AATS Aortic Symposium

April 25–26, 2024
Sheraton New York Times Square
New York, NY, USA

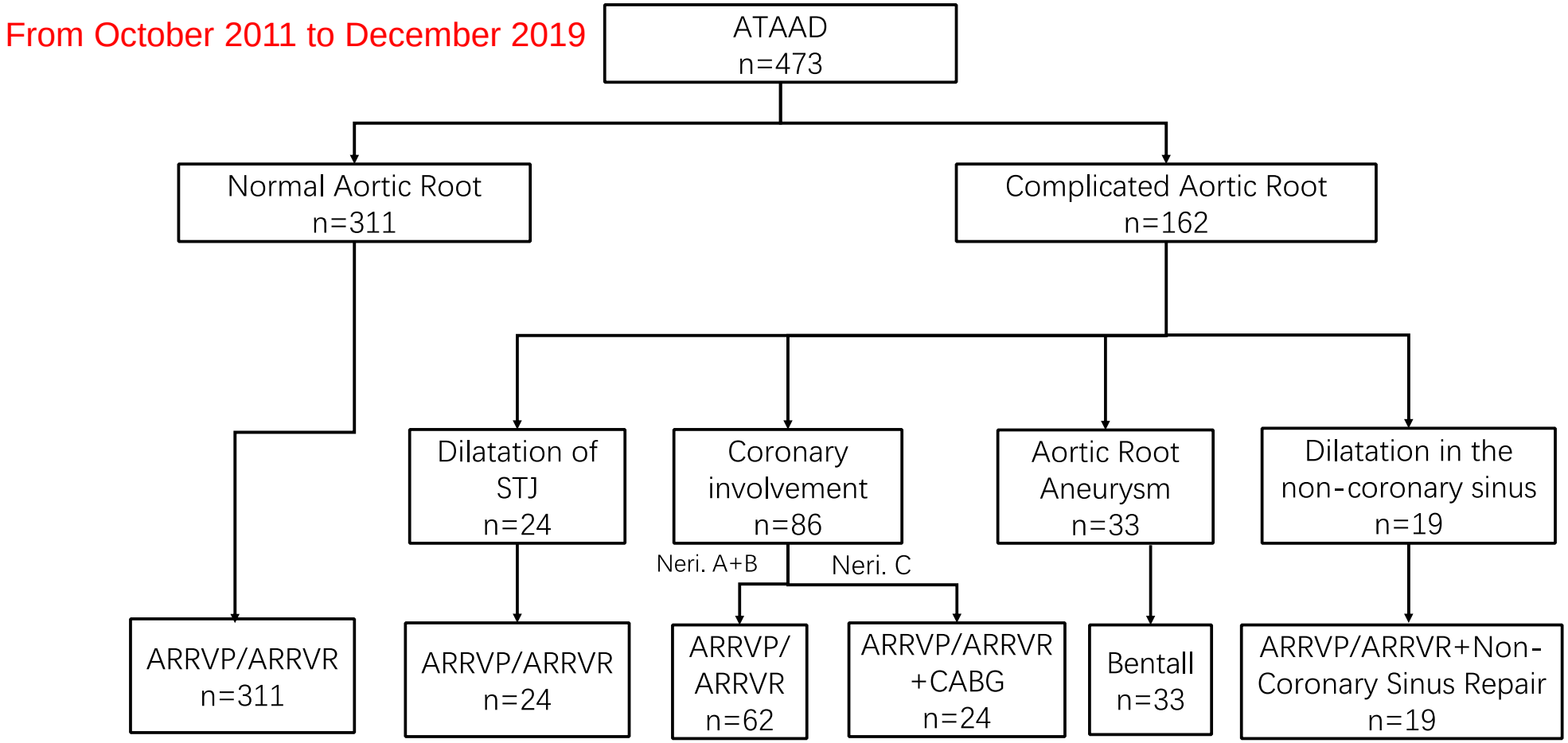
Surgical Strategies and Outcomes of Aortic Root in Complicated Acute Type A Aortic Dissection

Background

- The surgical strategies for acute type A aortic dissection (ATAAD) with a complicated aortic root are controversial and prognosis is unclear. The aim of this study was to evaluate the therapeutic efficacy of Liu's aortic root repair strategy for patients with a complicated aortic root in ATAAD.
- Definition of complicated aortic root in acute type A aortic dissection: The complicated aortic root contains 4 types when a patient with acute type A aortic dissection, such as: 1, aortic sinus diameter < 4.5 cm, but sinotubular junction (STJ) diameter ≥ 4.5 cm; 2, coronary involvement, including Neri. type A, B and C; 3, aortic sinus diameter ≥ 4.5 cm with significant dilatation in the non-coronary sinus only; 4, aortic sinus diameter ≥ 4.5 cm with Marfan syndrome or other hereditary thoracic aortic disorder, or aortic sinus diameter ≥ 5.0 cm and excessive dilatation of the aortic root involving two or three sinuses of Valsalva; respectively .

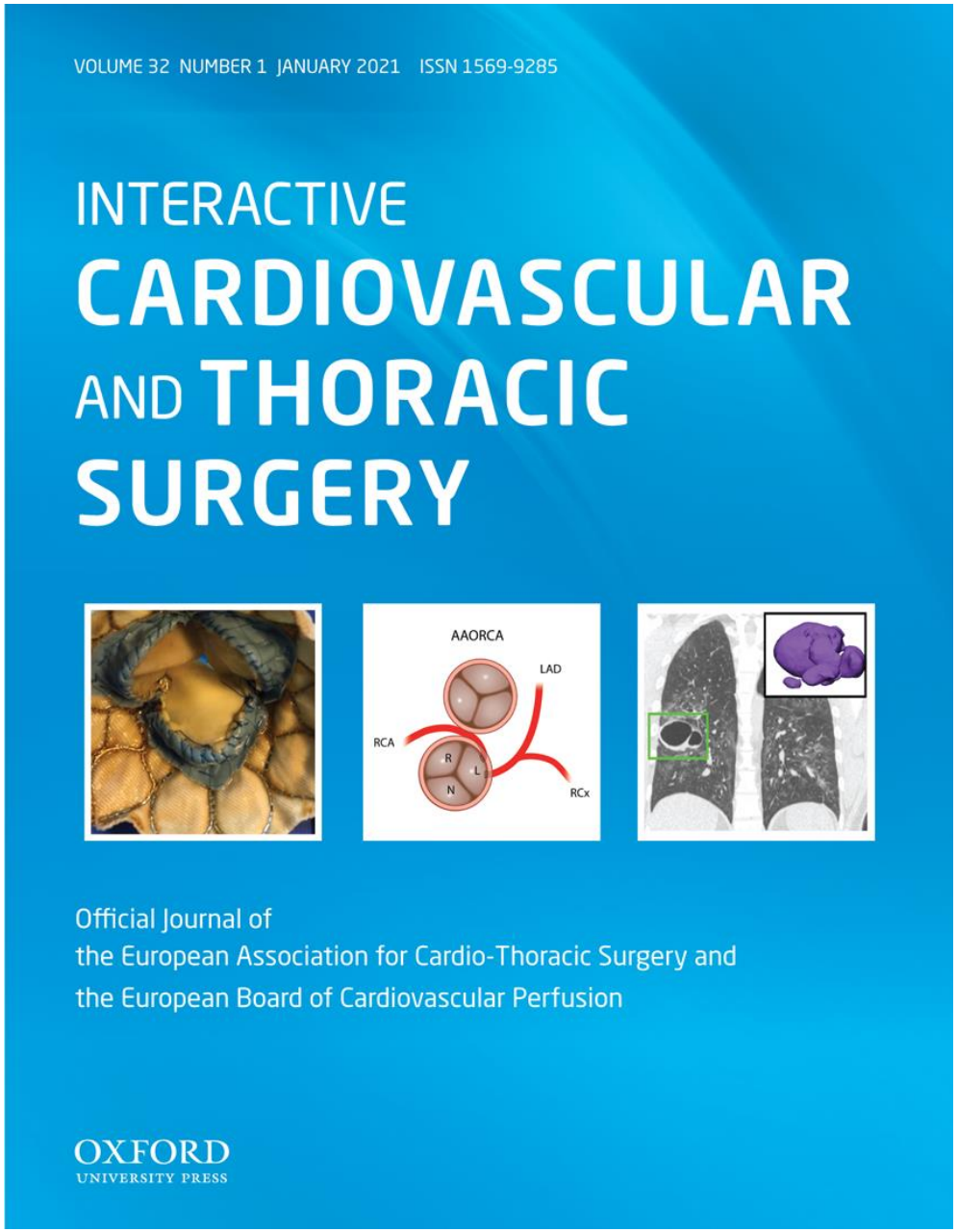
Patients-Research flow chart

A CONSORT type diagram of all patients with ATAAD included in the study.



ATAAD, Acute type A aortic dissection; STJ, Sinotubular Junction; ARRVP, Liu' Aortic root repair and valve preservation; ARRVR, Liu' Aortic root repair and valve replacement; CABG, Coronary Artery Bypass Graft.

ARRVP-Liu' Aortic root repair and valve preservation



Interactive CardioVascular and Thoracic Surgery (2021) 1–8
doi:10.1093/icvts/ivaa322

ORIGINAL ARTICLE

Cite this article as: Piao H, Wang Y, Huang M, Zhu Z, Xu R, Wang T *et al*. Outcomes of Liu's aortic root repair and valve preservation in patients with type A dissection and aortic regurgitation. Interact CardioVasc Thorac Surg 2021; doi:10.1093/icvts/ivaa322.

VASCULAR

Outcomes of Liu's aortic root repair and valve preservation in patients with type A dissection and aortic regurgitation

Hulin Piao, Yong Wang, Maoxun Huang, Zhicheng Zhu, Rihao Xu, Tiance Wang, Dan Li and Kexiang Liu*

Department of Cardiovascular Surgery, Second Hospital of Jilin University, Jilin University, Changchun, Jilin, China

* Corresponding author. Department of Cardiovascular Surgery, Second Hospital of Jilin University, Jilin University, No. 218 Ziqiang Street, Nanguan, Changchun, Jilin 130041, China. Tel: +86-0431-81136741; e-mail: kxliu64@hotmail.com (K. Liu).

Received 11 August 2020; received in revised form 3 November 2020; accepted 21 November 2020

Key question

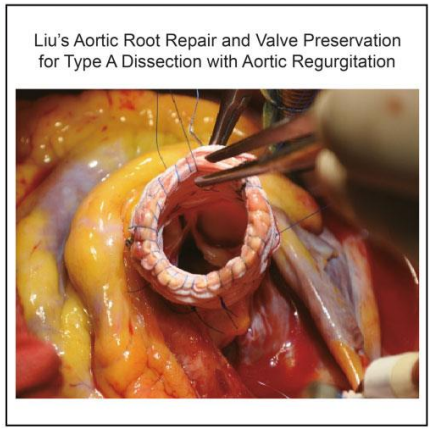
Is aortic root repair and valve preservation an effective treatment for type A dissection and aortic regurgitation (AR) ?

Key finding(s)

All patients were free from reoperation during follow-up, and the incidence of recurrence of AR was 2% at 8 years.

Take-home message

Liu's aortic root repair and valve preservation used for type A dissection and AR achieved an excellent short- and medium-term outcomes.



Abstract

OBJECTIVES: To evaluate short- and medium-term outcomes following Liu's aortic root repair and valve preservation in patients with acute type A aortic dissection complicated by moderate-to-severe aortic regurgitation (AR).

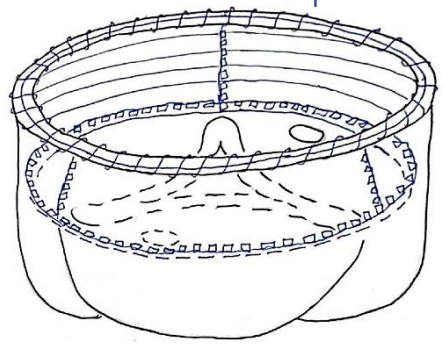
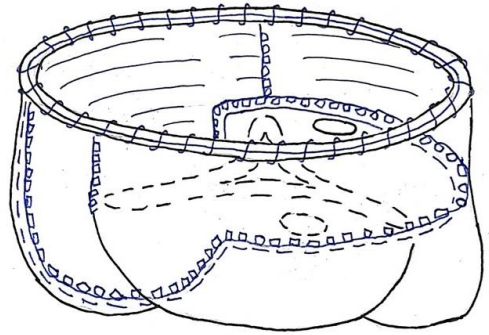
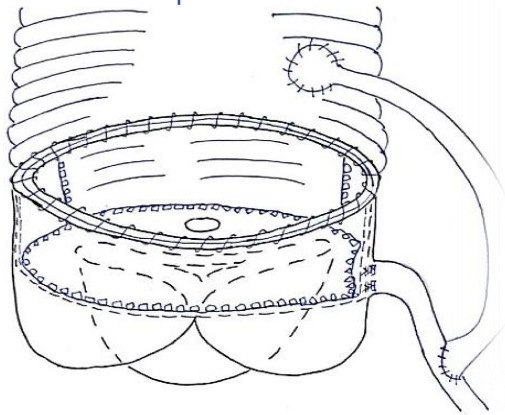
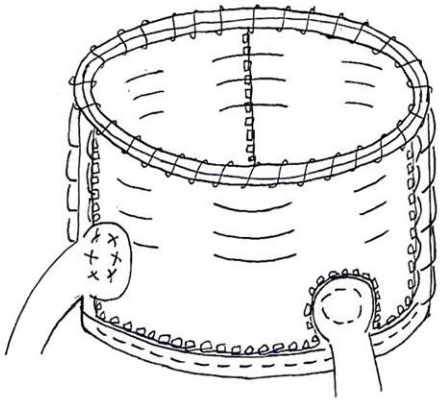
METHODS: From October 2011 to July 2018, a total of 324 consecutive patients underwent emergency surgery for acute type A aortic dissection. There were 122 patients (38%) with moderate-to-severe AR, of whom 82 (67%) underwent Liu's aortic root repair and valve preservation. Aortic computed tomography angiography and echocardiography were performed at discharge, 6 and 12 months postoperatively, and annually thereafter. We focused on assessing the survival and aortic root and valve durability in the 82 patients.

RESULTS: The 30-day, 1-year, 3-year and 6-year survival estimates were 94%, 90%, 85% and 81%, respectively. At a median follow-up of 36.5 (interquartile range 24.9–50.9) months, all patients were free from reoperation. No residual false lumens in the aortic root, recurrent aortic root dissections or aortic root pseudoaneurysms were observed during the follow-up period. Only 1 patient (1%) presented with moderate AR at 6 months, which remained asymptomatic with no significant changes over a 3-year period. The remaining patients showed satisfactory valve function with an AR grade of mild (27%) or trace or none (72%). In the competing risk analysis, the incidence of recurrence of AR was 2% at 8 years.

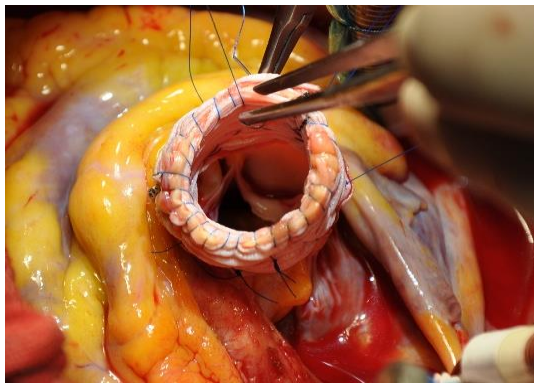
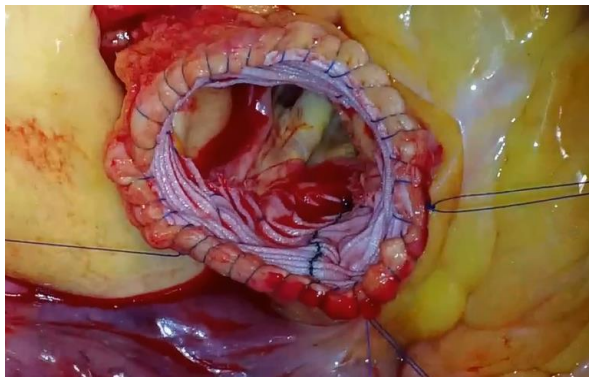
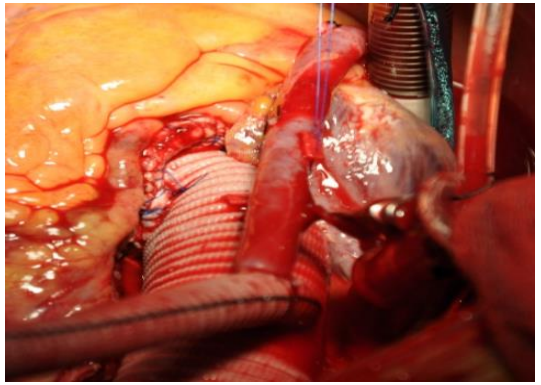
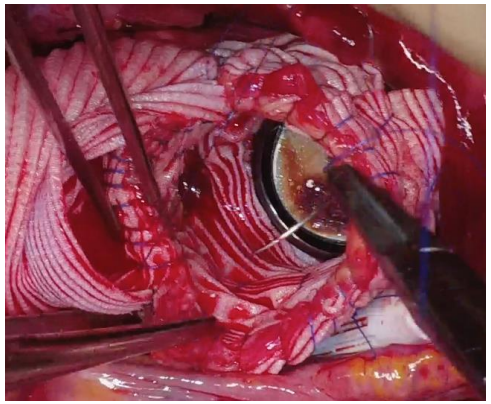
Methods-Surgical methods

Liu's aortic root repair procedure

Schematic diagram

Intraoperative pictures

Surgical methods	ARRVP/R	ARRVP/R plus Non-Coronary Sinus Repair	ARRVP/R plus CABG	Modified Bentall procedure
Indications	1. Dilatation of STJ 2. Neri. A and B coronary involvement	1.Dilatation in the non-coronary sinus	1. Neri. C coronary involvement	1. Aortic Root Aneurysm

ARRVP, Aortic root repair and valve preservation; ARRVR, Aortic root repair and valve replacement; CABG, Coronary Artery Bypass Graft.

Methods-Preoperative patient characteristics

Characteristic	Number of patients (n=162，%)			
	Dilatation of STJ n=24	Coronary involvement n=86	Dilatation in the non-coronary sinus n=19	Aortic Root Aneurysm n=33
Age, years	50.3 ± 9.6	52.4 ± 10.1	52.2 ± 10.3	42 ± 10.9
Sex, male	19(79.2)	53(61.6)	17(89.5)	27(81.8)
Coronary Malperfusion	0 (0)	32(37.2)	0 (0)	0 (0)
Renal Malperfusion	2 (8.3)	6(7.0)	2(10.5)	1 (3.0)
Leg Malperfusion	1 (4.2)	3(3.5)	1 (5.3)	1(3.0)
Cerebral Malperfusion	0 (0)	1(1.2)	0(0)	0 (0)
Moderate AR	8 (33.3)	30(34.9)	9(47.4)	9(30.3)
Mean AR	0.45 ± 0.1	0.45 ± 0.1	0.42 ± 0.09	0.45 ± 0.2
Severe AR	10(41.7)	32(37.2)	6(31.6)	24(72.7)
Mean AR	0.78 ± 0.14	0.84 ± 0.12	0.86 ± 0.11	0.87 ± 0.12

AR, Aortic Regurgitation. The severity of AR was assessed by a semi-quantitative method based on the ratio of the proximal jet width to the left ventricular outflow tract (< 0.10 = trace; 0.10-0.25 = mild； 0.25-0.64 = moderate; ≥ 0.65 = severe)

Methods-Intraoperative and postoperative data

Characteristic	Number of patients (n=162，%)			
	Dilatation of STJ n=24	Coronary involvement n=86	Dilatation in the non-coronary sinus n=19	Aortic Root Aneurysm n=33
Circulatory arrest time, minutes	37.2± 9.6	37.4± 10.6	36.1± 10.6	37.7± 6.9
Cross-clamp time, minutes	104.4 ± 21.2	116.5 ± 23.2	123.6 ± 26.7	137 ± 23.7
CPB time, minutes	139.1 ± 22.4	161.2 ± 31.7	157.1 ± 25.6	171.9 ± 22.6
Re-exploration for bleeding	0 (0)	1 (1.2)	0 (0)	0 (0)
Permanent neurological deficit	0(0)	1 (1.2)	0 (0)	0 (0)
Paraplegia	0 (0)	0 (0)	0 (0)	0 (0)
Stroke	1 (4.2)	5 (5.8)	1 (5.3)	2 (6.1)
Gastrointestinal bleeding	0 (0)	2 (2.3)	0 (0)	1 (3.0)
Acute renal dysfunction requiring dialysis	3 (12.5)	15 (17.4)	2 (10.5)	3 (9.1)
Intraoperative death	0 (0)	0 (0)	0 (0)	0 (0)
30-day mortality	1 (4.2)	6 (6.9)	1(5.3)	1 (3.0)

Results-Follow up

Overall in-hospital mortality was 5.6%.

Follow-up: 98.7% (151/153) complete.

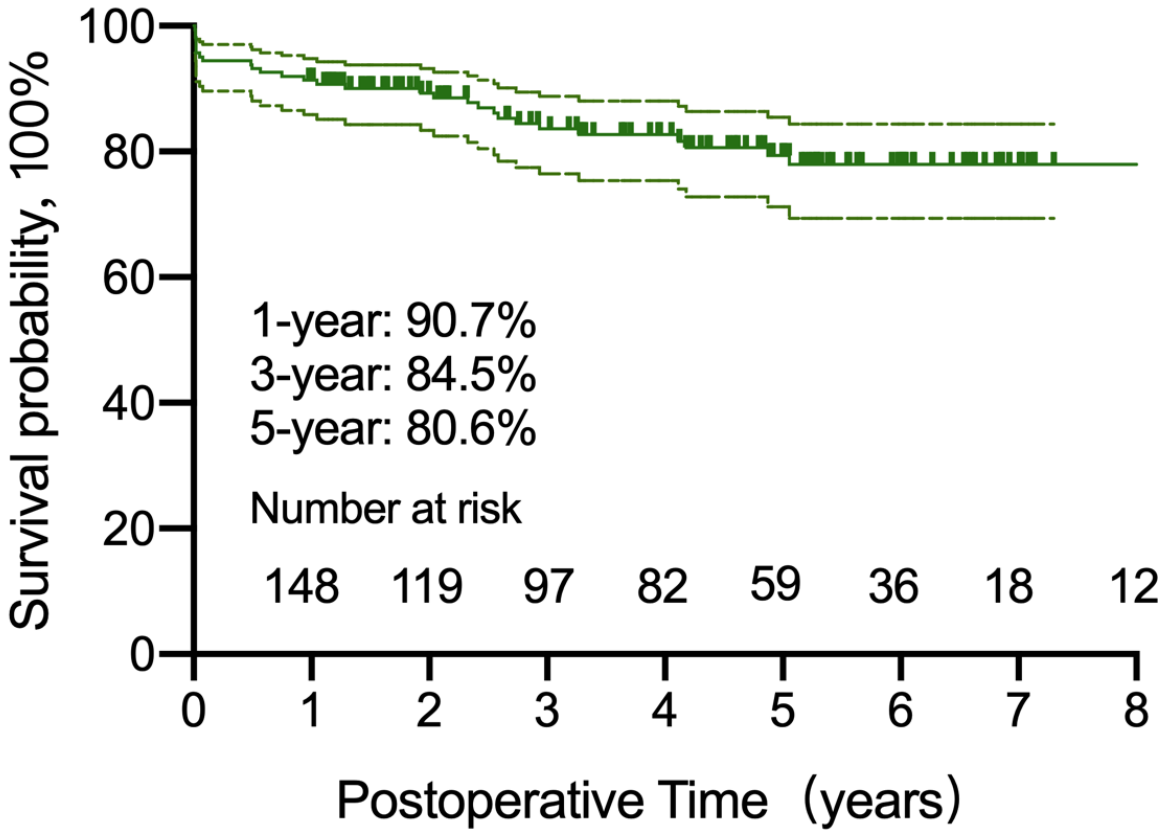
Mean follow-up period: Median follow-up of 48.2 months (23.1- 67.7 months).

Actuarial survival rate: 1-year, 90.7%

3-year, 84.5%

5-year, 80.6%

Follow-up deaths: 29 late deaths.



Results-Follow up

- No reoperation during the follow-up.
- All patients were free from reoperation for aortic root disease.
- No recurrent aortic root dissections;
- No residual false lumens in the aortic root;
- No aortic root pseudoaneurysms;
- No and severe aortic regurgitation.

Conclusion

- In type A aortic dissection with complicated aortic root except aortic root aneurysm, Liu’s aortic root repair is a safe and effective surgical strategy that achieves favorable outcomes.