Repair of common atrio-ventricular valve in univentricular circulation using adjustable annular bridging technique

OKAYAMA UNIVERSITY

Dept. of Cardiovascular Surgery, Okayama University

Shingo Kasahara

NO COI

Shingo Kasahara

Department of Cardiovascular surgery, Okayama University

Dept. of Cardiovascular Surgery,
Okayama University

Atrioventricular valve repair in patients with single ventricle : emulating the fibrous skeleton of the heart.

Operative Techniques in Thoracic and Cardiovascular Surgery
Volume 27, Issue 1, Spring 2022, Pages 105-113

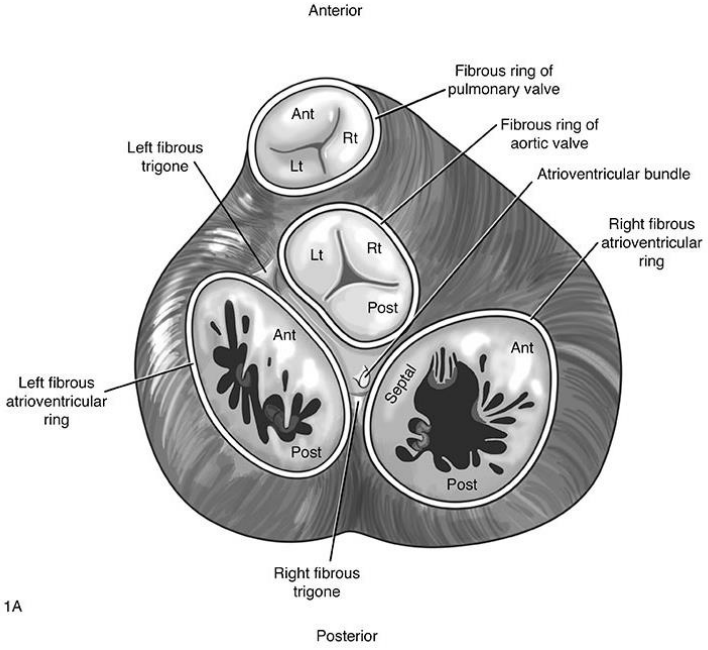


Fig. 1A

Determine the dividing line according to the fibrous skeleton

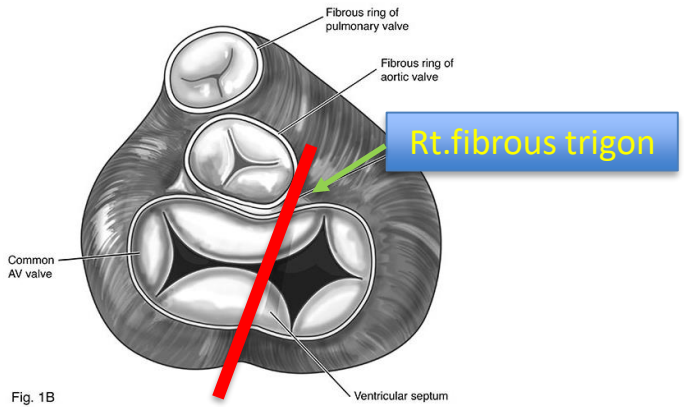


Fig. 1B

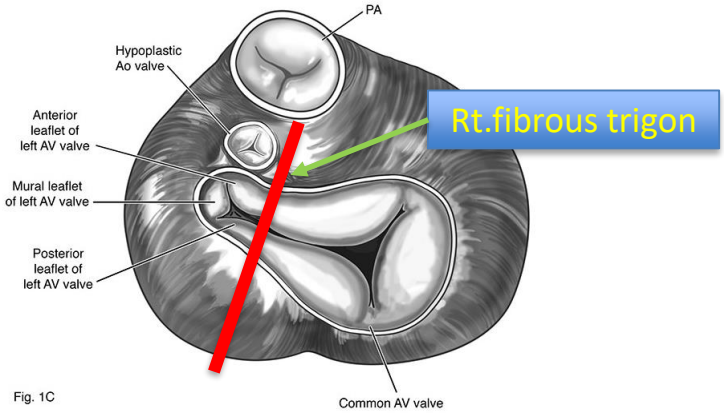


Fig. 1C

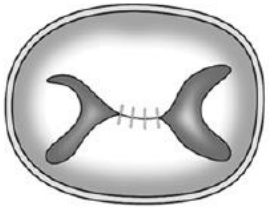
Previous our experiences in OKAYAMA

Atrioventricular Valve Repair for Patient With Heterotaxy Syndrome and a Functional Single Ventricle

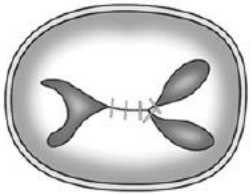
Shunji Sano, Yasuhiro Fujii, Sadahiko Arai, Shingo Kasahara, and Atsushi Tateishi

Semin Thorac Cardiovasc Surg Pediatr Card Surg Ann 15:88-95 © 2012 Elsevier Inc.

A variety of valve apposition techniques

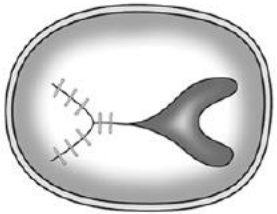


Two orifices

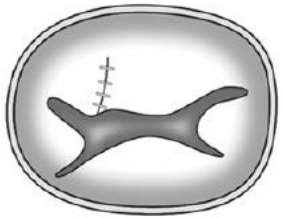


Three orifices

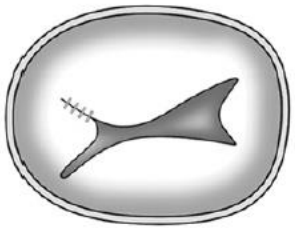
Edge-to-edge repair



Complete closure of one compornent



Closure of the cleft



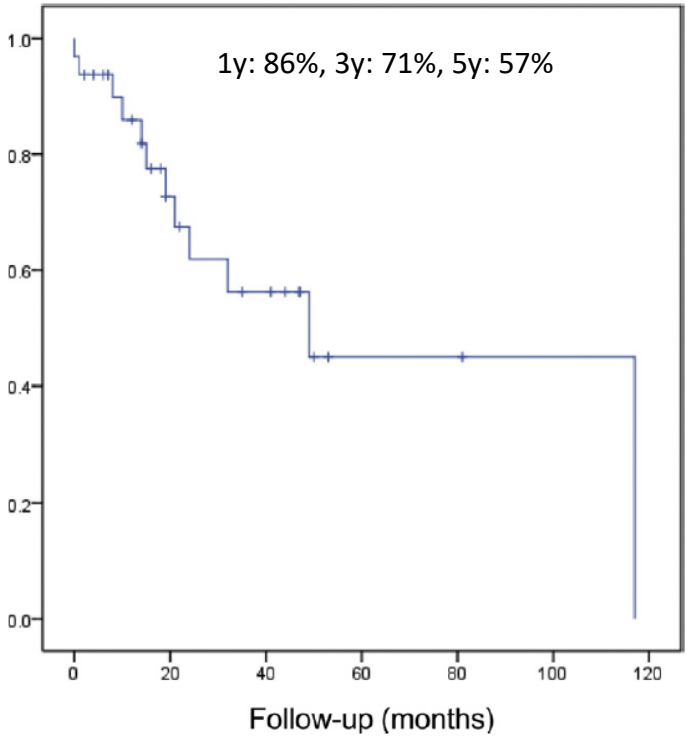
Closure of the commissure

Semin Thorac Cardiovasc Surg Pediatr Card Surg Ann 15:88-95 © 2012 Elsevier Inc.

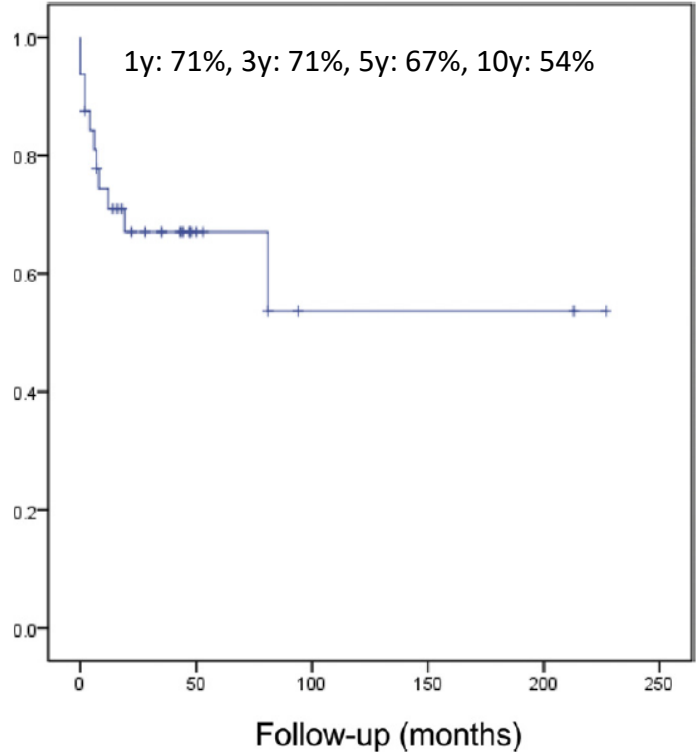
Is the long-term results satisfactory?

Dept. of Cardiovascular Surgery, Okayama University

Actuarial moderate or sever AVV regurgitation free rate
Determined by the Kaplan-Meier method



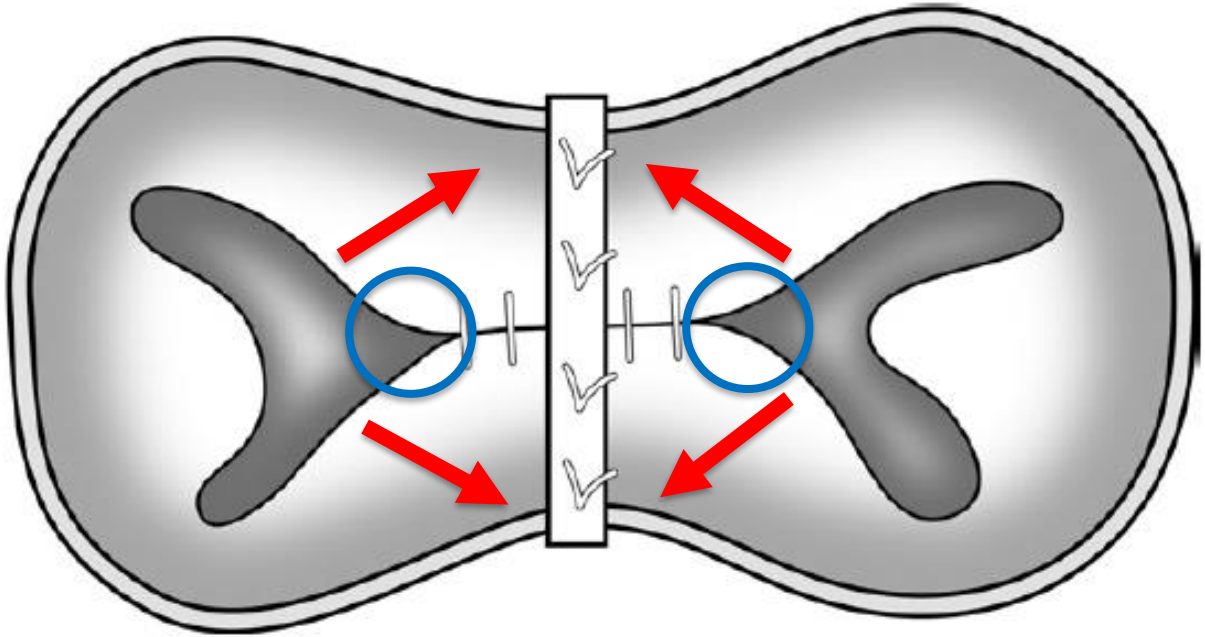
Actuarial survival by the Kaplan-Meier method

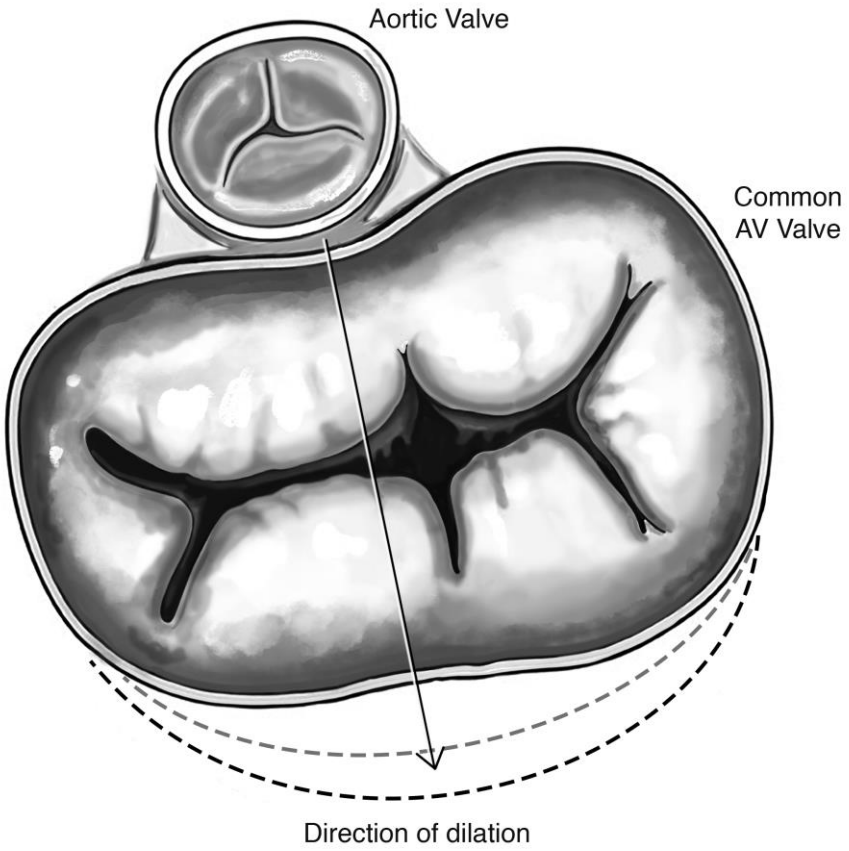


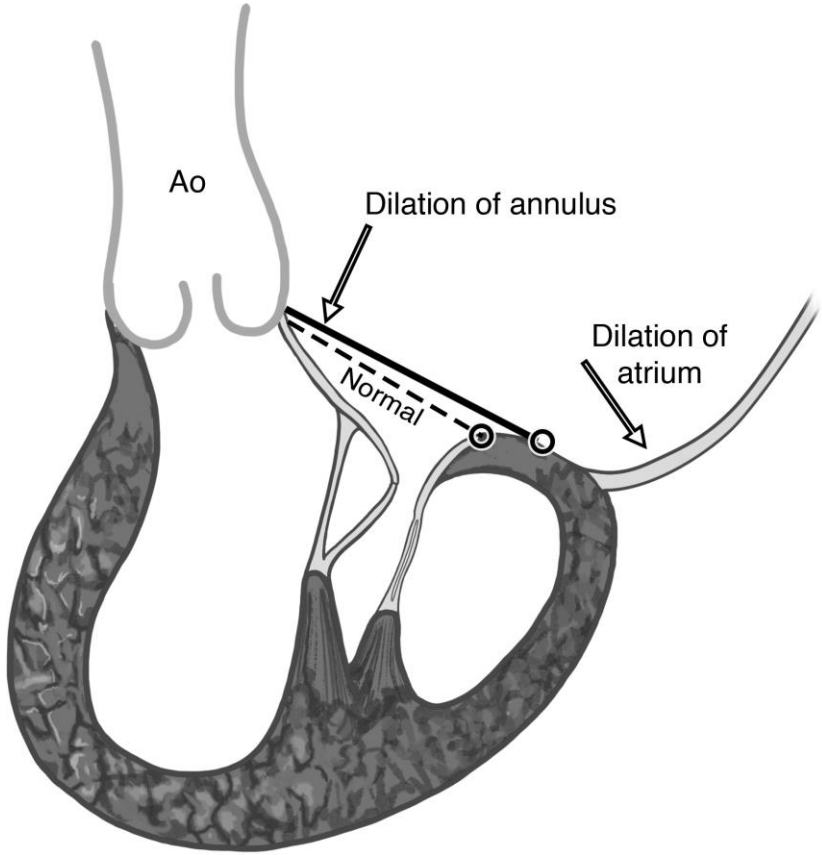
Semin Thorac Cardiovasc Surg Pediatr Card Surg Ann 15:88-95 © 2012 Elsevier Inc.

Bivalvation:

Increased regurgitation with growth and morphologic changes occurring over time







CONGENITAL| optechstcvs, VOLUME 27, ISSUE 3, P302-308, SEPTEMBER 01, 2022

Purpose:

Common atrioventricular valve (CAVV) repair in functional single ventricle (FSV) remains technically challenging despite the various techniques reported previously. This study aimed to investigate the short-term outcomes of adjustable annular bridging technique in patients with FSV associated with CAVV regurgitation

Methods:

Retrospective chart review, single institute, 46 patients with single-ventricle associated with CAVV, who underwent AVV repair, from January 2010 to July 2023.

Group A. : With Adjustable annular bridging technique

Group C. : Without bridging technique

(Patients who previously had a valve repair other than adjustable annular bridging technique were also included in Group A.)

The definition of the regurgitation grade by echocardiogram:none=0, mild=1, moderate=2, severe=3.

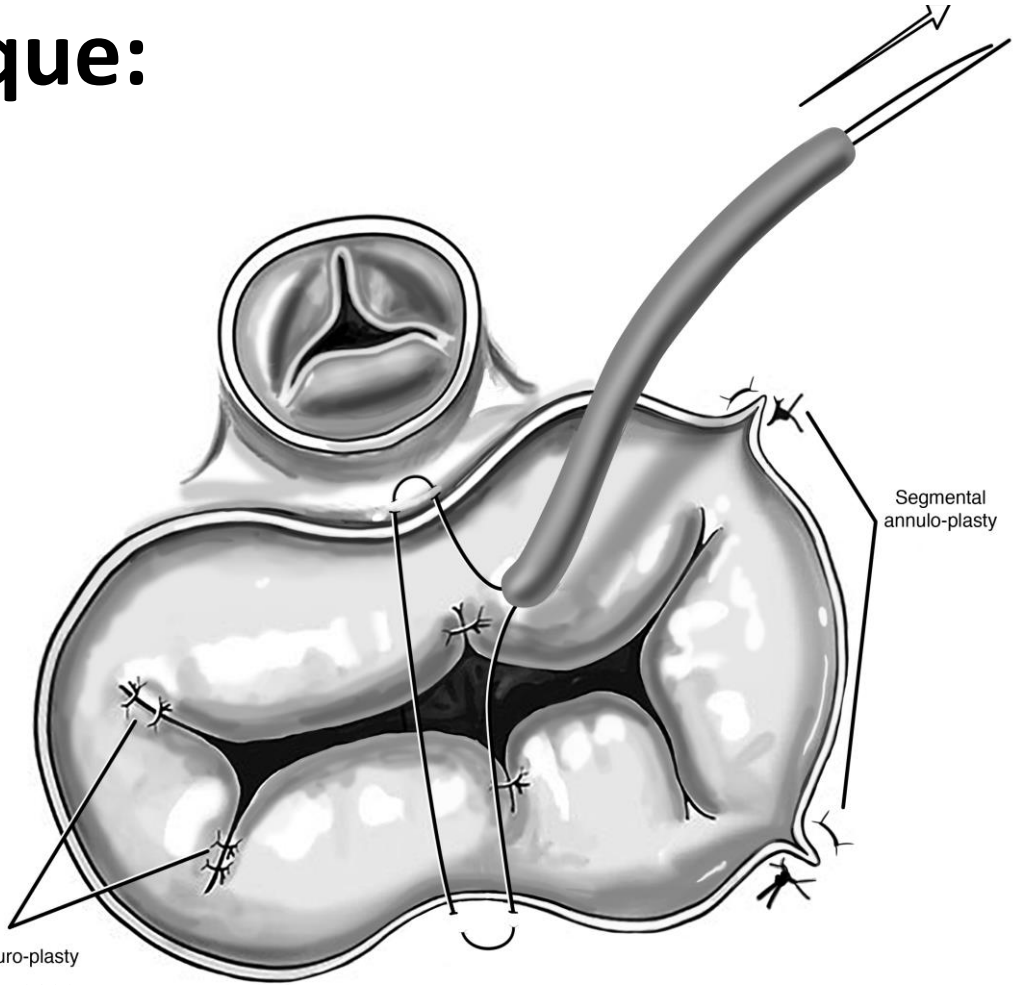
Characteristics at time of CAVV repair

Dept. of Cardiovascular Surgery, Okayama University

	Group A(N=17)	Group C(N=29)	P
Male	7	18	0.17
Age (months)	48.1±68.9(2SD)	27.0±47.3	0.22
Body weight (kg)	12.7±12.5	8.70±7.81	0.18
BSA (m^2)	0.440±0.291	0.400±0.247	0.2
BNP (pg/ml)	255±406	480±733	0.25
preoperative EF (%)	55.5±9.87	58.4±7.50	0.26
PA index (mm^2/m^2)	245±75.8	260±112	0.66
preoperative PAP (mmHg)	14.3±2.96	15.6±5.46	0.42
Timing of valve repair			
before BDG	4(24%)	11(38%)	
BDG-before TCPC	8(47%)	13(44%)	
TCPC-	5(29%)	6(18%)	
Procedure			
edge-edge	3	22	
partial annuloplasty	6	14	
commissuroplasty	5	9	
cleft closure	5	2	
bridging	17	0	
Ventricular types			
UVH	14	21	
CAVC	3	7	
Associated lesions			
Heterotaxy	12	24	
bilateral SVC	12	12	
TAPVC	7	11	
pulmonary atresia	3	9	

Surgical technique:

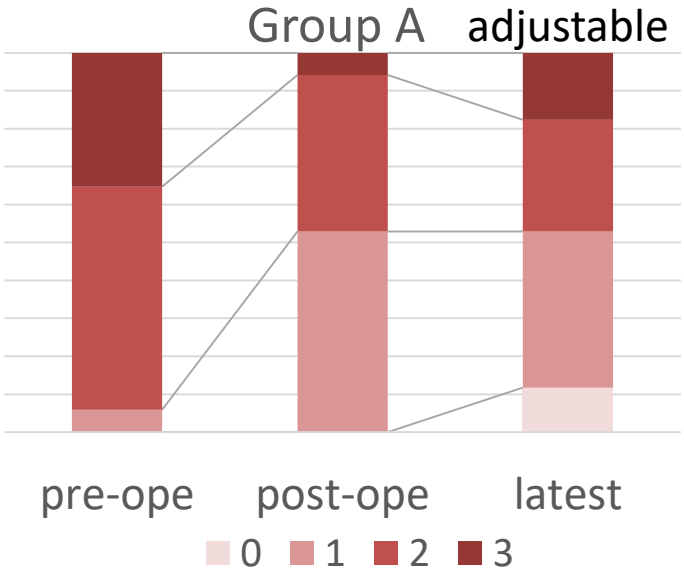
For adjustable annular bridging technique, an ePTFE vascular suture was applied to fix the length of the anteroposterior dimension against the valve annular dilatation. Using the tourniquet, the size of the valve orifice was adjusted by guidance of a regurgitation test.

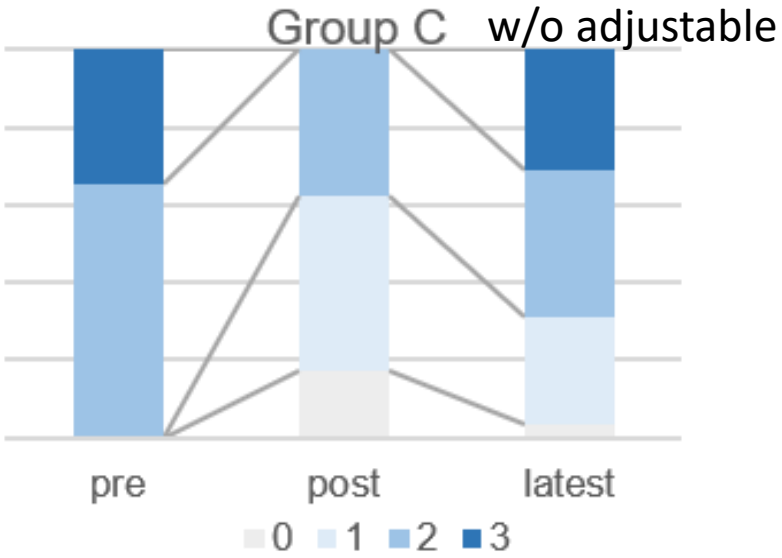


Operative Video

Dept. of Cardiovascular Surgery,
Okayama University

Results 1

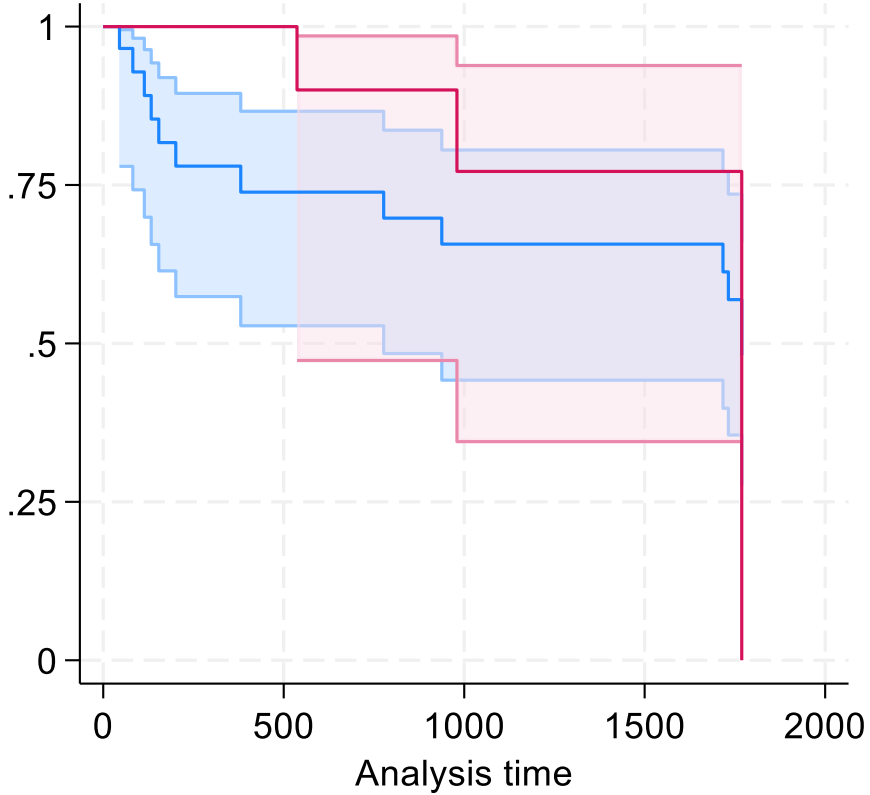




The severity of CAVV regurgitation was unchanged in Group A (-0.05±0.89) but progressed in Group C (0.75±0.78) (P=0.001)
progress: the difference between regurgitation grade in the latest follow-up (or before re-intervention) echocardiography from immediately post-operative.(follow-up time; Group A(2.64±1.33 years) vs Group C(9.24±2.50 years), (P<0.001)

Freedom from valve intervention

Dept. of Cardiovascular Surgery,
Okayama University



- In total, 22 valve re-interventions (19 CAVV plasty and 3 valve replacement) were performed in 16 out of 46 patients (34%).
- Re-intervention was more required in Group C compared to Group A (13 patients (44%) vs. 3 patients (17%)).

Discussion:

Valve regurgitation in Fontan candidates gradually worsens over time. Most of them are due to valve annular dilation, which is caused by an incomplete fibrous skeleton. This study suggested that adjustable annular bridging technique may prevent valve anulus enlargement and subsequent valve regurgitation deterioration in the long-term.

Conclusions:

Adjustable annular bridging technique vs. conventional repair resulted in favorable short-term outcomes by maintaining CAVV competence.

Thank you for your attention

Dept. of Cardiovascular Surgery,
Okayama University