

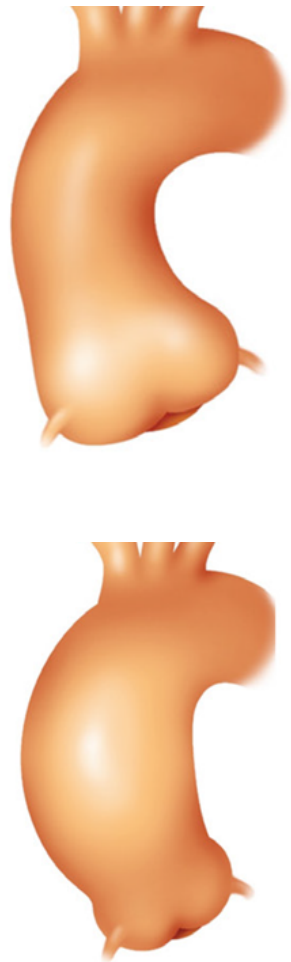


Fifteen-year outcomes after two VSARR techniques: isolated non-coronary sinus exclusion vs Yacoub procedure

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Ascending aortic aneurysm, what do the guidelines say?



B) Aortic root or tubular ascending aortic aneurysm^c (irrespective of the severity of aortic regurgitation)

Valve-sparing aortic root replacement is recommended in young patients with aortic root dilation, if performed in experienced centres and durable results are expected.^{133–136,140}

Ascending aortic surgery is recommended in patients with Marfan syndrome who have aortic root disease with a maximal ascending aortic diameter ≥ 50 mm.

I

B

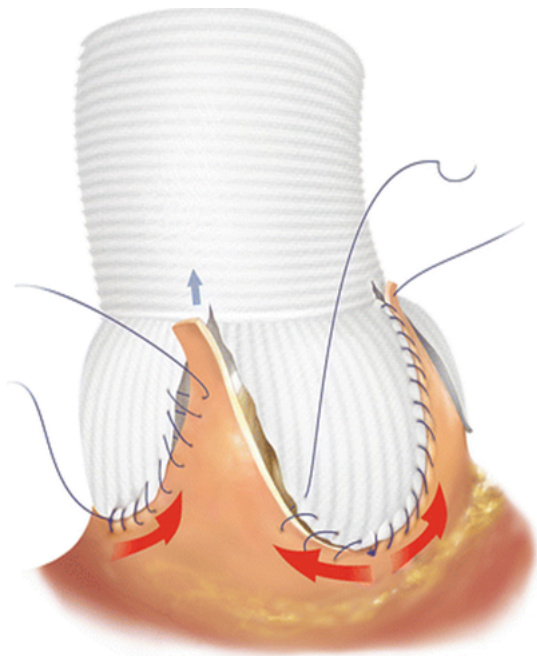
I

C

2021 ESC/EACTS guidelines for the management of valvular heart disease

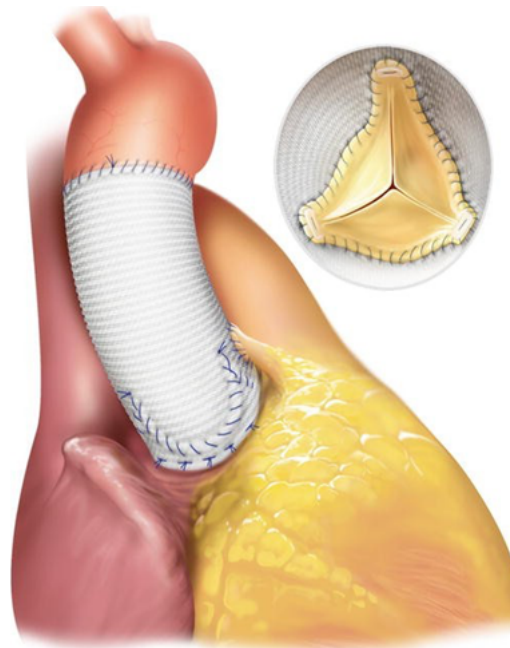
Three mostly used VSARR techniques

Remodeling



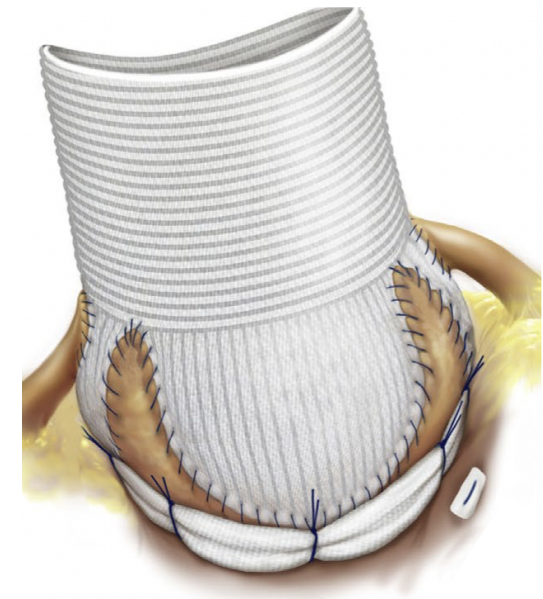
Yacoub 1979

Re-implantation



David 1989

Remodeling+annuloplasty



Lansac 2003

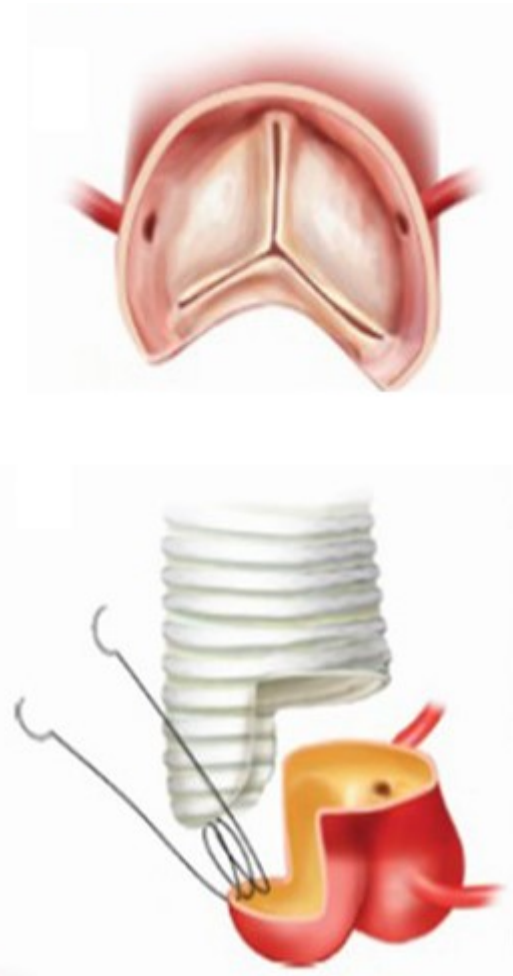
How about isolated non-coronary sinus exclusion for aortic root repair ?

➤ Pros:

- ✓ Avoid extensive aortic root dissection
- ✓ Avoid coronary reimplantation

➤ Cons:

- ✓ Untreated aortic annular dilation
- ✓ Unknown fate of remnant sinuses of Valsalva

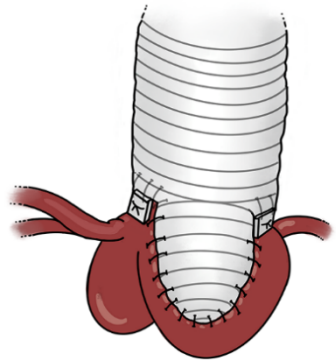


Isolated non-coronary sinus (NCS) exclusion for VSARR in selected cases: rationales in the literature

- ✓ Long-term stability of the sinuses of Valsalva in patients undergoing combined aortic valve and supra-coronary ascending aortic replacement (Milewski RK, et al. J Thorac Cardiovasc Surg. 2017 Aug;154(2):421-32)
- ✓ Aortic root aneurysms are usually asymmetric with a prone involvement of NCS (Agozzino L, et al. Eur J Cardiothorac Surg. 2002 Apr;21(4):675-82)
- ✓ Medial degeneration is more severe in the NCS than right and left coronary sinuses of Valsalva (Peterss S, et al. Ann Thorac Surg. 2017 Mar;103(3):828-33)
- ✓ The right and left coronary sinus of Valsalva are protected from dilation by excess collagen fibers surrounding the ostia of coronary arteries (Elfteriades JA, et al. J Thorac Cardiovasc Surg. 2017 Jul;154(1):72-6)

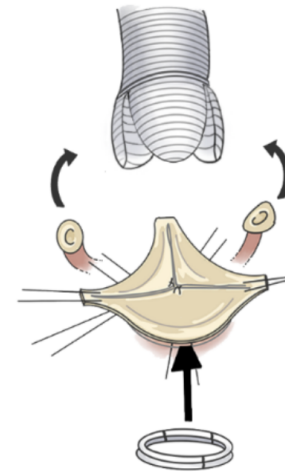
Fifteen-year outcomes following valve-sparing aortic root remodeling or exclusion of the non-coronary sinus: when to preserve the sinuses of Valsalva?

- ✓ A retrospective, single center observational study
- ✓ 85 patients between January 2006 to December 2013 operated by a single surgeon



Isolated NCS exclusion (Group NCS, n=29)

- ✓ Moderate aortic sinus dilation (45-52mm)
- ✓ Moderate aortic annular dilation (≤ 28 mm)
- ✓ Asymmetric root aneurysm in pre-op imaging



Modified Yacoub procedure (Group MY, n=56)

- ✓ Tissue dystrophy involving all sinus of Valsalva

✓ Questions to answer

- would partial aortic root reconstruction compromise the long-term durability of aortic valve repair?
- Would the retained sinuses of Valsalva be an issue of aortic complications and reoperation?

Demographics, pre-operative clinical, echocardiographic and CTA data

	Group NCS		Group MY		P
	n		n		
Age (years)	29	54.0±12.5	56	58.9±12.5	0.09
Weight (kg)	29	87.3±15.0	56	82.4±13.1	0.13
Height (cm)	29	176.1±9.8	56	174.3±8.4	0.39
Sex					
Male	29	22(75.9)	56	38(67.8)	0.66
Female		7(24.1)		18(32.2)	
HTA	29	15(51.7)	56	33(58.9)	0.64
Diabetes Mellitus	29	1(3.4)	56	3(5.4)	0.71
Dyslipidemia	29	9(31.0)	56	16(28.6)	0.74
COPD	29	1(3.4)	56	5(8.9)	0.34
AF before surgery	29	4(13.8)	56	12(21.4)	0.32
NYHA class before surgery					
I		8(27.6)		13(23.2)	0.76
II	29	12(41.4)	56	26(46.4)	
III		9(31.0)		17(30.4)	
Logistic Euroscore (%)	29	8.1±3.3	56	10.3±5.3	0.1

	Group NCS		Group MY		P
	n		n		
Marfan	29	3(10.3)	56	6(10.7)	0.78
Bicuspid aortic valve	29	12(41.4)	56	7(12.5)	0.002
Pre-op LVDd (mm)	29	59.0±9.6	53	58.6±8.5	0.84
Pre-op LVEF (%)	29	53.4±7.2	56	58.9±6.7	0.001
Pre-op aortic annulus (mm)	28	26.0±2.0	52	25.8±2.2	0.61
Pre-op sinuses of Valsalva (mm)	29	47.3±4.7	56	51.5±4.9	0.01
Pre-op ascending aorta (mm)	27	48.6±7.9	54	51.4±4.9	0.15
AR before surgery					
None		1(3.4%)		2(3.6%)	0.70
Mild	29	6(20.7%)	56	6(10.7%)	
Moderate		10(34.5%)		17(30.4%)	
Severe		12(41.4%)		31(55.3%)	

Perioperative parameters

	Group NCS(n=29)	Group MY (n=56)	P
Indications for surgery			
SV≥45mm, AR<Grade 3	14(48.3)	23(41.1)	0.012
SV≥45mm, AR≥Grade 3	8(27.6)	30(53.6)	
SV<45mm, AR≥Grade 3	7(24.1)	3(5.4)	
Vascular graft (mm)			
24	2(6.9)	14(25.0)	0.066
26	15(51.7)	30(53.6)	
28	11(37.9)	12(21.4)	
30	1(3.4)	0	
Aortic clamping time (min)	69.0±21.8	105.4±27.8	<0.001
CPB time (min)	106.6±40.5	138.4±37.5	0.001
External annuloplasty			
Yes	3(10.3)	38(67.9)	<0.001
No	26(89.7)	18(32.1)	
Aortic leaflet repair			
Triangular resection	2 (6.9)	5 (8.9)	0.12
Central plication	7 (24.1)	9 (16.1)	
Subcommissure plication	0	7 (12.5)	

Early post-operative outcomes

	Group NCS (n=29)	Group MY (n=56)	P
Mechanical ventilation (hours)	5.0(4.0, 6.0)	6.0(4.0, 9.0)	0.01
RBC Transfusion (units)	0(0, 2.0)	0(0, 3.0)	0.14
ICU stay (days)	2.0(1.0, 4.0)	2.0(1.0, 4.0)	0.94
Reoperation for bleeding	1(3.4)	2(3.6)	0.73
Post-op PM implantation	1(3.4)	1(1.8)	0.54
Hospital stay (days)	10.6±5.0	11.2±4.1	0.60
Post-op residual AR			
None	12(41.4)	25(44.6)	0.77
Mild	14(48.3)	24(42.8)	
Moderate	3(10.3)	7(12.5)	
Post-op LVDd (mm)	51.9±12.6	54.6±7.4	0.26
Post-op LVEF (%)	56.2±8.0	56.9±6.4	0.66

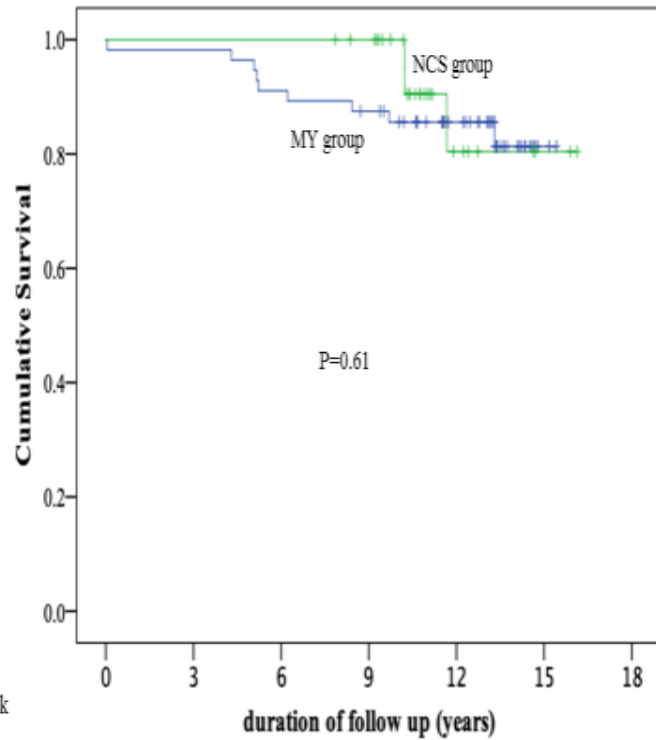
Follow up outcomes

	Group NCS		Group MY		P
	n		n		
All-cause mortality					
Malignant tumors		1(3.4)		5(8.9)	
Aortic arch dissection		0		1(1.8)	
Advance heart failure	29	1(3.4)	56	1(1.8)	0.74
Traffic accident		0		1(1.8)	
Septic shock		0		1(1.8)	
Unknown cause		1(3.4)		0	
Aortic valve-related reoperation					
Recurrent severe AR	29	0	56	2(3.6)	0.66
Aortic valve endocarditis		1(3.4)		2(3.6)	
Cardiovascular reoperation					
Aortic valve replacement		1(3.4)		4(7.2)	
Mitral valve replacement	29	0	56	1(1.8)	0.31
Type B aortic dissection		1(3.4)		2(3.6)	
TAAA		0		2(3.6)	
NYHA class in follow-up					
I		15(65.2)		24(53.3)	
II	23	7(30.4)	45	18(40.0)	0.64
III		1(4.3)		3(6.7)	
AF in follow-up	26	5(19.2)	47	15(31.9)	0.29

	Group NCS		Group MY		P
	n		n		
Oral anti-coagulants in follow up					
None		21(80.8)		32(68.1)	
VKAs	26	3(11.5)	47	12(25.5)	0.22
DOACs		2(7.7)		3(6.4)	
Neurologic complications					
None		24(92.3)		44(93.6)	
TIA	26	2(7.7)	47	2(4.3)	0.55
CVAs		0		1(2.1)	
Post-op aortic annulus (mm)	29	25.4±21.7	54	24.5±2.5	0.07
Post -op sinus of Valsalva (mm)	29	38.2±4.2	51	34.0±4.0	<0.001
LVDd in follow-up (mm)	26	51.1±7.2	47	50.6±8.1	0.73
LVEF in follow-up (%)	26	55.8±8.1	47	56.3±7.5	0.62
AR in follow-up					
None		10(38.5)		11(23.4)	
Mild	26	11(42.3)	47	25(53.2)	0.40
Moderate		4(15.4)		8(17.0)	
Severe		1(3.8)		3(6.4)	

K-M analysis

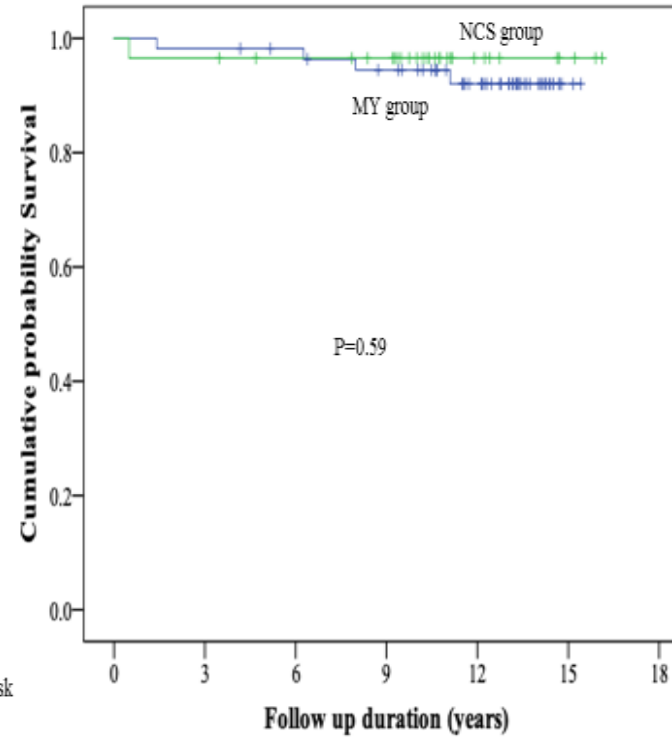
Kaplan Meier analysis of overall survival



No. at risk

	0	3	6	9	12	15	18
MY group	56	55	51	48	32	2	-
NCS group	29	29	29	27	7	2	-

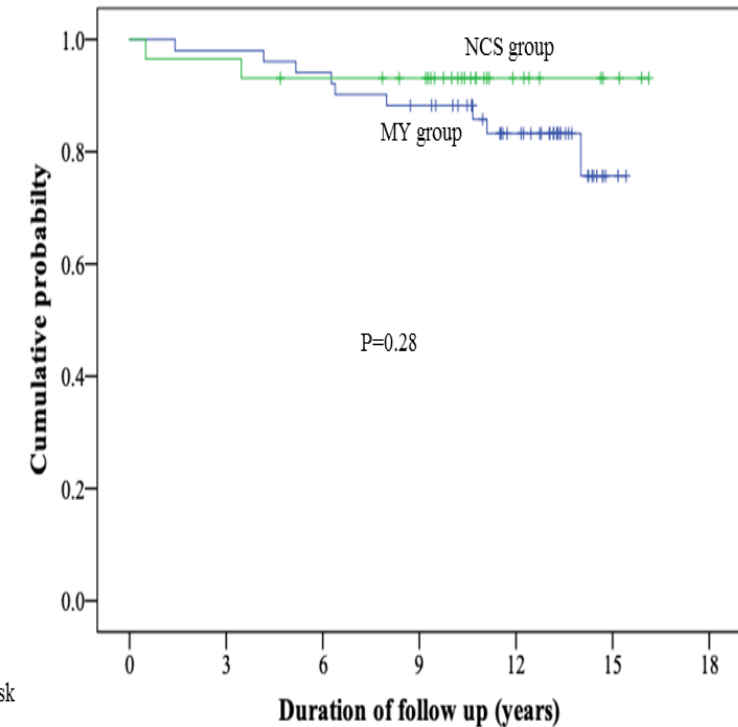
Freedom from aortic valve-related reoperation



No. at risk

	0	3	6	9	12	15	18
MY group	56	55	53	49	34	2	-
NCS group	29	28	26	24	8	3	-

Freedom from cardiovascular-related reoperation



No. at risk

	0	3	6	9	12	15	18
MY group	56	55	53	49	34	2	-
NCS group	29	28	26	24	8	3	-

Aortic valve-related reoperation, p=0,59

Overall survival, p=0,61

Reoperation for aortopathy, p=0,28

Limitations of the study

- ✓ Retrospective nature, low volume, unequal baseline patients' characteristics
- ✓ Lack of quantitative definition of 'asymmetry' of aortic root aneurysm
- ✓ Subjective decision-making factors such as peroperative evaluation: tissue frailty, aortic wall thickness...
- ✓ Variable intervals between surgery and last imaging of control (TTE, Angio-CT)

...

Conclusions

- ✓ Aortic valve-sparing isolated non-coronary sinus replacement can be safely performed in selected cases such as asymmetric aortic root aneurysm, moderate aortic root dilation (45-52 mm) and bicuspid aortic valve (type 1 L-R)
- ✓ The early outcomes, overall survival and long-term freedom from aortic valve-related or aortopathy-related re-intervention were comparable to those obtained with the Yacoub procedure



Thanks for your attention !