistent PH after an initially successful procedure is a suboptimal valve opening

Jorge E et Al (Coimbra, PT & Córdoba SP). Am J Cardiol 2016 (epub)

Mitral valve surgery after percutaneous mitral commissurotomy:is repair still feasible?

1993 – 2012

n = 61 patients
with previous PMC

Repair in
38(62.3%).

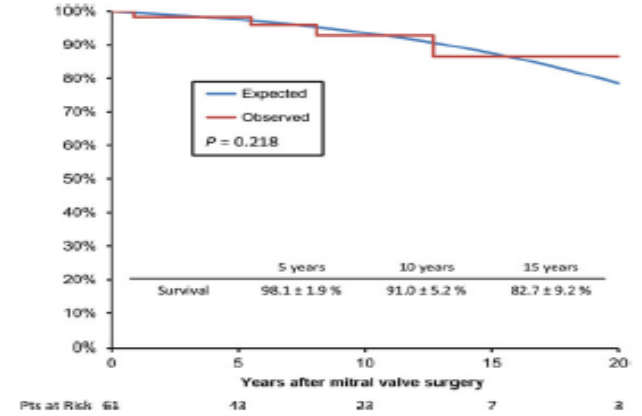


Figure 1: Overall survival curve of the study population compared with an age- and sex-adjusted general population (National Institute of Statistics, census 2011). Pts: patients.

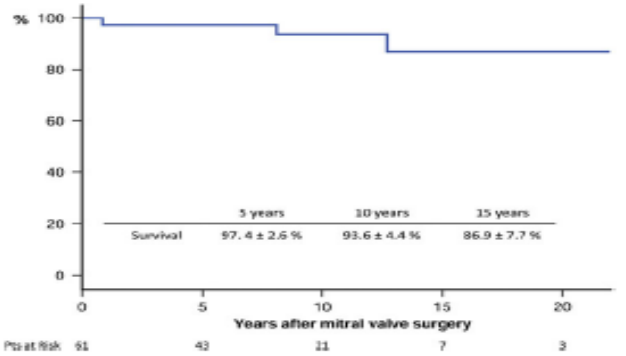
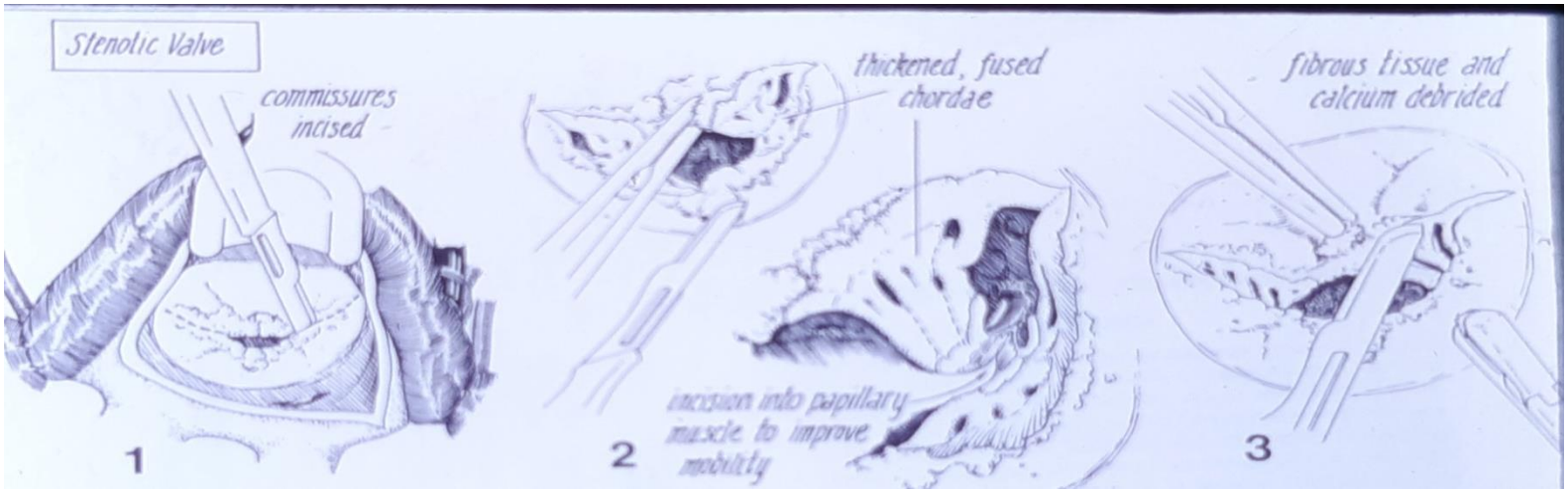


Figure 2: Survival free from mitral reoperation of patients submitted to mitral valve surgery after previous percutaneous mitral commissurotomy. Pts: patients.

Coutinho GF, Branco CF, Jorge E, Correia PM, Antunes MJ. (Coimbra,PT)Eur J Cardiothorac Surg 2015;47:e1–e6.


Stenotic Valve
commissures incised
1
thickened, fused chordae
incision into papillary muscle to improve mobility
2
fibrous tissue and calcium debrided
3

Late Outcome of Unsupported Annuloplasty for Rheumatic Mitral Regurgitation

RENATO A. K. KALIL, MD, PhD, FERNANDO A. LUCCHESE, MD, FACC, PAULO R. PRATES, MD, JOÃO R. M. SANT'ANNA, MD, FARID C. FAES, MD, EDEMAR PEREIRA, MD, IVO A. NESRALLA, MD

Porto Alegre, Brazil

N = 154
55 male 99 female
Age 5 to 73 (36+-16y)

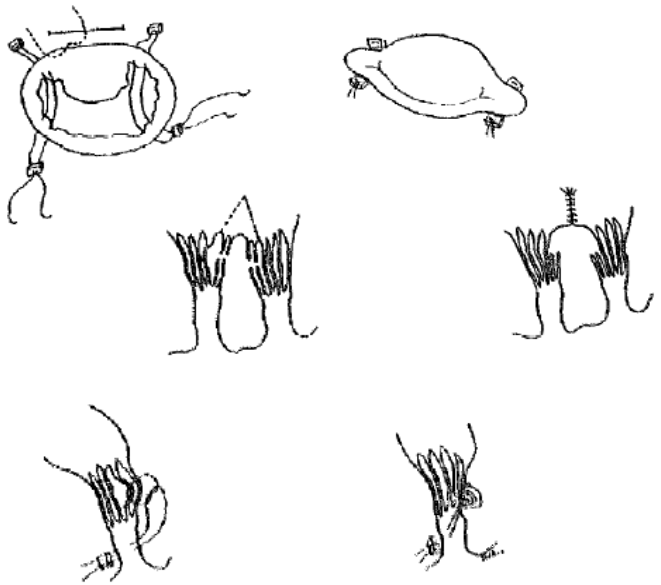


Figure 1. The unsupported mitral annuloplasty procedure consisted of a reduction in the mural portion of the annulus obtained with the

(J Am Coll Cardiol 1993;22:1915--20)

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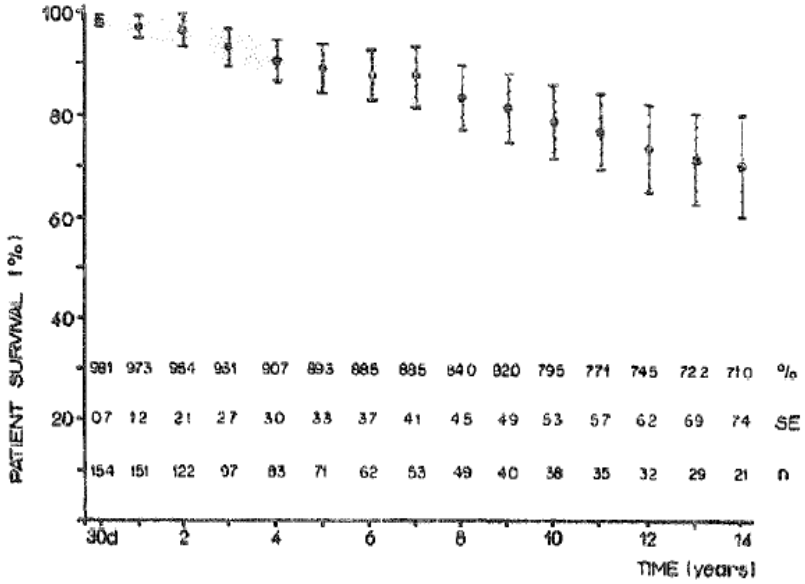
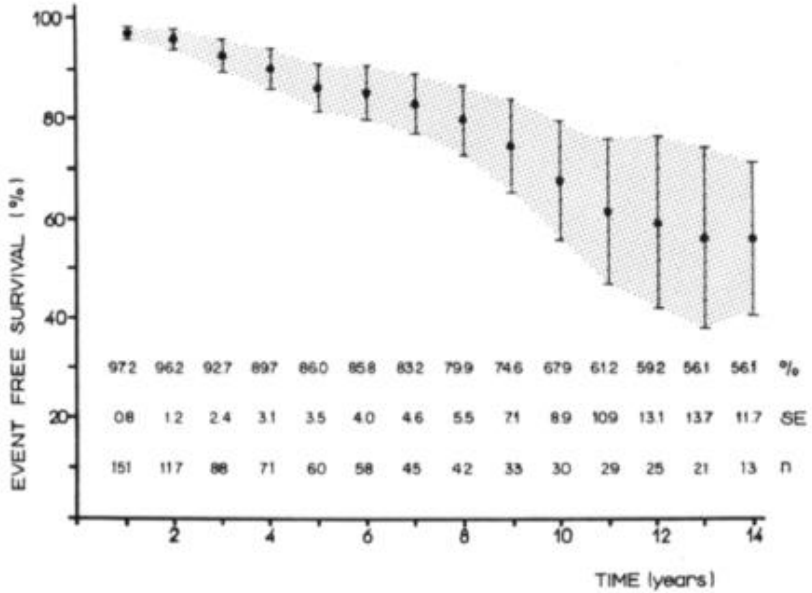
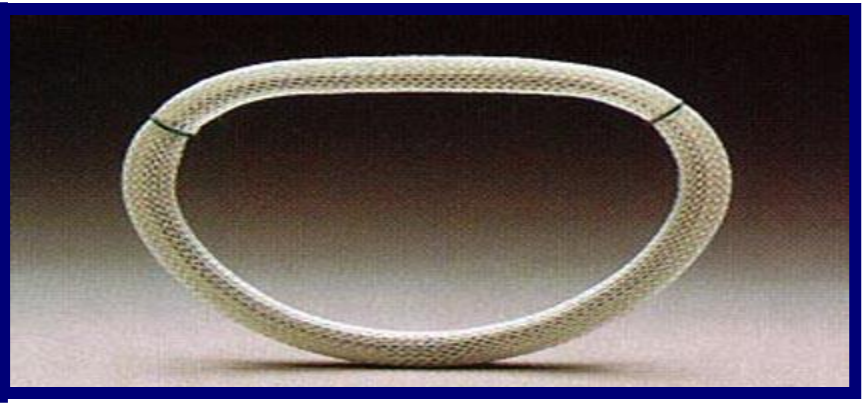


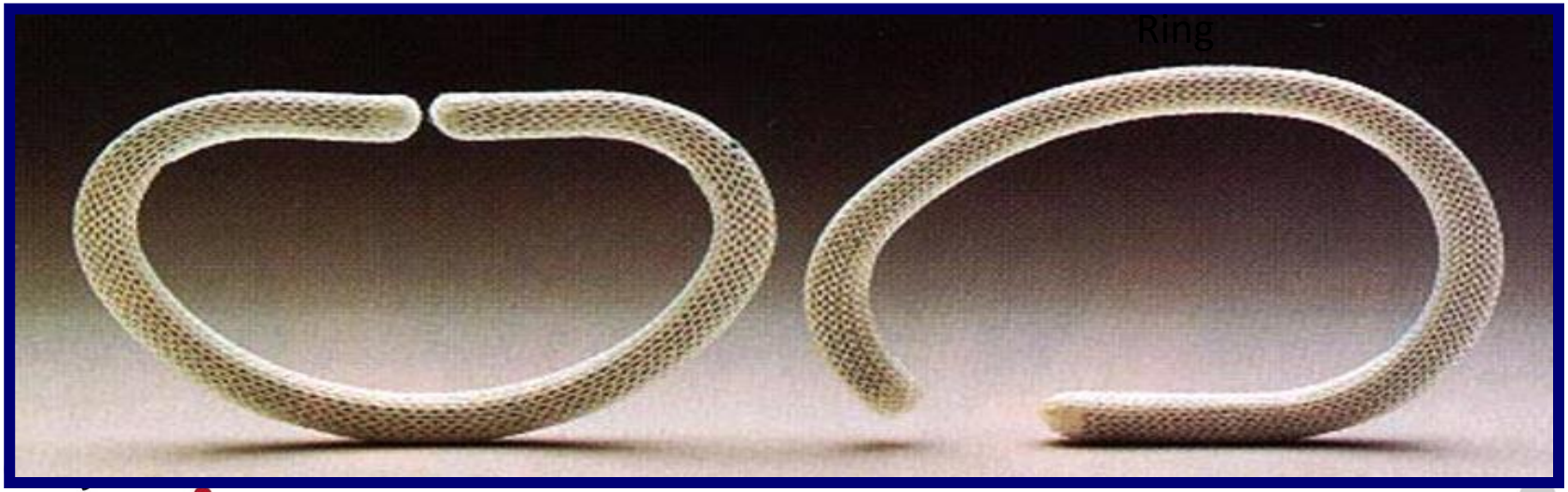


(J Am Coll Cardiol 1993;22:1915-20)

Cosgrove-Edwards® Annuloplasty Band



Carpentier-Edwards Physio™ Annuloplasty Ring



Carpentier-Edwards Classic™ Annuloplasty Rings

Rings

ADVANTAGES

- Technical standardization
- Reproducibility
- Redilation prevention
- Support to the surgeon
- Possible *“valve in ring” later*

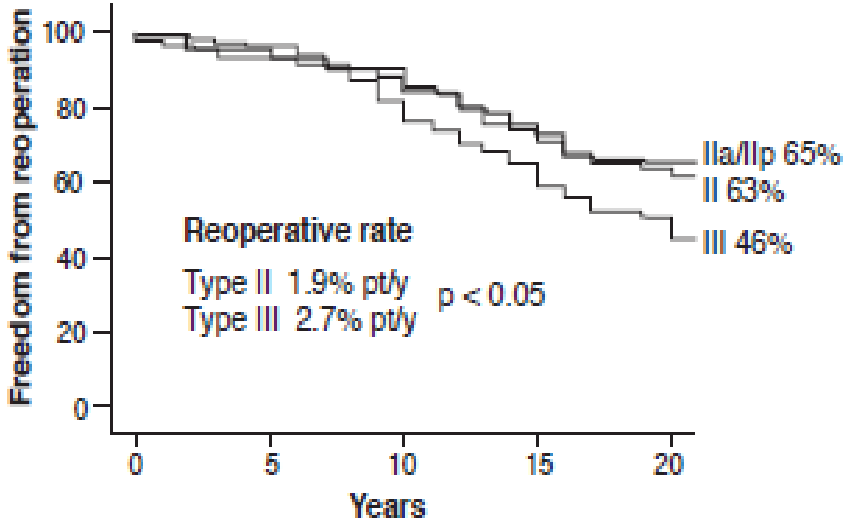
DISADVANTAGES

- Compromises dynamic nature
- Reduces basal LV contraction
- Changes the saddle shape of mitral annulus
- Difficults growing, in children
- Useless in anterior portion and may cause SAM
- Deiscence

TABLE 25-3

Reconstructive Techniques in a Series of 951 Patients with Rheumatic Mitral Valve Diseases

Techniques	N	%
Remodelling annuloplasty	899	95
Chordae shortening	717	75
Chordae transfer	99	10
Extensive chordae resection	58	7
Commissurotomy	373	39
Pericardial extension	65	7.5
Resection of localized calcification	43	5



Chauvaud S, Fuzellier JF, Berrebi A, et al: Long-term (29 years) results of reconstructive surgery in rheumatic mitral valve insufficiency, *Circulation* 104(12 Suppl 1):I12-I15, 2001.

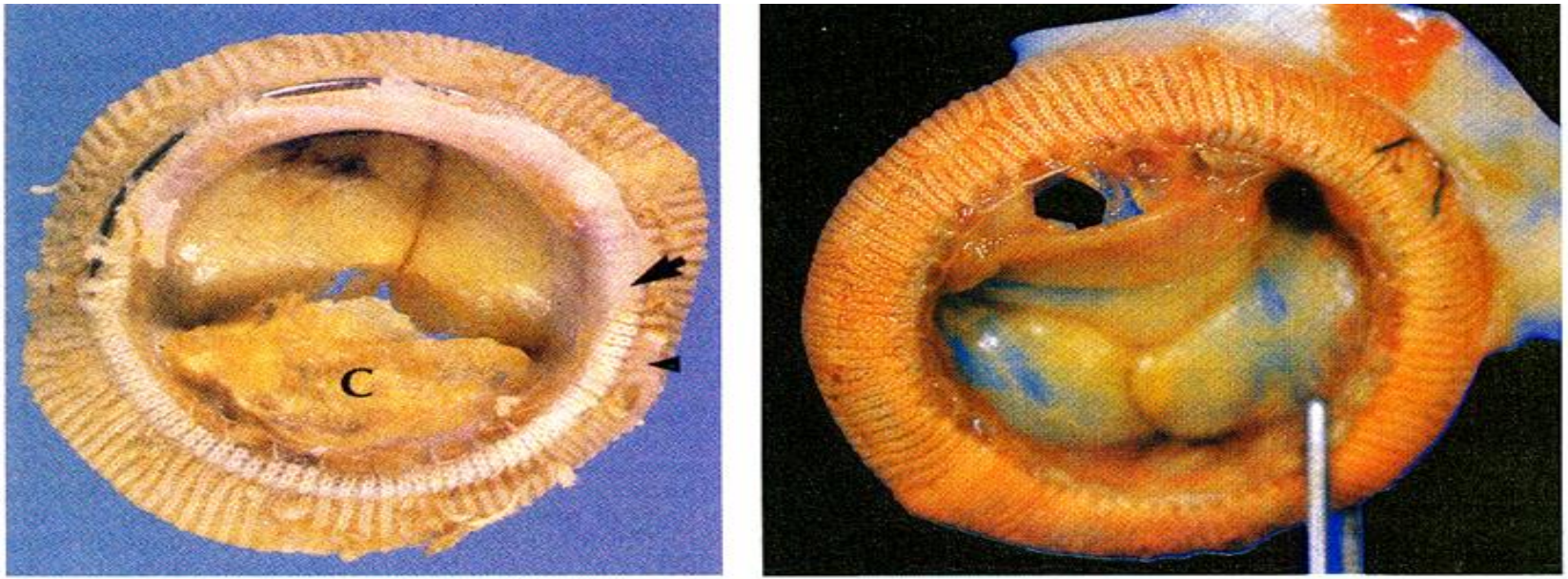
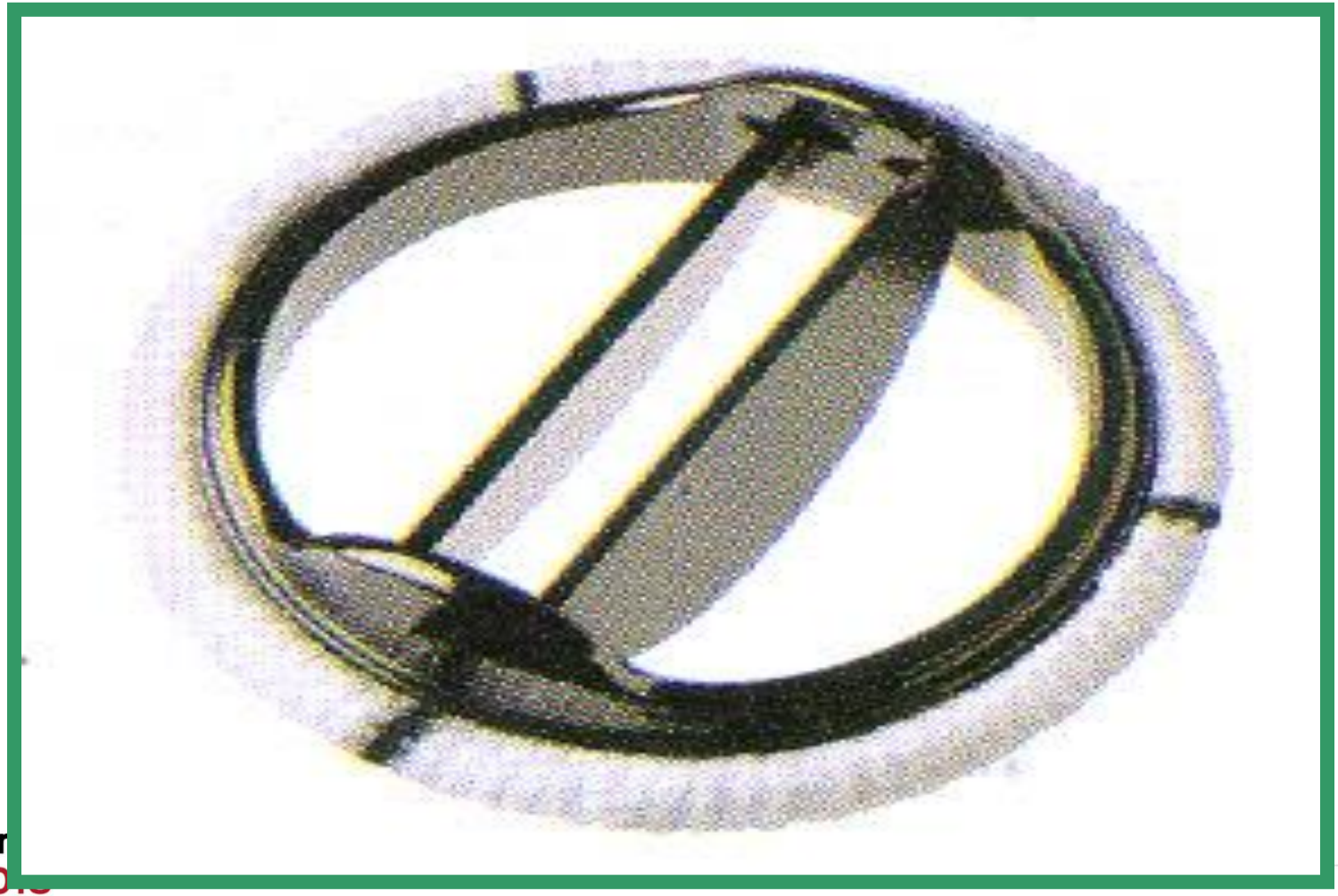
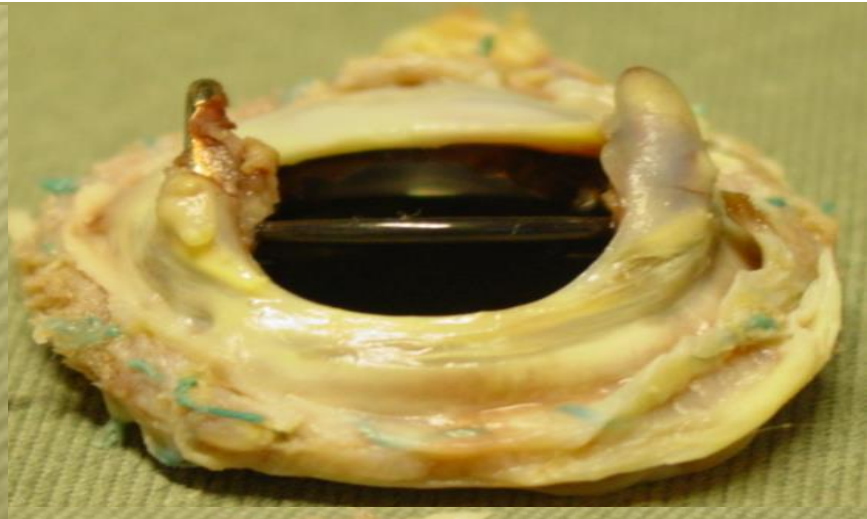


FIGURE 57–50 Structural deterioration of bioprosthetic valves. **A,** Valve failure related to mineralization and collagen degeneration. **B,** Cuspal tears and perforations. These processes may occur independently, or they may be synergistic. (**A,** From Virmani R, Burke AP, Farb A: Pathology of valvular heart disease. *In* Rahimtoola SH [ed]: Valvular Heart Disease. *In* Braunwald E [series ed]: Atlas of Heart Diseases. Vol 11. Philadelphia, Current Medicine, 1997, p 1.26; **B,** From Manabe H, Yutani C [eds]: Atlas of Valvular Heart Disease. Singapore, Churchill Livingstone, 1998, p 158.)





Clinical outcomes in 1731 patients undergoing mitral valve surgery for rheumatic valve disease

mean age = 52.3±12.5 years
female = 1190(68.7%)

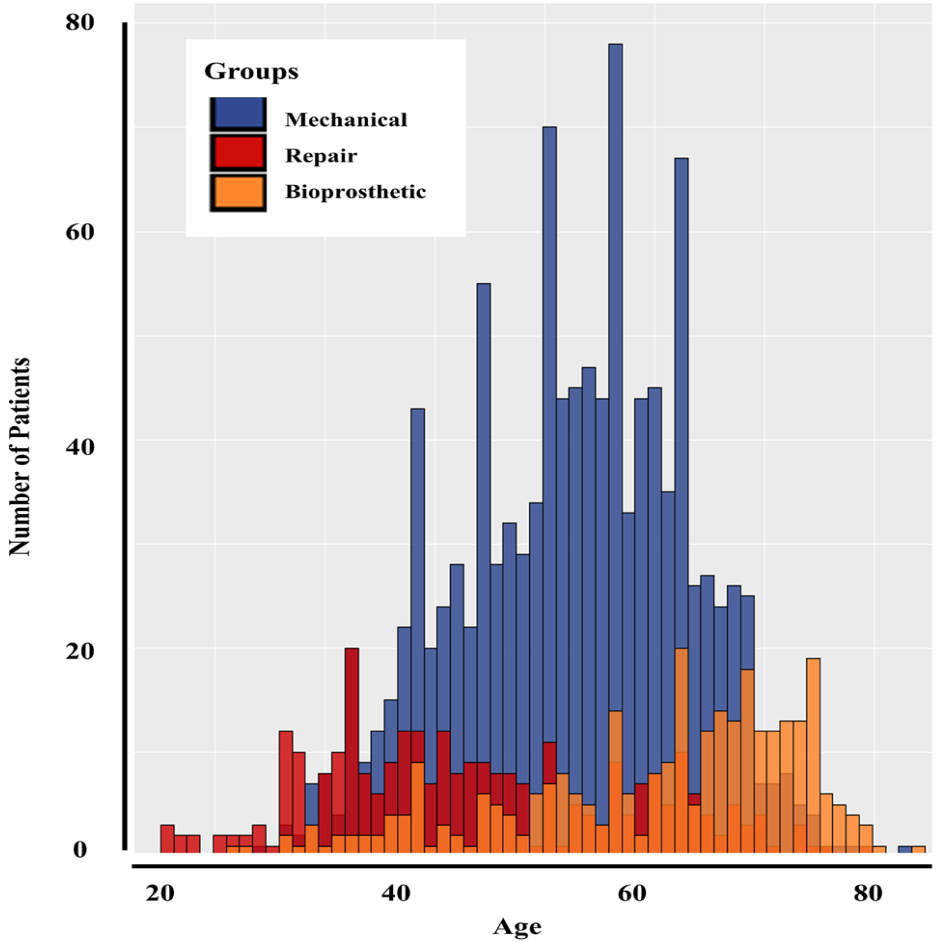


Figure 1 Distribution of patients according to mitral valve (MV) procedures based on patient age (red=repair; blue=mechanical valvereplacement; orange=bioprosthetic valve replacement).

Kim WK, et al. Heart 2017;**0**:1–8. doi:10.1136/heartjnl-2017-312249 (On line) Seoul, Korea

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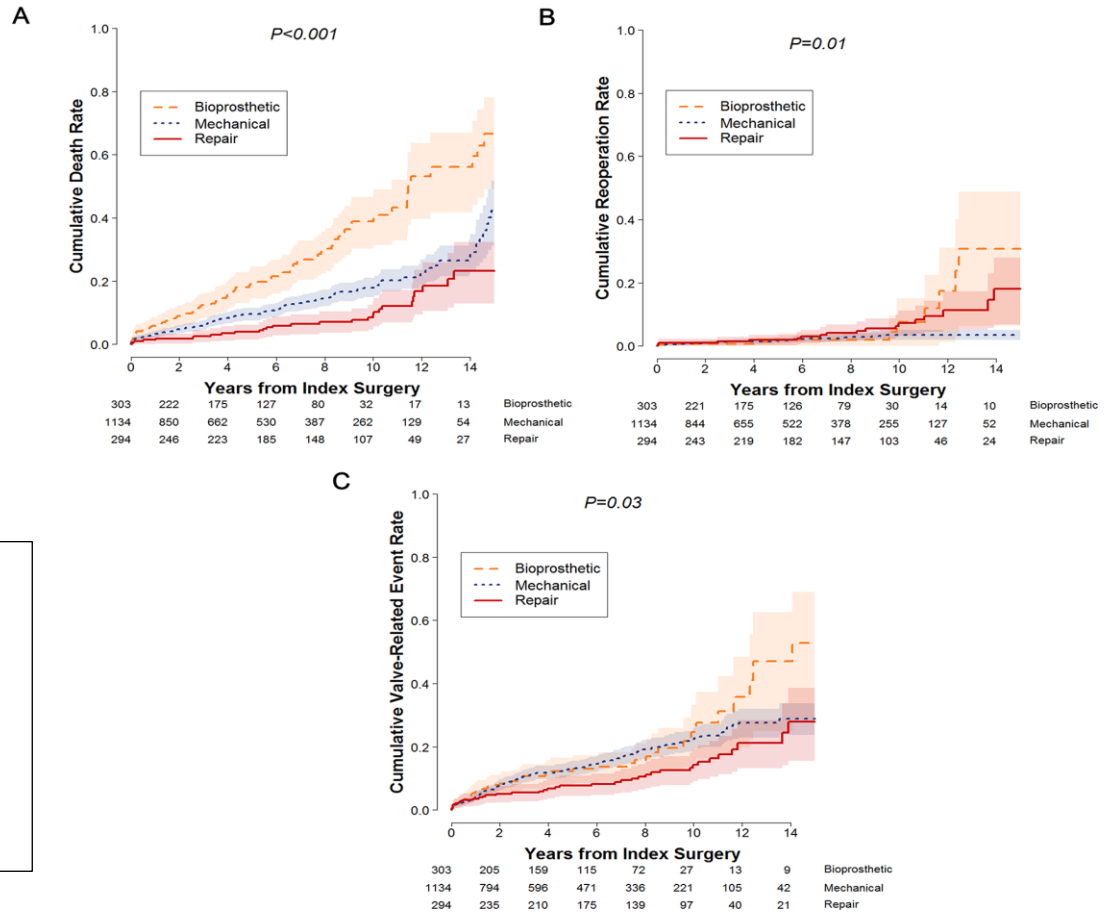

Figure 2 Unadjusted Kaplan-Meier (KM) plots for cumulative overall mortality (A), reoperation (B) and valve-related complication rates (C) according to the types of surgery. Shaded bands indicate areas within 95% Cis.
(red=repair;
blue=mechanical valve replacement;
orange=bioprosthetic valve replacement).

Kim WK, et al. Heart 2017;**0**:1–8. doi:10.1136/heartjnl-2017-312249 (On line) Seoul, Korea

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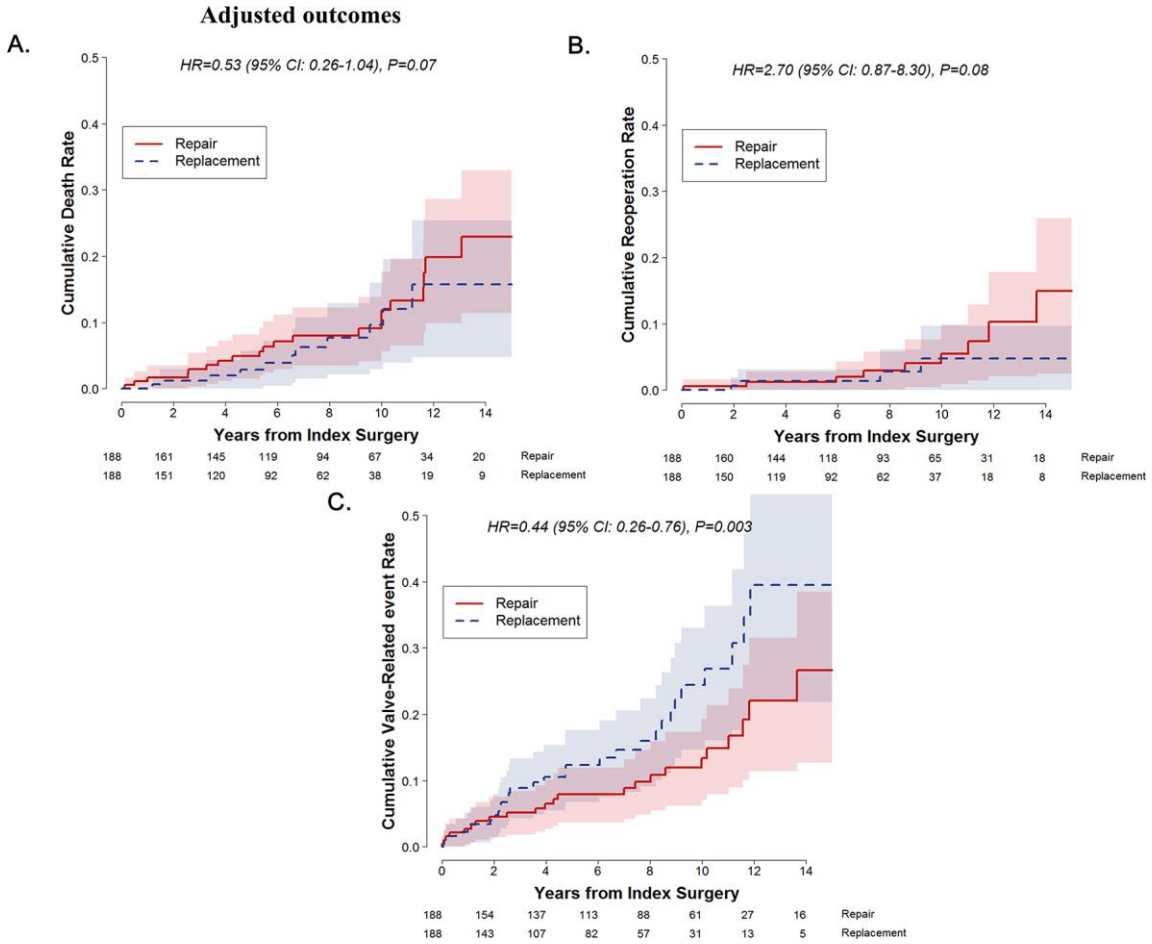


Figure 3 Adjusted Kaplan-Meier plots for cumulative overall mortality (A), reoperation (B) and valve-related complication rates (C) according to the types of surgery. Shaded bands indicate areas within 95% CIs (red=repair; blue=replacement).

Kim WK, et al. Heart 2017;**0**:1–8. doi:10.1136/heartjnl-2017-312249 (On line) Seoul, Korea

Clinical outcomes in 1731 patients undergoing mitral valve surgery for rheumatic valve disease

Key messages

What might this study add?

Valve repair in well-selected patients with severe rheumatic MV disease showed comparable survival outcomes (HR, 1.24; 95% CI 0.62 to 2.48; P=0.54) and a trend towards more favourable valve-related outcomes (HR, 0.57; 95% CI 0.33 to 0.99; P=0.045) compared with valve replacement surgery.

How might this impact on clinical practice?

The MV repair procedure for rheumatic heart disease may be a reasonable alternative to replacement surgery in well-selected young patients.

Kim WK, et al. Heart 2017;**0**:1–8. doi:10.1136/heartjnl-2017-312249 (On line) Seoul, Korea

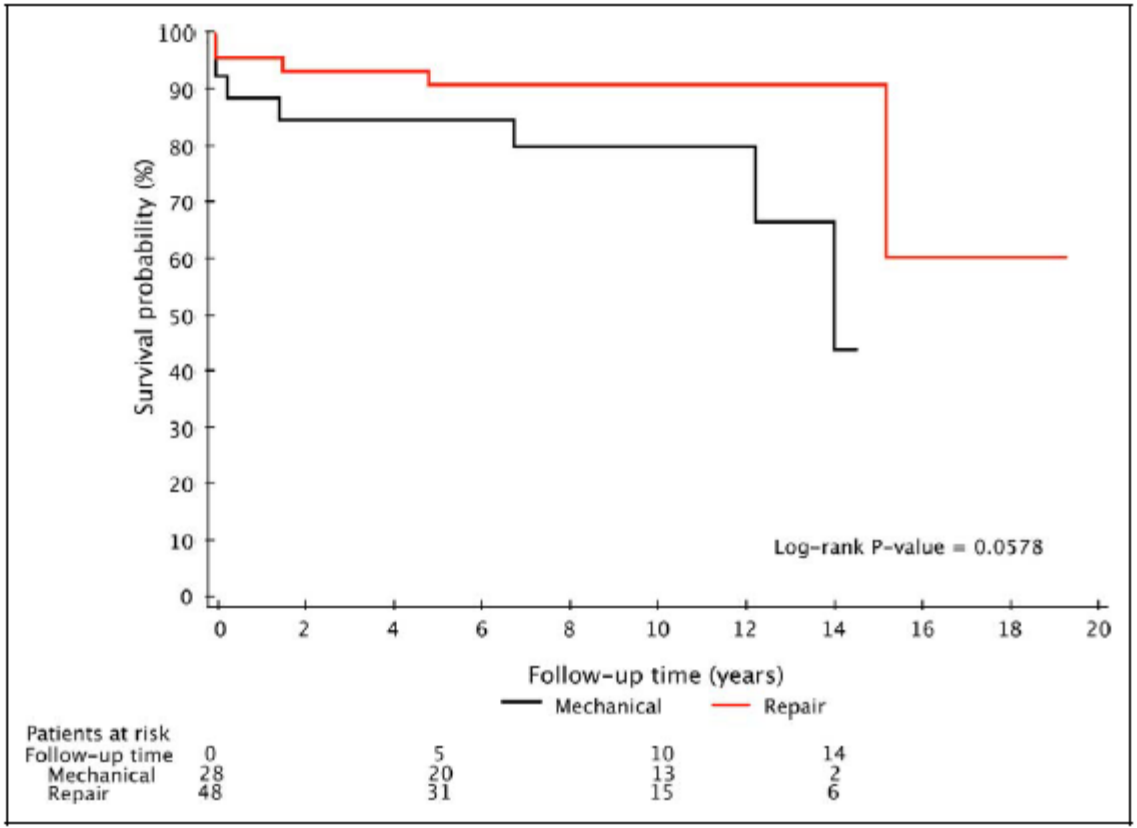


Figure 1. Actuarial global survival: mitral valve (MV) repair versus mechanical valve replacement (MVR).

Remenyi et al (New Zealand). **Improved Long-Term Survival for Rheumatic Mitral Valve Repair Compared to Replacement in the Young**
World Journal for Pediatric and Congenital Heart Surgery , 2012; 4(2): 155-164

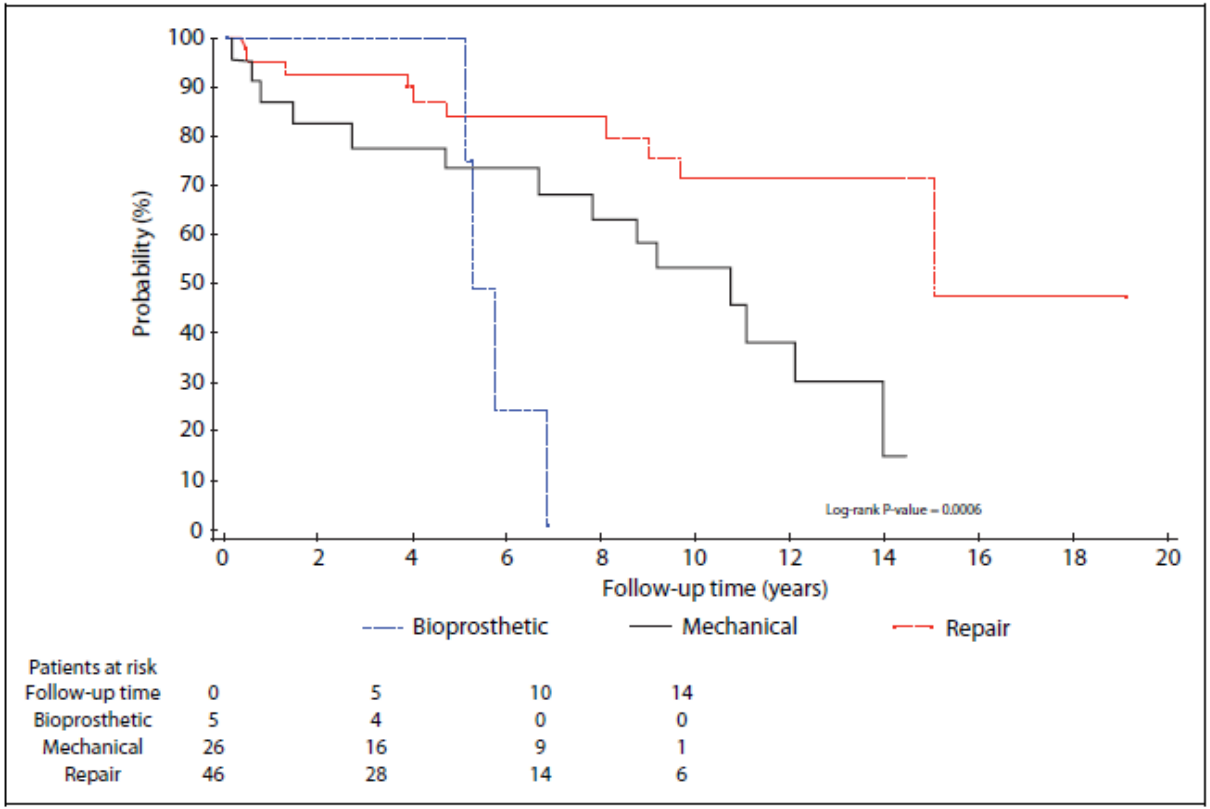


Figure 6. Freedom from all late valve-related events (including late death, reoperation, infective endocarditis, and thrombotic and embolic events): Comparison of mitral valve (MV) repair, mechanical valve replacement (MVR), and bioprosthetic valve replacement (BVR).

Remenyi et al (New Zealand). **Improved Long-Term Survival for Rheumatic Mitral Valve Repair Compared to Replacement in the Young**

World Journal for Pediatric and Congenital Heart Surgery 2012; 4(2): 155-164

A meta-analysis of late outcomes of mitral valve repair in patients with rheumatic heart disease

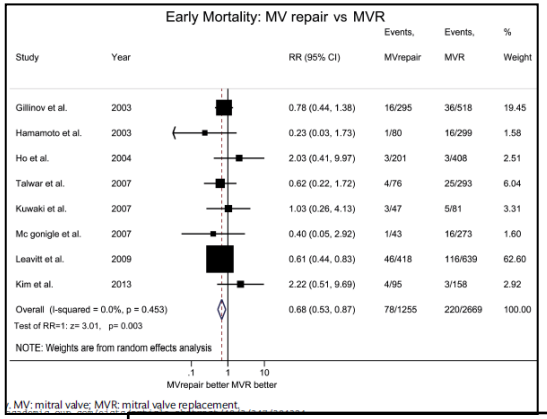
Table 3 Outcomes at follow-up after MV repair surgery

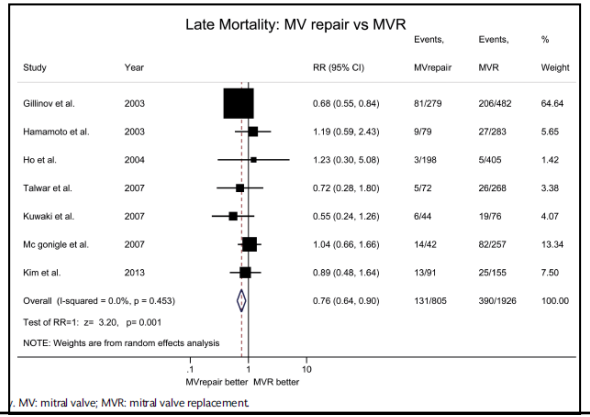
Study name	30-day mortality (%)	Long-term survival (%)	Freedom from reoperation (%)	Freedom from valve-related event (%)
Fedakar *et al.* (6)	2.3	93.3 (5 years); 93.3 (10 years)	89	Unknown
Yankah *et al.* (7)	6	84.7 (5 years); 66.9 (10 years); 50.2 (15 years)	77.3 (5 years); 53.4 (10 years)	Unknown
Severino *et al.* (8)	0	99 (5 years); 92.1 (10 years)	91.2 (5 years); 71.1 (10 years)	Unknown
Kim *et al.* (9)	0.5	96.7 (5 years); 92.2 (10years)	97.5 (5 years); 96.7 (10 years)	90.3 (5 years); 85.5 (10 years)
Yakub *et al.* (10)	2.4	99.7 (5 years); 98.1 (10 years)	91.8 (5 years); 87.3 (10 years)	85.6 (5 years); 72.8 (10 years)
Waikittipong *et al.* (11)	1	95.5 (5 years); 89.2 (10 years)	94.5 (5 years); 82.7 (10 years)	68 (5 years); 56.4 (10 years)
Kumar *et al.* (12)	3.6	93.8 (5 years); 92 (10 years)	95.5 (5 years); 81 (10 years)	32 (10 years)
Kalangos *et al.* (13)	0	99.5	94.5 (5 years); 92.7 (10 years)	93.2 (5 years); 86.5 (10 years)
El Oumeiri *et al.* (14)	0	94 (5 years); 81 (10 years)	94 (10 years)	86.5 (5 years); 86 (10 years)
Pomerantzeff *et al.* (15)	0.9	86.4 (20 years)	30.4 (20 years)	99.7 (thromboembolism-free), 95.6 (endocarditis-free) in 20 years

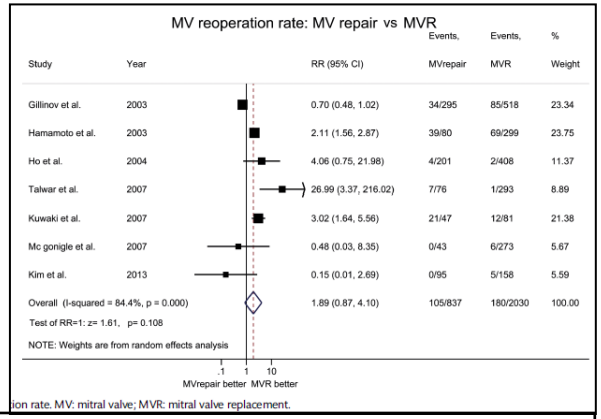
MV, mitral valve.

Fu et al (China) J Thorac Dis 2017;9(11):4366-4375

Outcomes of mitral valve repair compared with replacement in patients undergoing concomitant aortic valve surgery: a meta-analysis of observational studies







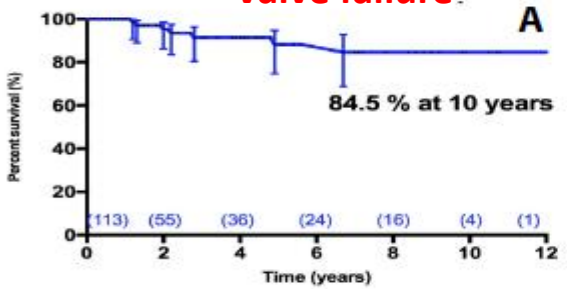
Conclusion

In patients undergoing concomitant mitral and AV surgery, MV repair is associated with improved early and late survival without any increased risk for mitral valve reoperation.

However, in patients with rheumatic heart disease MV repair does not impart any survival advantage while the risk for MV reoperation remains significantly higher.

MV replacement is preferable to repair in RHD patients who undergo dual valve surgery pending more data from randomized controlled trials.

Valve failure



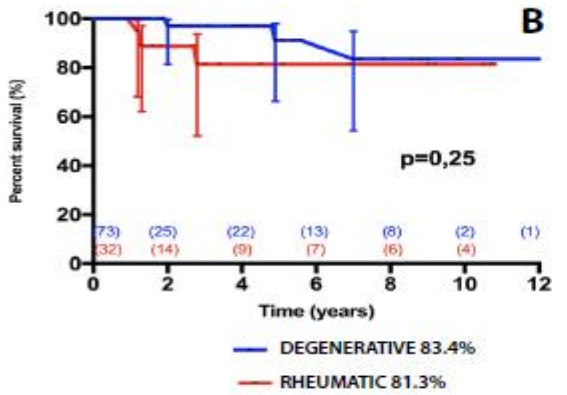
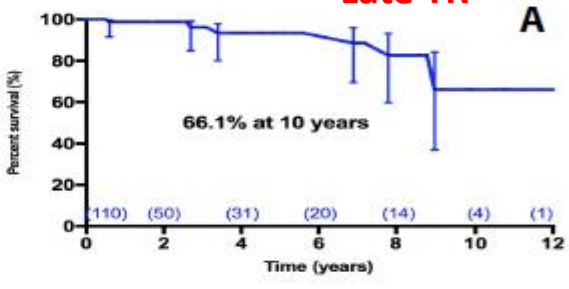


Fig. 4 – *A) Freedom from valve failure after mitral valve repair. Failure was defined as any mitral regurgitation (MR) ≥ moderate or reoperation due to any cause. B) Freedom from valve failure stratified according to patients presenting with degenerative or rheumatic disease.*

MR=mitral regurgitation

Late TR



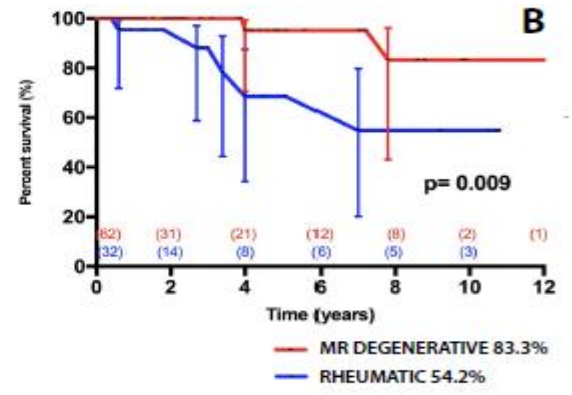


Fig. 5 – *A) Freedom from late development of moderate or severe tricuspid regurgitation (TR) after mitral valve repair. B) Freedom from late development of moderate or severe tricuspid regurgitation (TR) after mitral valve repair stratified according to patients presenting degenerative or rheumatic disease.*

MR=mitral regurgitation

ESC/EACTS Guidelines Valvular Heart Disease

In severe primary tricuspid regurgitation, surgery is not only recommended in symptomatic patients but should also be considered in asymptomatic patients when progressive RV dilatation or decline of RV function is observed.

In secondary tricuspid regurgitation repair provides reverse remodeling of the RV and improvement of functional status even in the absence of substantial tricuspid regurgitation when annulus dilatation is present. It should therefore be performed liberally.

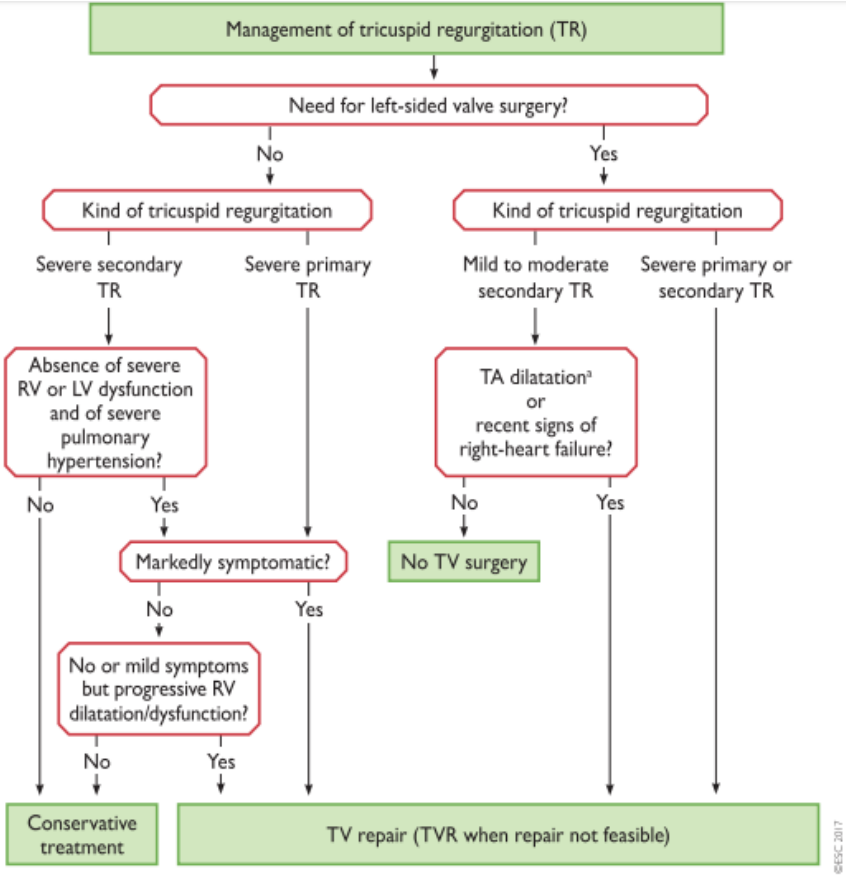


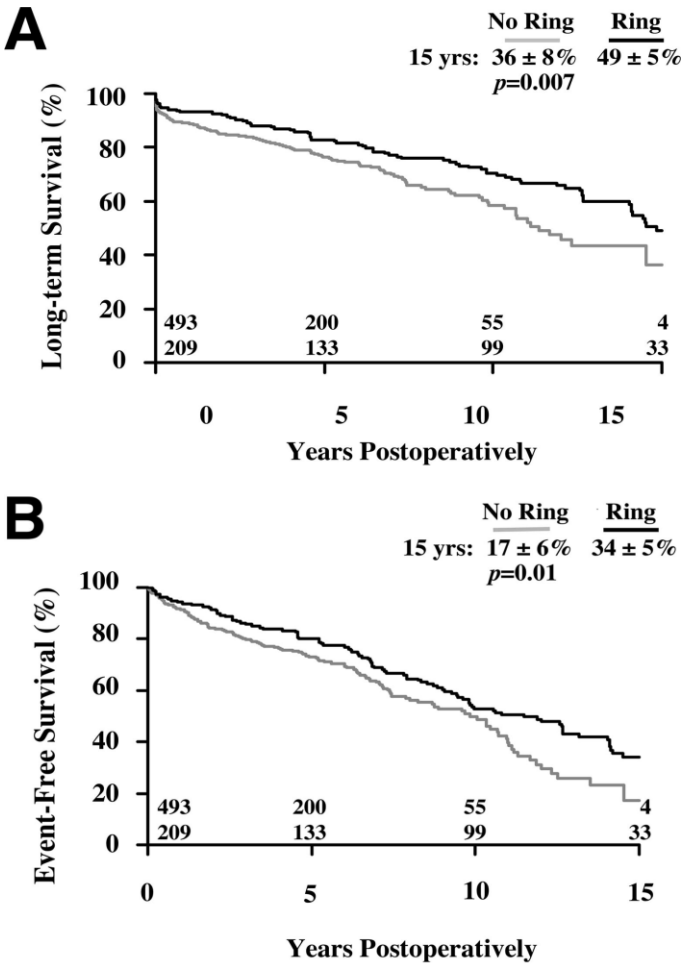
Figure 6: Indications for surgery in tricuspid regurgitation. LV: left ventricular; RV: right ventricular; TA: tricuspid annulus; TR: tricuspid regurgitation; TV: tricuspid valve; TVR: tricuspid valve replacement.
[a]TA ≥ 40 mm or > 21 mm/m^2.

European Journal of Cardio-Thoracic Surgery 52 (2017) 616–664

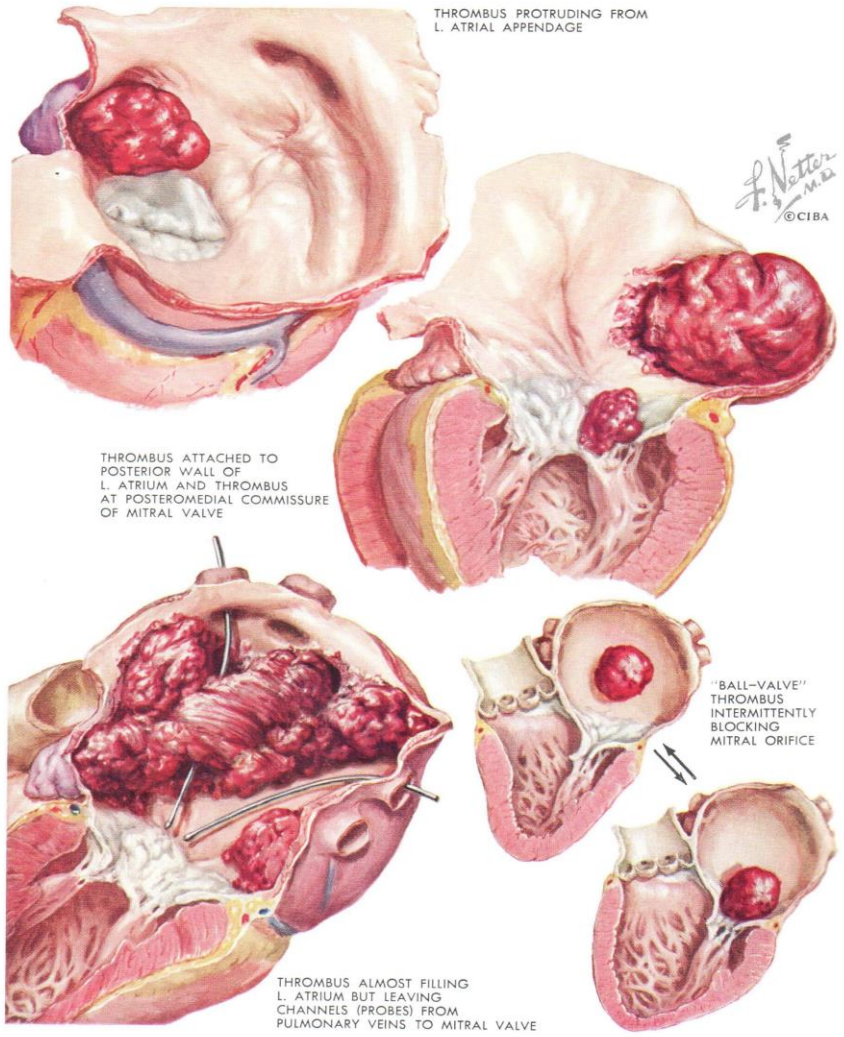
Tricuspid Valve Repair With an Annuloplasty Ring Results in Improved Long-Term Outcomes

Conclusions

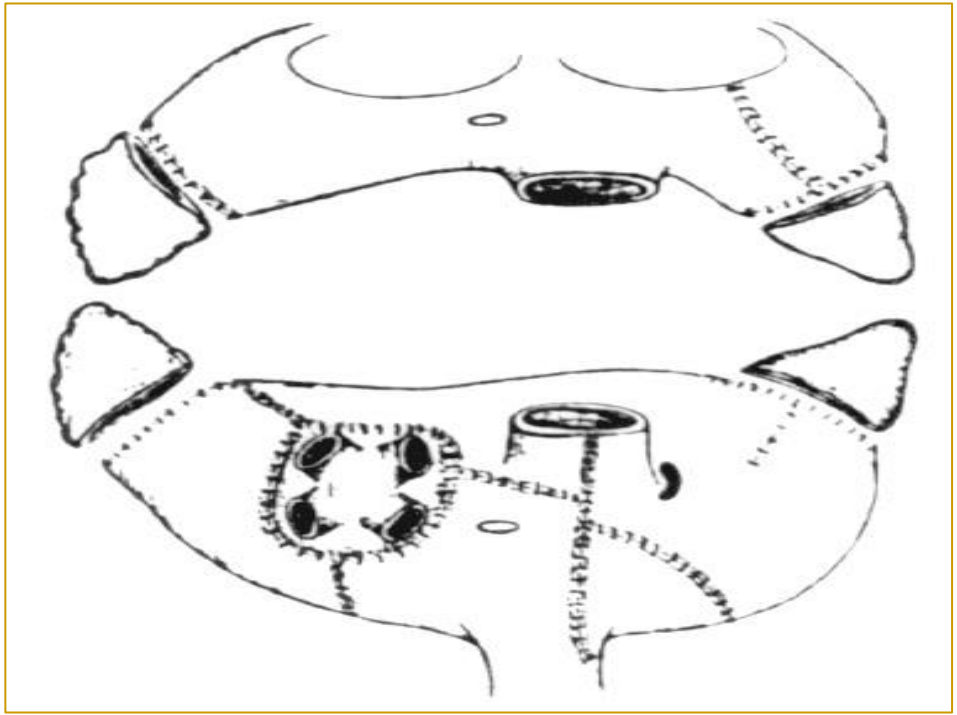
Placement of an annuloplasty ring during tricuspid valve repair is associated with a decreased recurrence of TR, and with improved long-term survival and event-free survival. An annuloplasty ring should therefore be used more routinely in tricuspid valve surgery.



Tang GHL et al (Toronto).Circulation. 2006;114[suppl I]:I-577–I-581


THROMBUS PROTRUDING FROM
L. ATRIAL APPENDAGE
F. Netter M.D.
©CIBA
THROMBUS ATTACHED TO
POSTERIOR WALL OF
L. ATRIUM AND THROMBUS
AT POSTEROMEDIAL COMMISSURE
OF MITRAL VALVE
"BALL-VALVE"
THROMBUS
INTERMITTENTLY
BLOCKING
MITRAL ORIFICE
THROMBUS ALMOST FILLING
L. ATRIUM BUT LEAVING
CHANNELS (PROBES) FROM
PULMONARY VEINS TO MITRAL VALVE

Cox: Maze Procedure for Atrial Fibrillation



Ann Thorac Surg 1993;55:578-80

The Cox maze III procedure for atrial fibrillation: Long-term efficacy in patients undergoing lone versus concomitant procedures

TABLE 2. Patient demographics

	Lone Maze procedure	Concomitant maze procedure	*P* value
Age (y)	51.3 ± 10.5	58.8 ± 9.9	<.001
Sex (M:F)	90:22	53:33	.003
PAF:PTAF	72:40	45:41	.08
Pump time (min)	162 ± 35	201 ± 42	<.001
Crossclamp time (min)	93 ± 34	122 ± 37	<.001
Mortality	2/112, 1.8%	1/86, 1.2%	.99
Median ICU stay (d)	2	3	.007
Median LOS (d)	9	12	.01

PAF, Paroxysmal atrial fibrillation; *PTAF,* persistent atrial fibrillation; *LOS* length of stay.

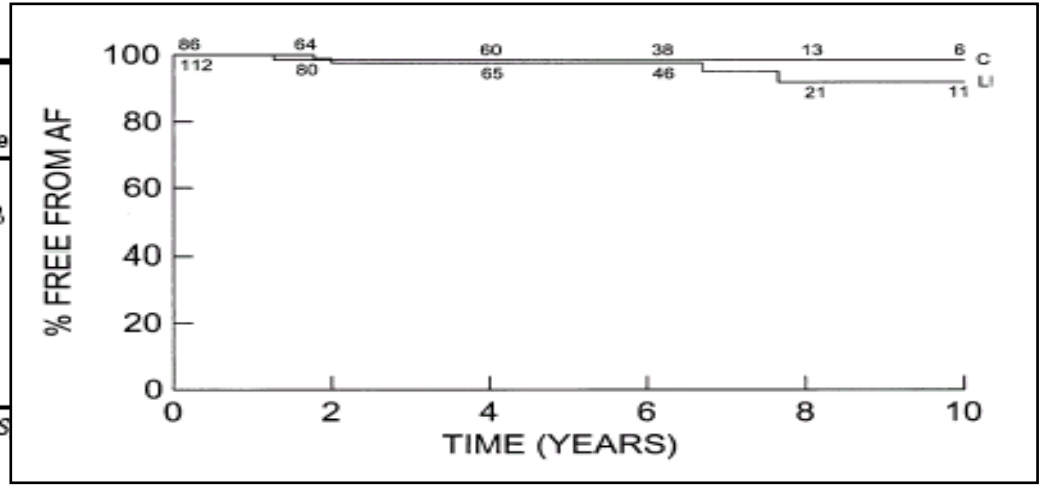
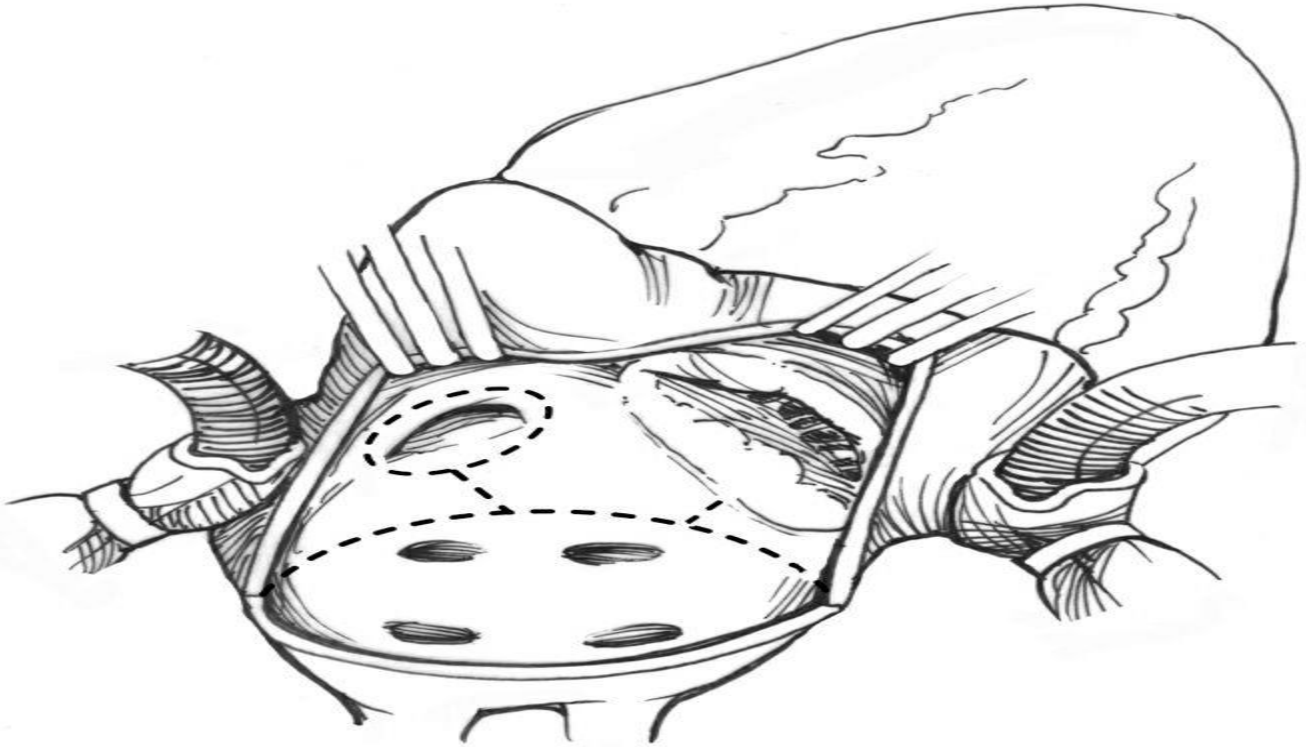
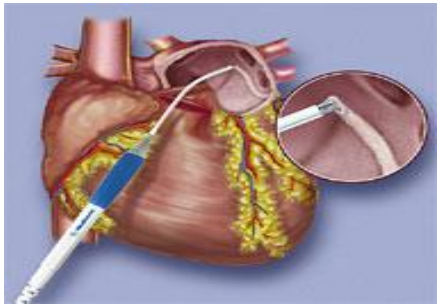


Figure 1. Kaplan-Meier survival analysis of freedom from recurrent AF. The numbers on each line indicate the number of patients at risk. There was no difference in the long-term estimate of freedom from AF between the lone maze group *(L)* and the concomitant group (*C*; *P* = .64).

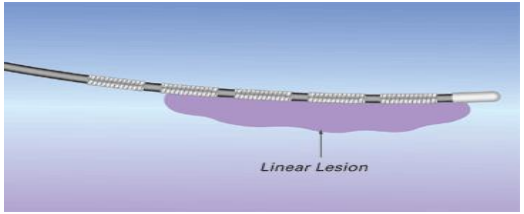
J Thorac Cardiovasc Surg 2003;126:1822-8

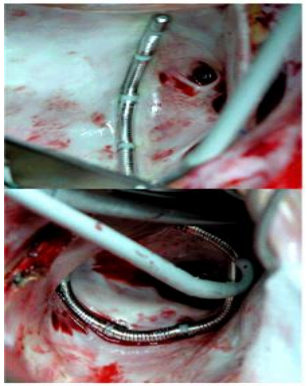
Mini-Maze Procedure

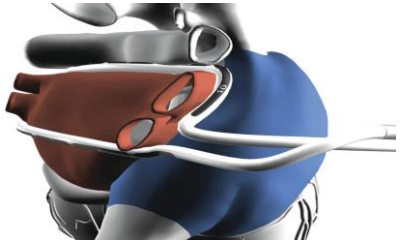





COBRA Adhere™
COBRA Adhere XL™


Linear Lesion

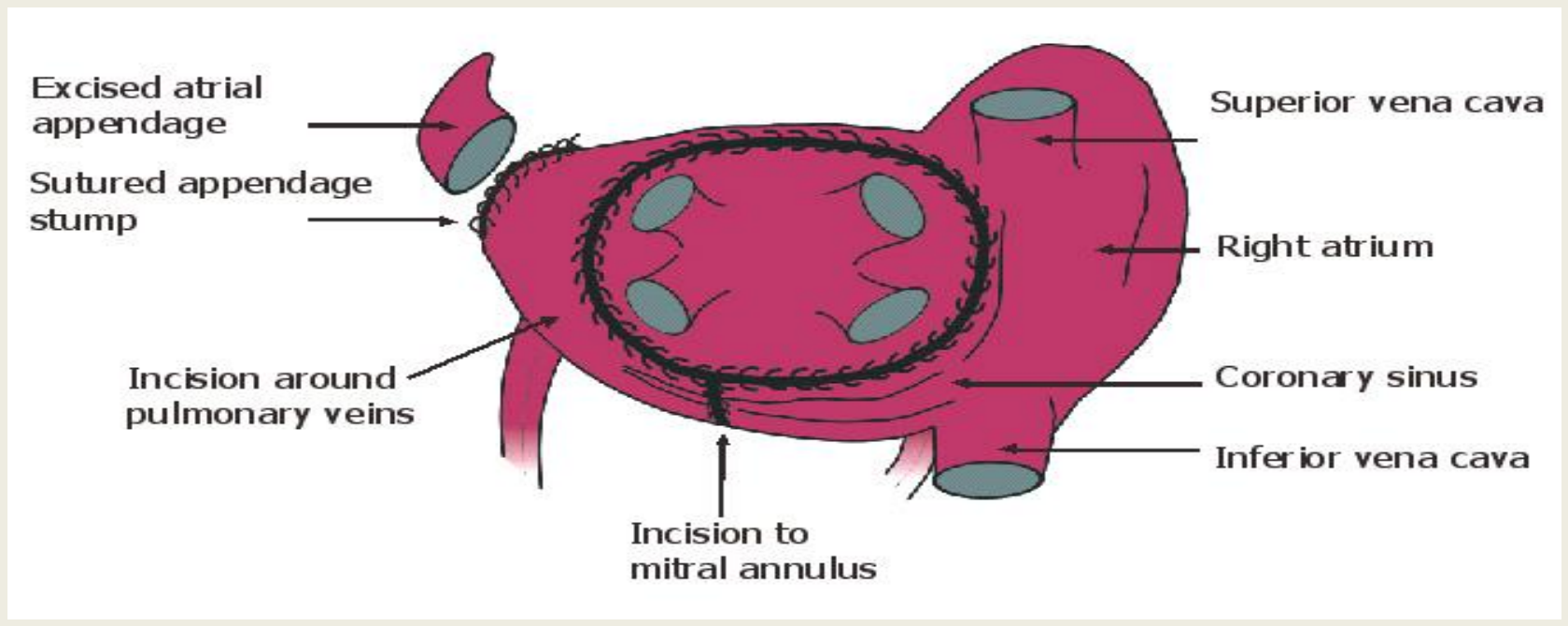





AtriCure


One System for Complete Lesion Sets
COBRA Surgical Probe
COBRA Bipolar Clamp
COBRA Electrosurgical Unit

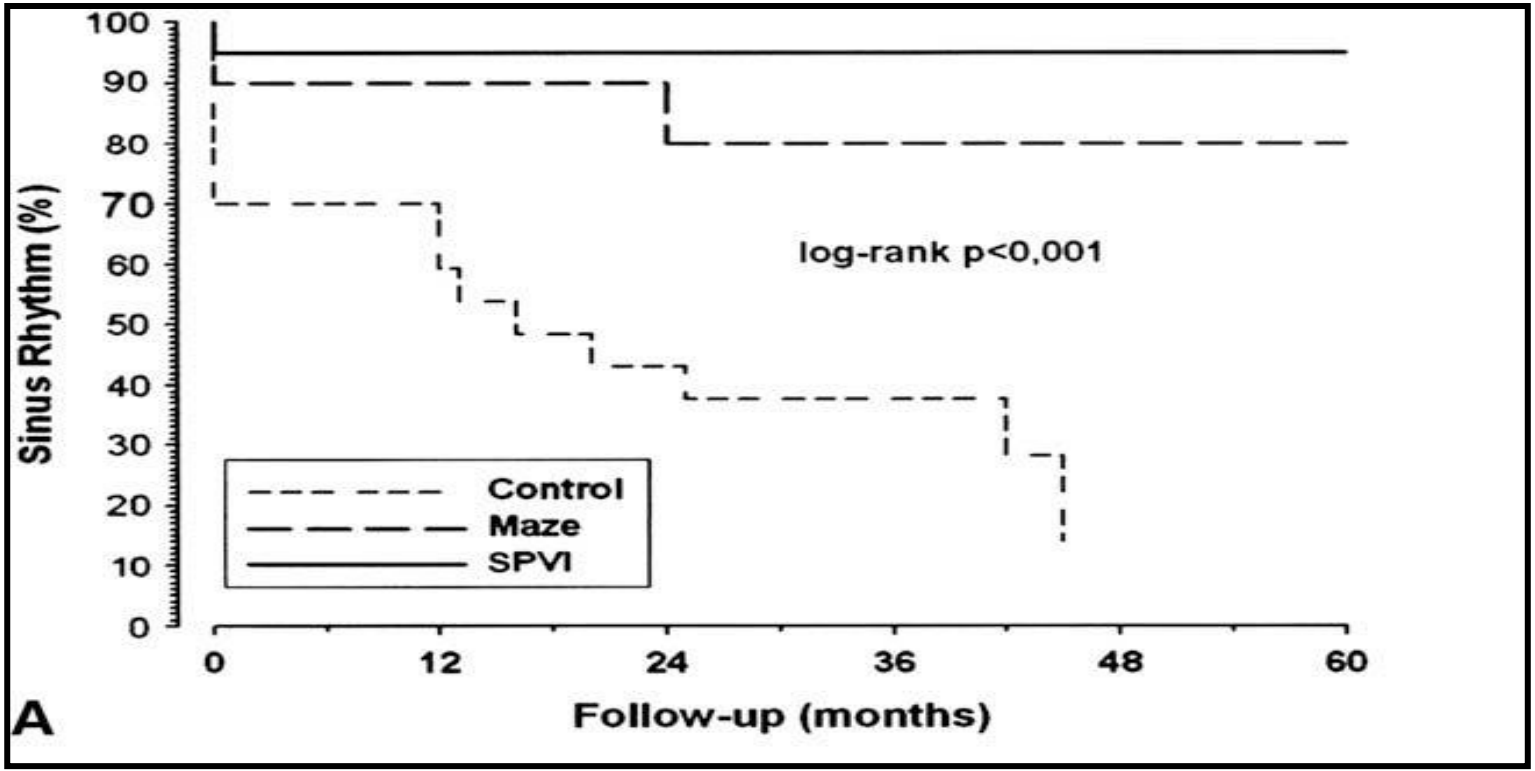
Cut&Sew Pulmonary Veins Isolation



KALIL, R, et al.

Simple surgical isolation of pulmonary veins for secondary chronic atrial fibrillation treatment in mitral valve disease.

Ann Thorac Surg 2002;73:1169-1173.



Randomized study of surgical isolation of the pulmonary veins for correction of permanent atrial fibrillation associated with mitral valve disease

Alvaro Albrecht, MD, Renato A. K. Kalil, MD, PhD, Luciana Schuch, MD, Roge´rio Abraha˜o, MD, Joao Ricardo M. Sant'Anna, MD, PhD, Gustavo Lima, MD, PhD, FACC, and Ivo A. Nesralla, MD, PhD

J Thorac Cardiovasc Surg. 2009 Aug;138(2):454-9.

Long-term outcomes after surgery for rheumatic mitral valve disease:
valve repair versus mechanical valve replacement

n=540
Repair =122
Replacement =418

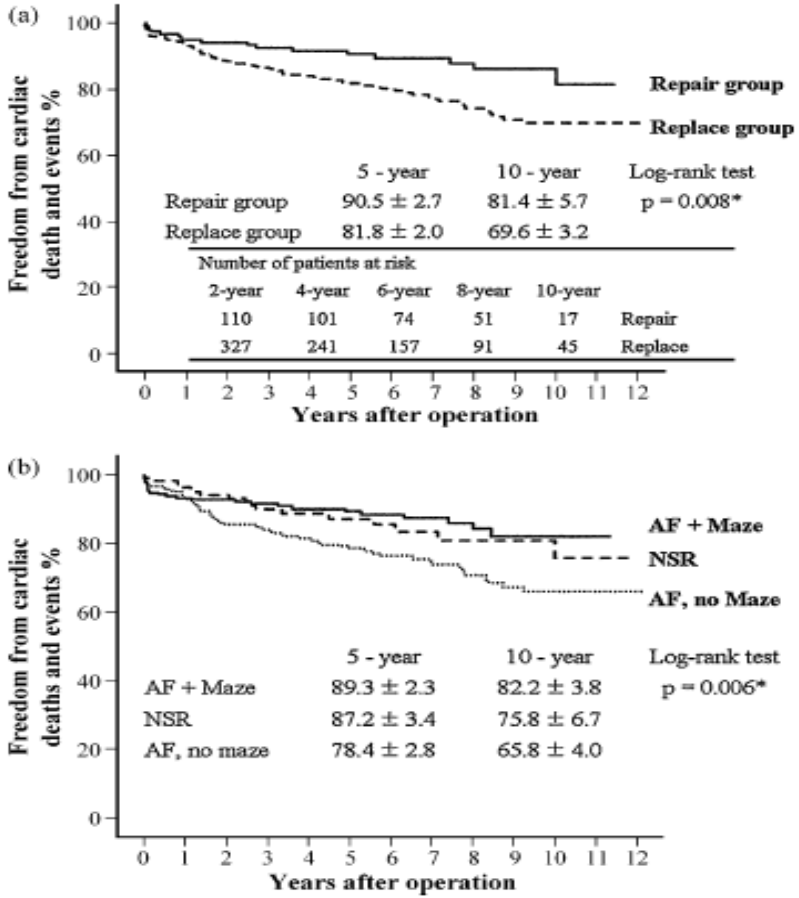


Fig. 2. Unadjusted Kaplan–Meier curves for freedom from cardiac death and major events. (a) Outcomes following MV repair versus replacement. (b) Outcomes according to the presence of atrial fibrillation and undergoing a maze procedure.

Maze procedure for AF

79/122 repairs= 88%
116/418 replacements 33%

J.B. Kim et al. (Seoul)
European Journal of Cardio-thoracic Surgery 37 (2010) 1039—1046

Conclusions

- *Operable rheumatic valve disease is still present in most regions with changing epidemiologic patterns due to prevention & migration*
- *Mitral valve is by far the most affected*
- *Prevalence has changed from MS in adult patients to MR in youngs*
- *Repair is preferable to replacement in favourable anatomy*
- *With simultaneous aortic replacement, probably mitral replacement better*
- *Secondary tricuspid regurgitation should be corrected early*
- *Atrial fibrillation treated simultaneously improves outcomes*

kalil@cardiol.br

Discussion Slides

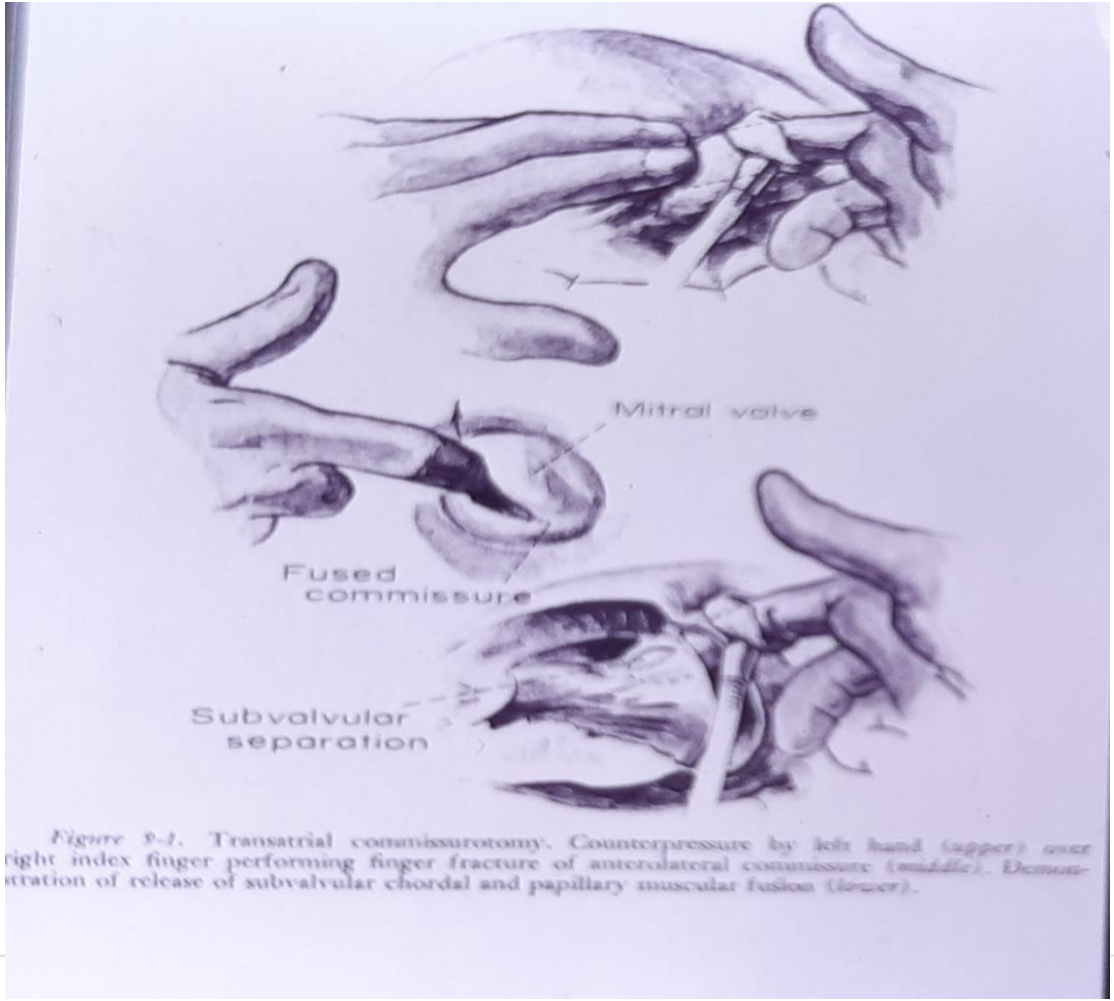


Figure 9-1. Transatrial commissurotomy. Counterpressure by left hand (*upper*) over right index finger performing finger fracture of anterolateral commissure (*middle*). Demonstration of release of subvalvular chordal and papillary muscular fusion (*lower*).

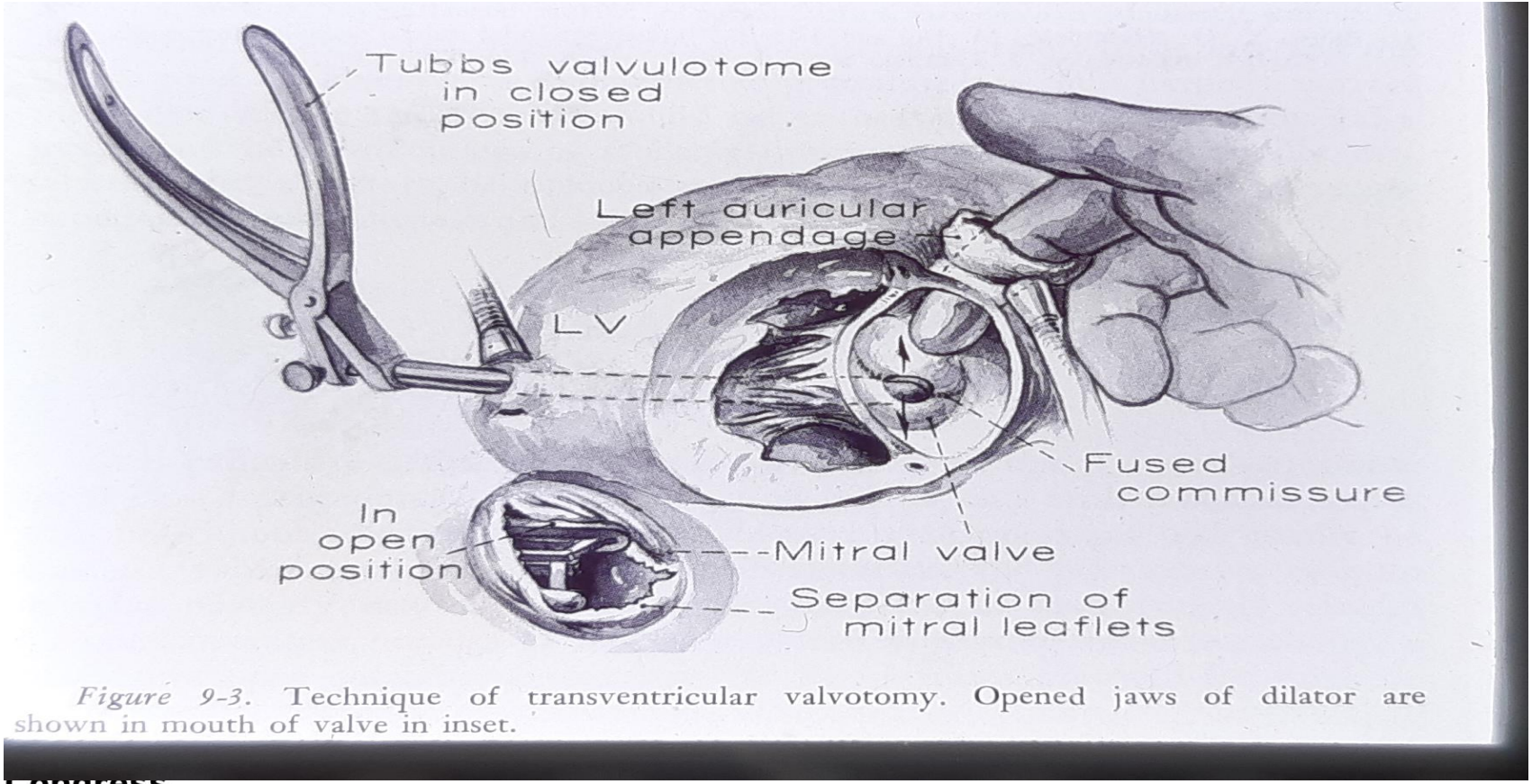


Figure 9-3. Technique of transventricular valvotomy. Opened jaws of dilator are shown in mouth of valve in inset.

TABLE 32-1 Traditional Risk Factors for Thromboembolism
Atrial fibrillation
Increased left ventricular cavity size
Regional wall motion abnormality
Depressed ejection fraction
Hypercoagulability
Increased age

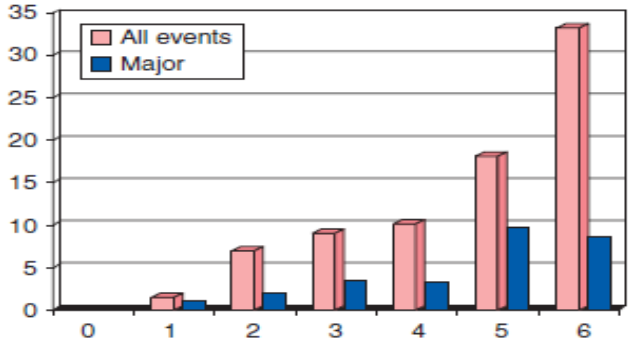


FIGURE 32-17 The correlation of number of risk factors to thromboembolic events. (*Reproduced with permission from*

approximately 40% of the bleeding episodes occurred in the first year after surgery. It is thus important during this initial postoperative time frame when the patient's anticoagulant levels are more likely to fluctuate, that INR be measured more frequently.[32] In the early postoperative period, INR can occasionally jump to

TABLE 32-2 Nontraditional Risk Factors for Thromboembolism
Cancer
Systemic infection
Diabetes
Prior event
IgA against *Chlamydia pneumoniae* (CP)
Eosinophilia
Hypertension

Reproduced with permission from Butchart EG, Ionescu A, Payne N, et al: A new scoring system to determine thromboembolic risk after heart valve replacement. Circulation 2003; 108(Suppl II):II-68.

TABLE 32-3 Target INR Recommendations
Normal ejection fraction and cavity size, NSR: INR 1.82.0, ASA
Any single factor: INR 2.0–2.5, ASA
Multiple factors or atrial fibrillation: INR 2.5–3.5
? Antiplatelet only

ASA = aspirin; INR = international normalized ratio; NSR = normal sinus rhythm.

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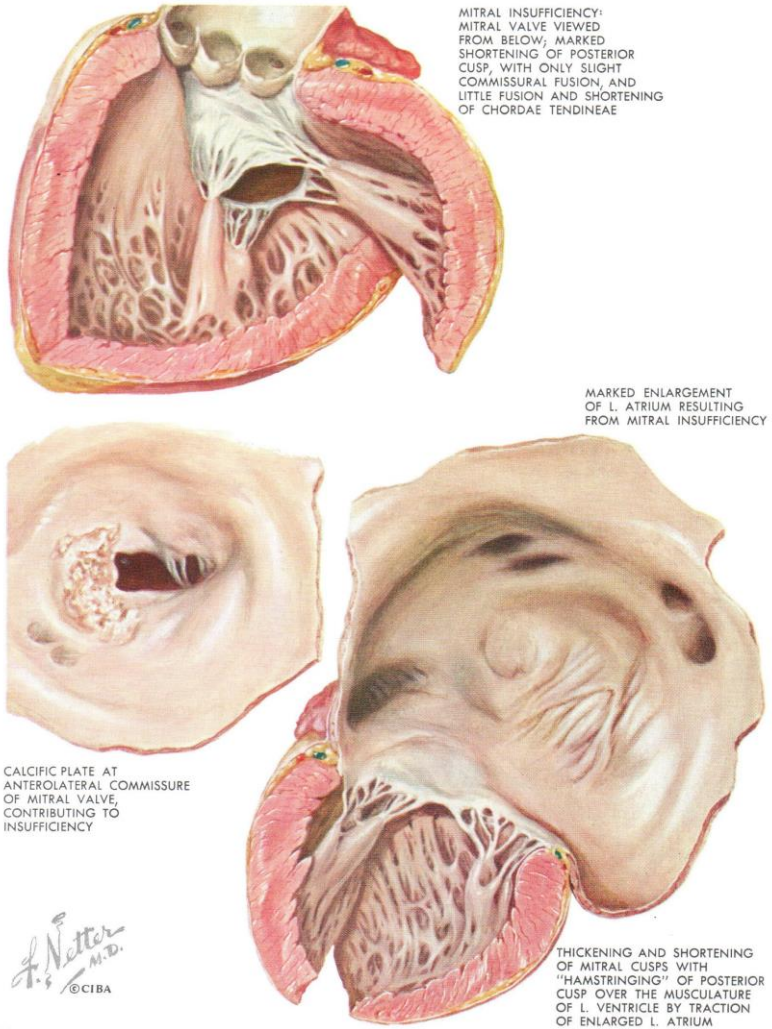
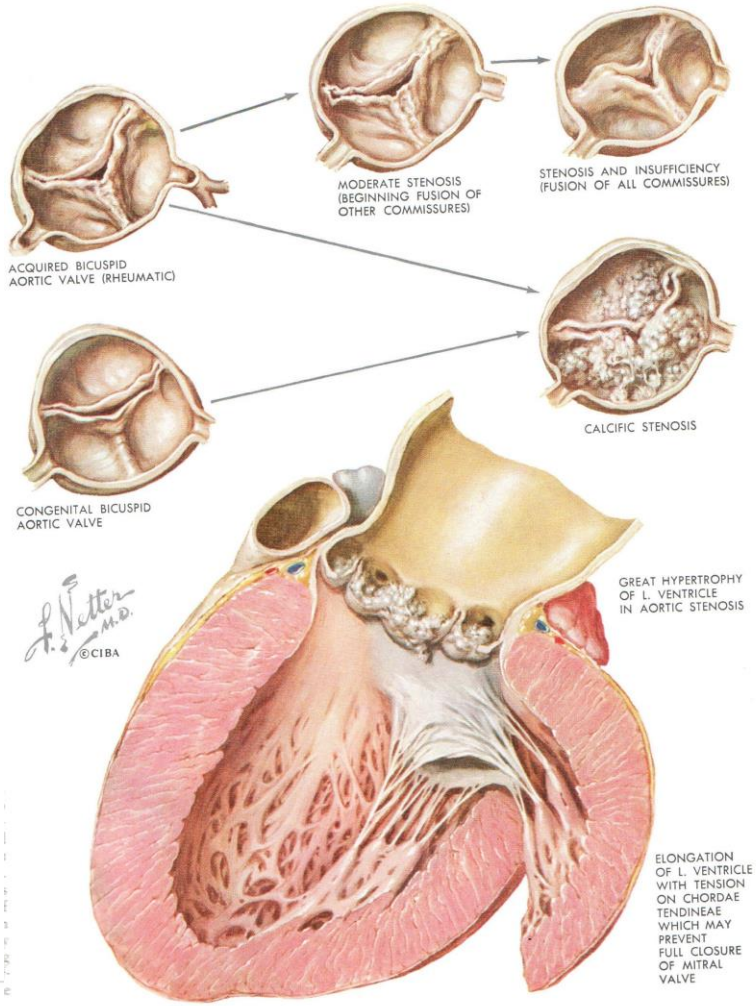

MITRAL INSUFFICIENCY:
MITRAL VALVE VIEWED
FROM BELOW; MARKED
SHORTENING OF POSTERIOR
CUSP, WITH ONLY SLIGHT
COMMISSURAL FUSION, AND
LITTLE FUSION AND SHORTENING
OF CHORDAE TENDINEAE
MARKED ENLARGEMENT
OF L. ATRIUM RESULTING
FROM MITRAL INSUFFICIENCY
CALCIFIC PLATE AT
ANTEROLATERAL COMMISSURE
OF MITRAL VALVE,
CONTRIBUTING TO
INSUFFICIENCY
F. Netter M.D.
©CIBA
THICKENING AND SHORTENING
OF MITRAL CUSPS WITH
"HAMSTRINGING" OF POSTERIOR
CUSP OVER THE MUSCULATURE
OF L. VENTRICLE BY TRACTION
OF ENLARGED L. ATRIUM


ACQUIRED BICUSPID
AORTIC VALVE (RHEUMATIC)
MODERATE STENOSIS
(BEGINNING FUSION OF
OTHER COMMISSURES)
STENOSIS AND INSUFFICIENCY
(FUSION OF ALL COMMISSURES)
CALCIFIC STENOSIS
CONGENITAL BICUSPID
AORTIC VALVE
F. Netter M.D.
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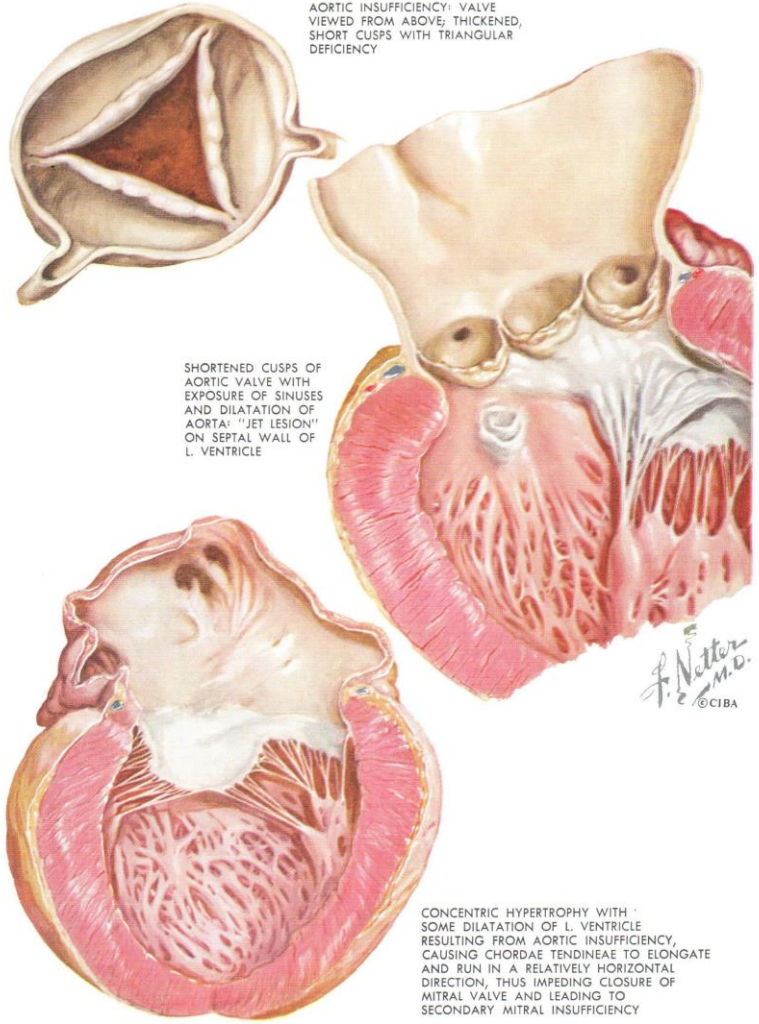
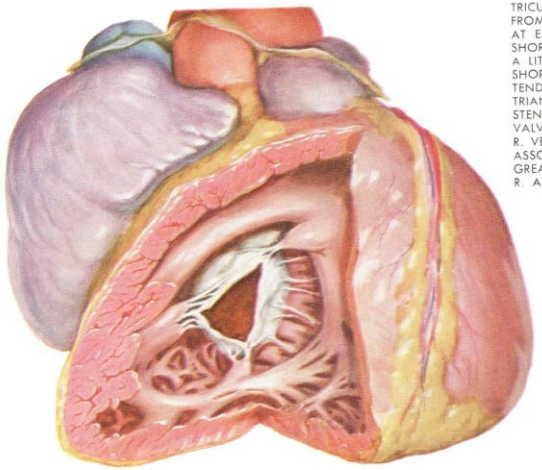
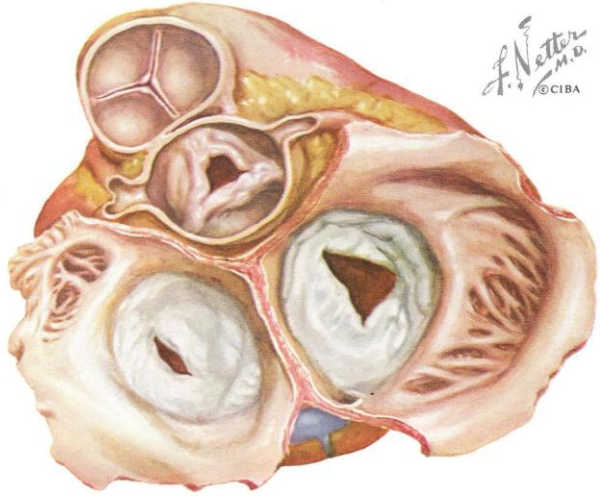
GREAT HYPERTROPHY
OF L. VENTRICLE
IN AORTIC STENOSIS
ELONGATION
OF L. VENTRICLE
WITH TENSION
ON CHORDAE
TENDINEAE
WHICH MAY
PREVENT
FULL CLOSURE
OF MITRAL
VALVE


AORTIC INSUFFICIENCY: VALVE VIEWED FROM ABOVE; THICKENED, SHORT CUSPS WITH TRIANGULAR DEFICIENCY
SHORTENED CUSPS OF AORTIC VALVE WITH EXPOSURE OF SINUSES AND DILATATION OF AORTA; "JET LESION" ON SEPTAL WALL OF L. VENTRICLE
F. Netter M.D.
©CIBA
CONCENTRIC HYPERTROPHY WITH SOME DILATATION OF L. VENTRICLE RESULTING FROM AORTIC INSUFFICIENCY, CAUSING CHORDAE TENDINEAE TO ELONGATE AND RUN IN A RELATIVELY HORIZONTAL DIRECTION, THUS IMPEDING CLOSURE OF MITRAL VALVE AND LEADING TO SECONDARY MITRAL INSUFFICIENCY



TRICUSPID VALVE VIEWED FROM BELOW: SOME FUSION AT EACH COMMISSURE, SHORTENING OF CUSPS, AND A LITTLE THICKENING AND SHORTENING OF CHORDAE TENDINEAE, LEAVING A TRIANGULAR ORIFICE OF A STENOTIC, INSUFFICIENT VALVE; HYPERTROPHY OF R. VENTRICLE DUE TO ASSOCIATED MITRAL DISEASE; GREAT ENLARGEMENT OF R. ATRIUM



MULTIVALVULAR DISEASE VIEWED FROM ABOVE: AORTIC VALVE STENOTIC AND INCOMPETENT FROM FUSION OF ALL THREE COMMISSURES; MITRAL VALVE HAS ONLY A "SLITLIKE" STENOTIC ORIFICE, TRICUSPID VALVE A TRIANGULAR, FIXED, STENOTIC, AND INCOMPETENT ORIFICE; PULMONARY VALVE NORMAL

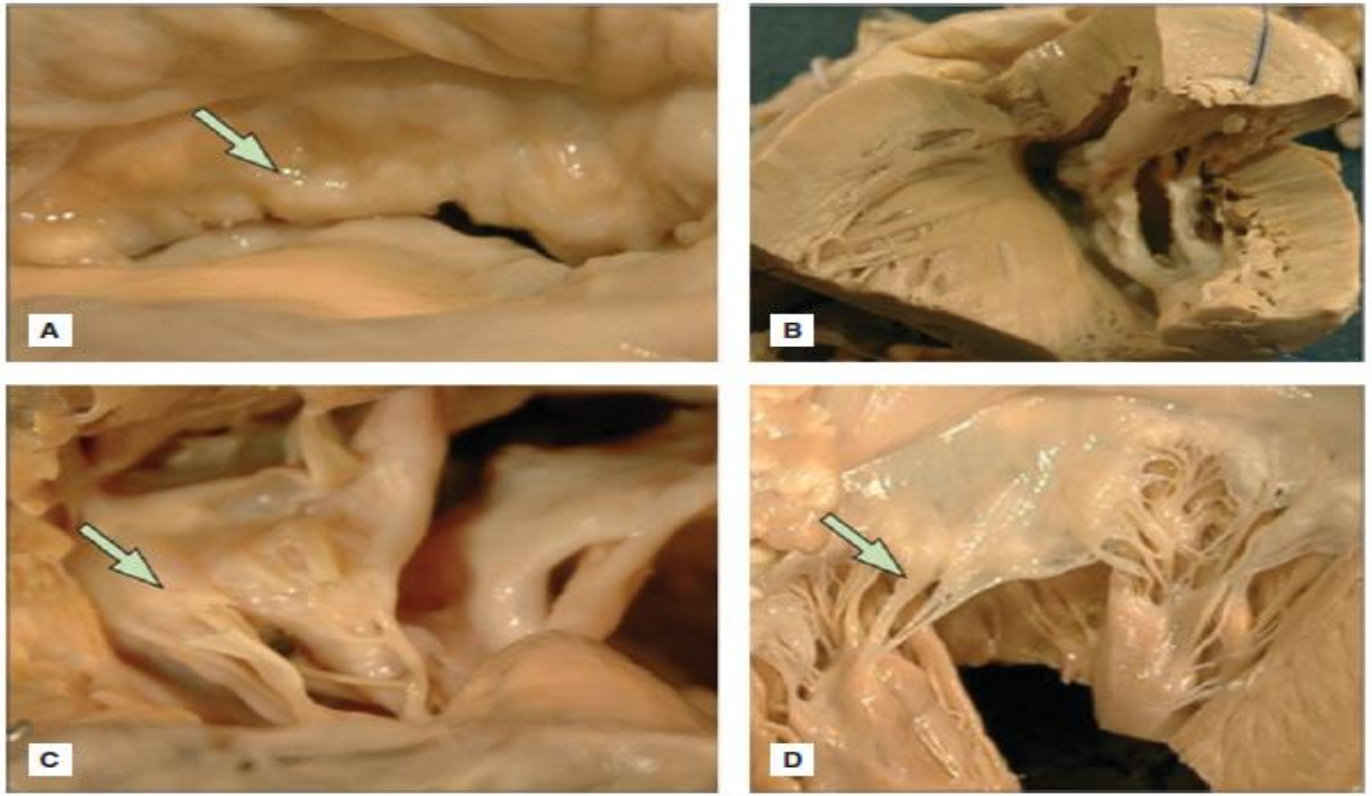


FIGURE 40-6 Pathology of the mitral valve in mitral stenosis. Thickened, rigid nodular appearance of the mitral valve leaflets viewed from the atria (**A**) and ventricle (**B**). Calcium is present in the commissure and the commissures are fused, resulting in a valve shaped like a fish mouth. Subvalvular apparatus is thick, fused, and shortened (**B, C**). Healthy mitral valve leaflets (**D**). (*Reproduced with permission from Chandrashekhar Y, Westaby S, Narula J. Mitral stenosis. Lancet 2009; 374:1271.*)

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Rheumatic Valve Lesions

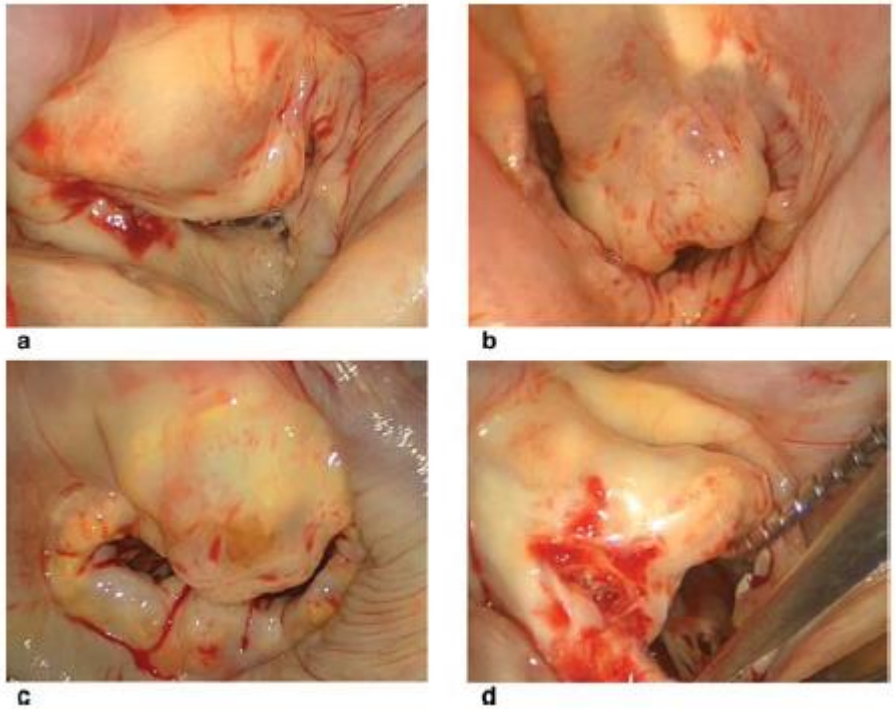
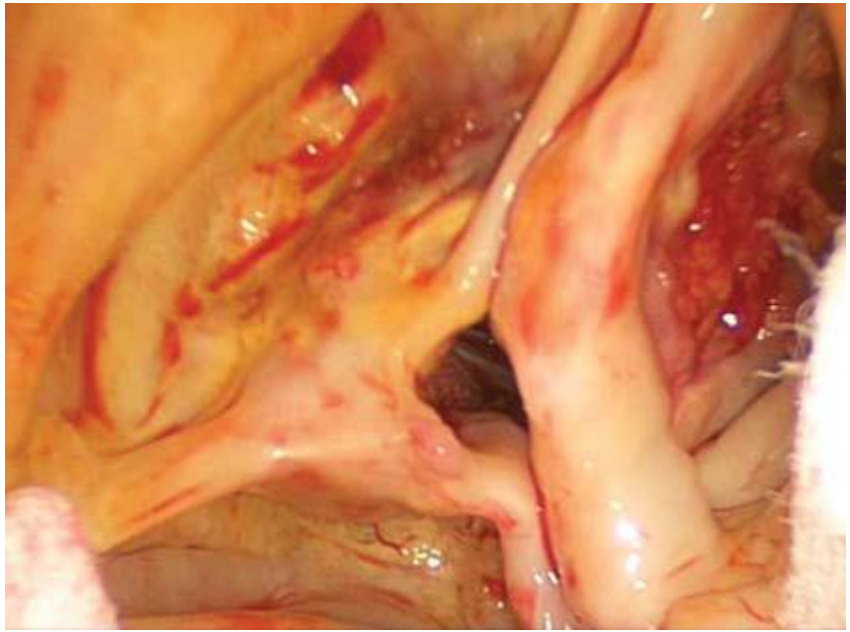


FIGURE 25-2



From:
Carpentier's Reconstrutive Valve Surgery
Carpentier, Adams, Filsoufi (editors)
Saunders 2010

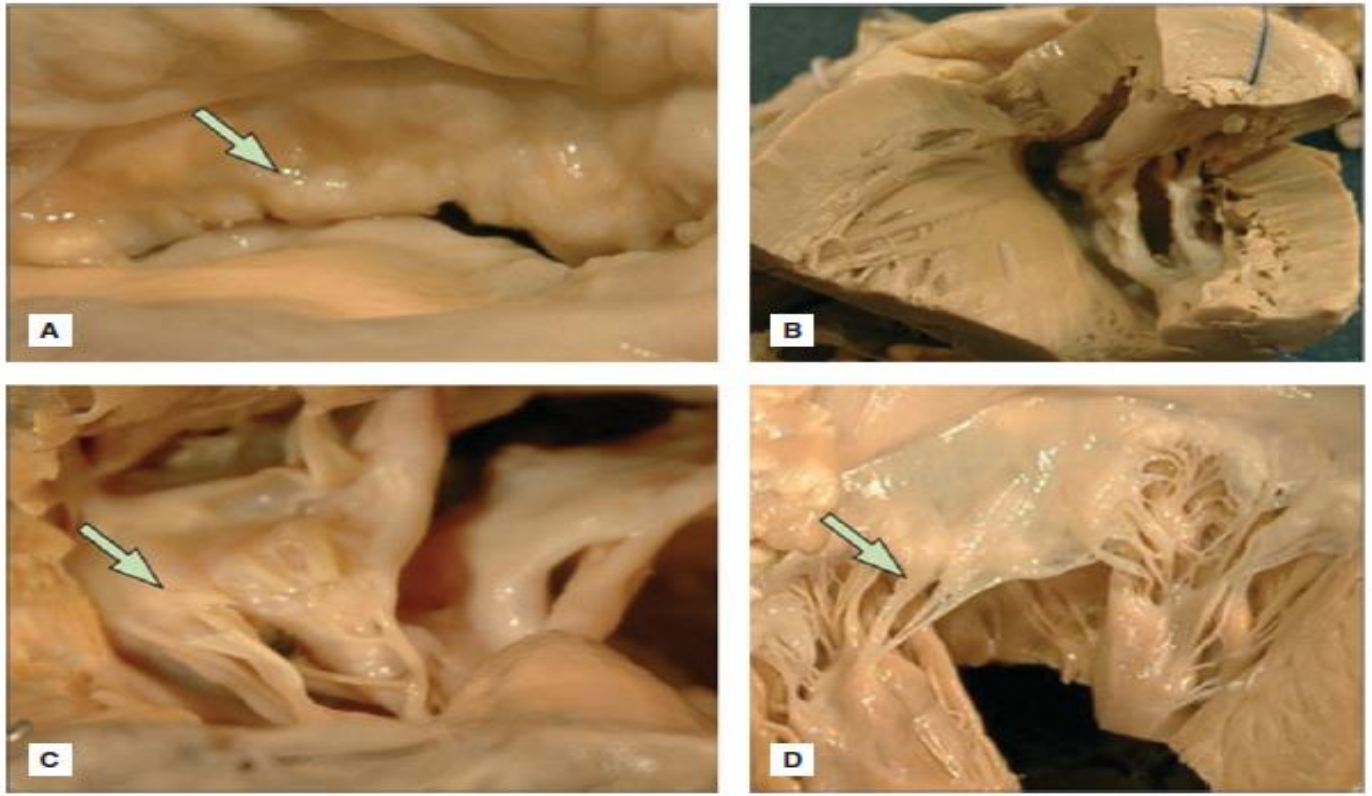


FIGURE 40-6 Pathology of the mitral valve in mitral stenosis. Thickened, rigid nodular appearance of the mitral valve leaflets viewed from the atria (**A**) and ventricle (**B**). Calcium is present in the commissure and the commissures are fused, resulting in a valve shaped like a fish mouth. Subvalvular apparatus is thick, fused, and shortened (**B, C**). Healthy mitral valve leaflets (**D**). (*Reproduced with permission from Chandrashekhar Y, Westaby S, Narula J. Mitral stenosis. Lancet 2009; 374:1271.*)

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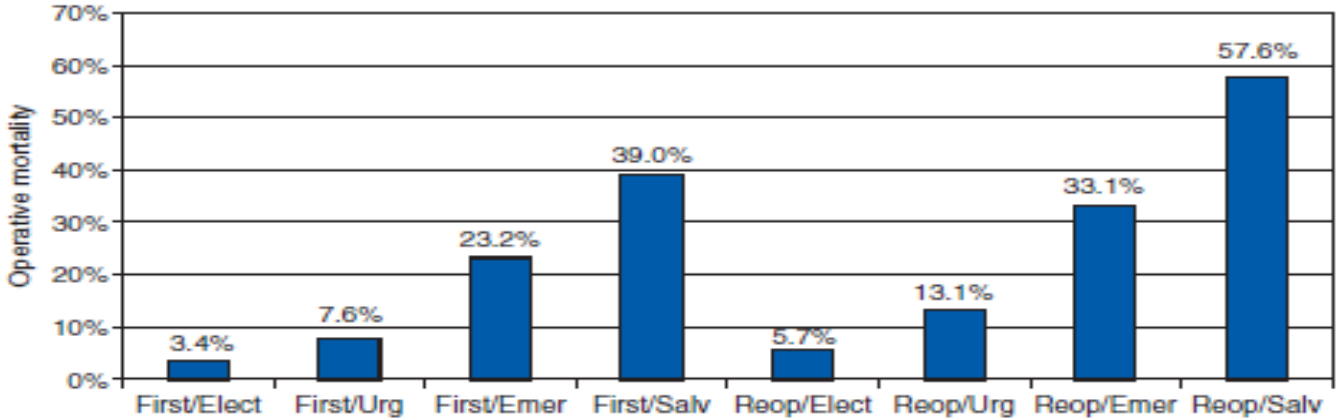

FIGURE 42-9 Operative mortality for elective, urgent, emergency, and salvage procedures for primary operations and reoperations for mitral valvular replacements. (*Data used with permission from Society of Thoracic Surgeons.*)

Rheumatic Disease

Estimation based on *IBGE* Population Census:

- **10.000.000 streptococal pharingoamigdalites/y**
- **30.000 new rheumatic fever cases/y**
- **15.000 heart lesions/y**
- **DALY (disability-adjusted-life-years) index: 55.000 years lost for RF, or 26 years/pt (based in 2000 data)**

Barbosa PJB, Müller RE, Latado AL, Achutti AC, Ramos AIO, Weksler C, et al.
Arq Bras Cardiol.2009;93(3 supl.4):1-18

Rheumatic Disease

Prevalence in some state capital schools:
1-7/1000 children*

Hospital Mortality and Costs**

	Mortality	Med Treatment	Surgical & Interv'l (US$)
2005	6.8%	26 million	47.5 million
2007	7.5%	27.5 million	50 million

*Meira ZM et al. Heart. 2005 Aug; 91 (8): 1019-22
* Meira ZM et al. Arq Bras Cardiol. 1995 Oct; 65 (4): 331-4
**Ministério da Saúde (BR) [Internet]. Sistema de Informações Hospitalares do SUS (SIH/SUS). http://w3.datasus.gov.br/datasus/datasus.php.

ESC/EACTS Guidelines Valvular Heart Disease

Indications for PMC and mitral valve surgery in clinically significant (moderate or severe) mitral stenosis (valve area ≤1.5 cm²)

Recommendations	Class[a]	Level[b]
PMC is indicated in symptomatic patients without unfavourable characteristics[c] for PMC [144, 146, 148].	I	B
PMC is indicated in any symptomatic patients with a contraindication or a high risk for surgery.	I	C
Mitral valve surgery is indicated in symptomatic patients who are not suitable for PMC.	I	C
PMC should be considered as initial treatment in symptomatic patients with suboptimal anatomy but no unfavourable clinical characteristics for PMC.[c]	IIa	C
PMC should be considered in asymptomatic patients without unfavourable clinical and anatomical characteristics[c] for PMC and: • high thromboembolic risk (history of systemic embolism, dense spontaneous contrast in the LA, new-onset or paroxysmal atrial fibrillation), and/or • high risk of haemodynamic decompensation (systolic pulmonary pressure >50 mmHg at rest, need for major non-cardiac surgery, desire for pregnancy).	IIa	C

LA: left atrium; PMC: percutaneous mitral commissurotomy.
[a]Class of recommendation.

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Mitral valve repair with aortic valve replacement in rheumatic heart disease.

n=609, from 1992 to 2001, followed up to 10y

AV replacement + mitral valve repair (n = 201)

+mitral valve replacement (n = 408)

30-day mortality = 1.4% for mitral repair x 0.7% for mitral replacement (p = 0.4)

Survival at 9 y = 96.5 +/- 1.4% after mitral repair x 89.7 +/- 7.8% after replacement (p = 0.73)

Freedom major bleeding/ 9 y = 94.8 +/- 2.4% after repair x 81 +/- 7.2% replacement (p = 0.03)

Results of mitral repair with AV replacement were comparable to those of double valve replacement.

Major bleeding was less frequent after mitral repair with AV replacement.

Therefore, whenever feasible, mitral valve repair should be attempted in patients with rheumatic heart disease who need concomitant aortic valve replacement.

Ho HQ et al. Asian Cardiovasc Thorac Ann 2004 Dec;12(4):341-5.

Echocardiographic prevalence of rheumatic heart disease in Brazilian schoolchildren: Data from the PROVAR study

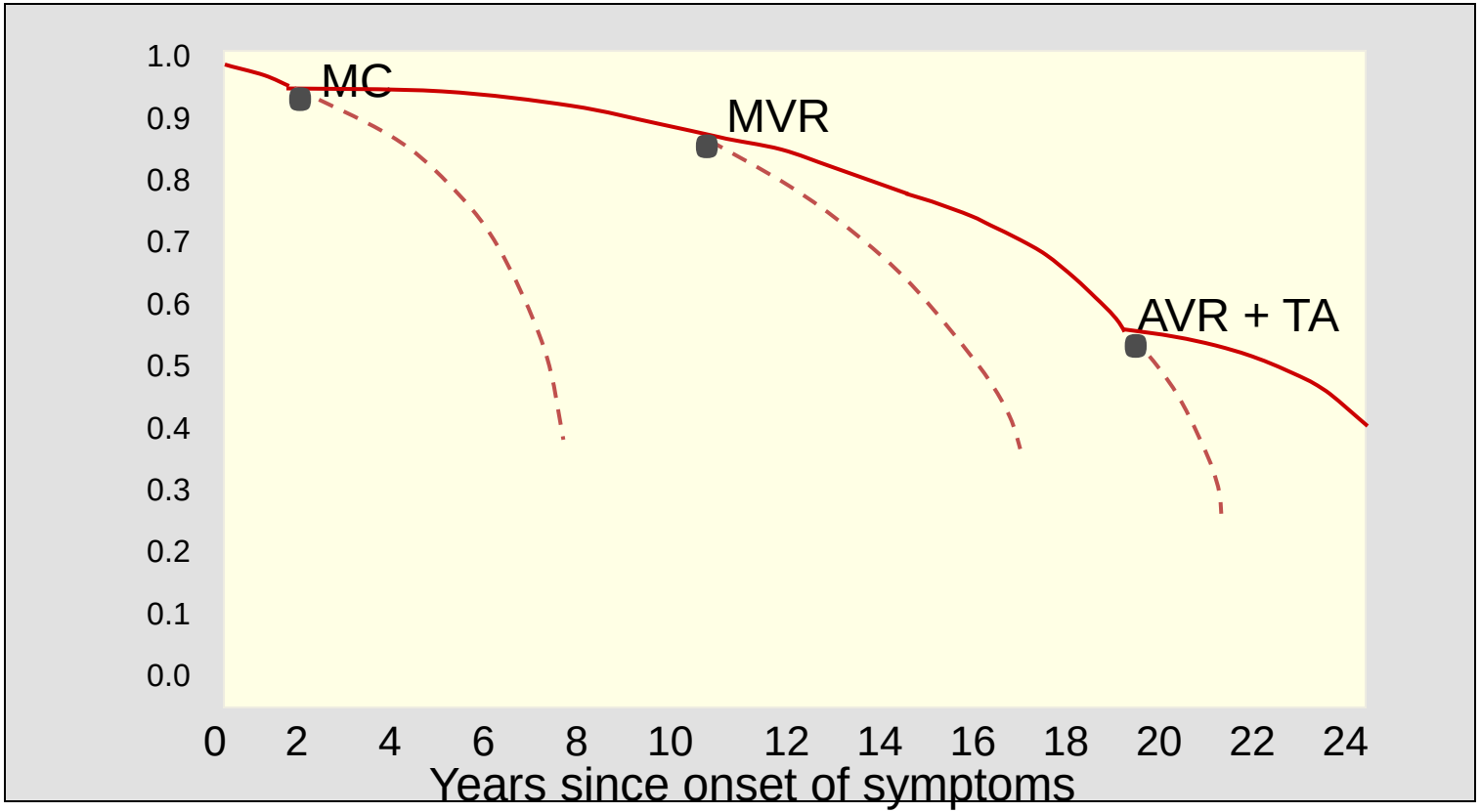
5996 students across 21 schools.
Median age = 11.9 [9.0/15.0] years, 59% females.

RHD prevalence
42/1000 (n = 251): 37/1000 borderline (n = 221) and 5/1000 definite (n = 30).

Mitral regurgitation in 203 (80.9%), Ao regurgitation in 38 (15.1%), and mixed mitral/aortic valve disease in 10 (4.0%) children.

Older children had higher prevalence (50/1000 vs. 28/1000, $p < 0.001$), but no difference was observed between northern (lower resourced) and central areas (34/1000 vs. 44/1000, $p = 0.31$).
Females had higher prevalence (48/1000 vs. 35/1000, $p = 0.016$).

Nascimento BR, International Journal of Cardiology2016;219: 439–445



From Kirklin, J.W., and Barratt-Boyes, B.G.:Cardiac Surgery. New York, John Wiley and Sons, 1986, p.328.

A meta-analysis of late outcomes of mitral valve repair in patients with rheumatic heart disease

Figure 1 Flow chart of the selection process.

Table 1 Study characteristics

Study name	Country	Study period	Total patients	Design	Quality score
Fedakar *et al.* (6)	Turkey	1998–2008	173	Observational	6
Yankah *et al.* (7)	Germany	1986–2009	50	Observational	6
Severino *et al.* (8)	Brazil	1994–2005	104	Observational	7
Kim *et al.* (9)	Korea	1997–2010	193	Observational	7
Yakub *et al.* (10)	Malaysia	1997–2010	627	Observational	7
Waikittipong *et al.* (11)	Thailand	2003–2014	97	Observational	6
Kumar *et al.* (12)	India	1988–2003	898	Observational	7
Kalangos *et al.* (13)	Switzerland	1994–2006	220	Observational	8
El Oumeiri *et al.* (14)	Belgium	1996–2007	78	Observational	7
Pomerantzeff *et al.* (15)	Brazil	1985–2005	330	Observational	6

Fu et al (China) J Thorac Dis 2017;9(11):4366-4375

Outcomes of mitral valve repair compared with replacement in patients undergoing concomitant aortic valve surgery: a meta-analysis of observational studies

Table 1: Study characteristics

Study name	Country	Study period	Design	Aetiology of MV disease	Total patients	RHD (%)	Follow-up (patient-years)
Gillinov *et al.* [14]	USA	1975–1998	Observational	Mixed	813	580 (71.3%)	5163
Hamamoto *et al.* [15]	Japan	1977–2000	Observational	Mixed	379	225 (59.3%)	3313
Ho *et al.* [16]	Vietnam	1992–2001	Observational	Rheumatic	609	609 (100%)	2204
Talwar *et al.* [17]	India	1995–2005	Observational	Rheumatic	369	369 (100%)	1575
Kuwaki *et al.* [18]	Japan	1981–2003	Observational	Rheumatic	128	128 (100%)	1025
Mcgonigle *et al.* [19]	UK	1977–1997	Observational	Mixed	316	242 (76.5%)	2374
Leavitt *et al.* [20]	USA	1989–2007	Observational	Mixed	1057	Unknown	Unknown
Kim *et al.* [21]	Korea	1990–2011	Observational	Mixed	253	115 (45.4%)	1520

Mixed: rheumatic as well as non-rheumatic aetiology; MV: mitral valve; RHD: rheumatic heart disease

Repair: lower early (p=0.003) and late (p=0.001) mortalities,
but more reoperations in RHD patients undergoing MV repair (RR: 5.10, p = 0.005).

Saurav A, Alla VM, Kaushik M, Hunter CC, Mooss AV.. Eur J Cardiothorac Surg 2015;48:347–53.