

P374. Validity of Ascending Aortic Replacement under Moderate Hypothermic Circulatory Arrest with Retrograde Cerebral Perfusion

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Background

As for ascending aortic replacement (AAR) for thoracic aortic aneurysms, there are a variety of surgical approaches that are controversial.

- Distal anastomose → clamped or open
- Cerebral perfusion → antegrade or retrograde cerebral perfusion (ACP, RCP)
- Hypothermia → What temperature?

Our hospital changed the surgical procedure from clamped AAR to open distal AAR with RCP after April 2017.

Therefore, we conducted a study on the outcomes in the clamped group and in the open distal group.

Patient and method

310 patients underwent elective Ascending aortic replacement(AAR)
Period:April.2011~May.2023



Clamped AAR

Group C

N=**88**

Open distal AAR

Group O

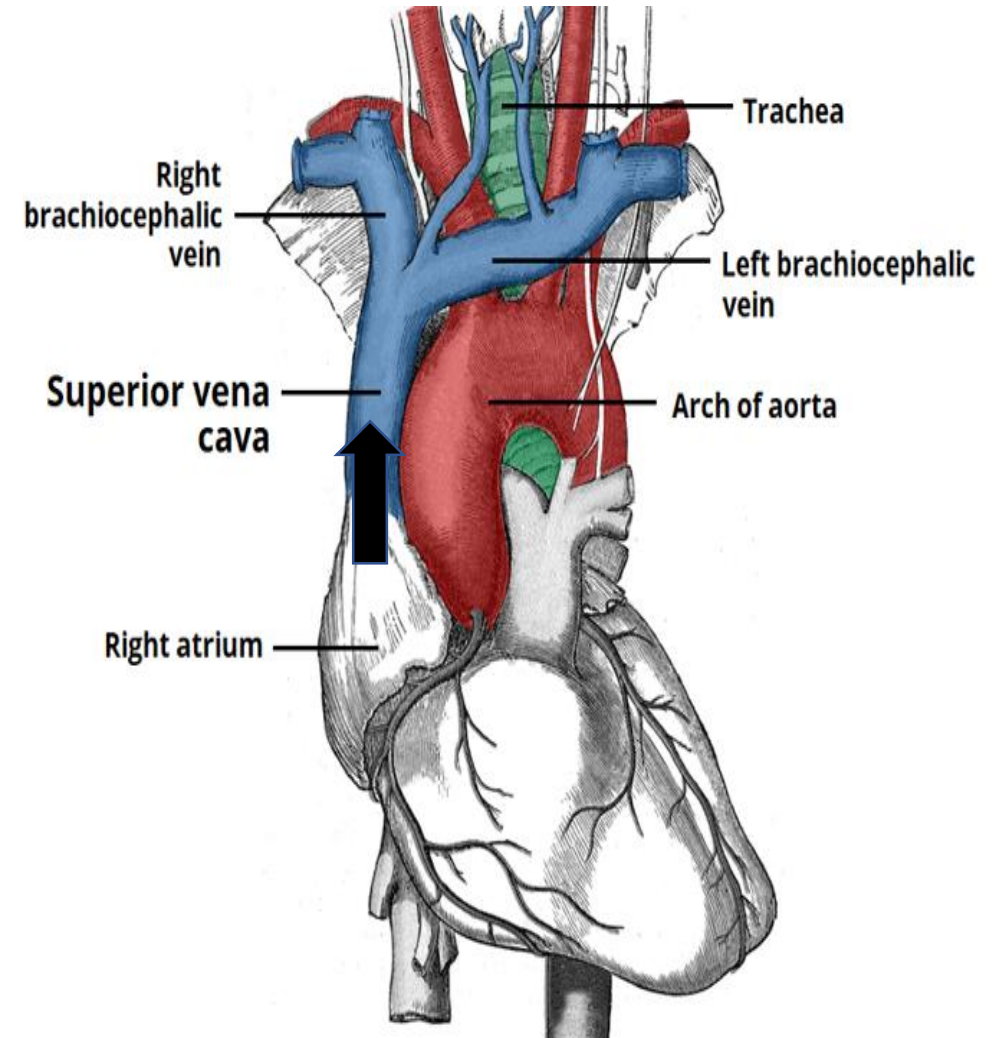
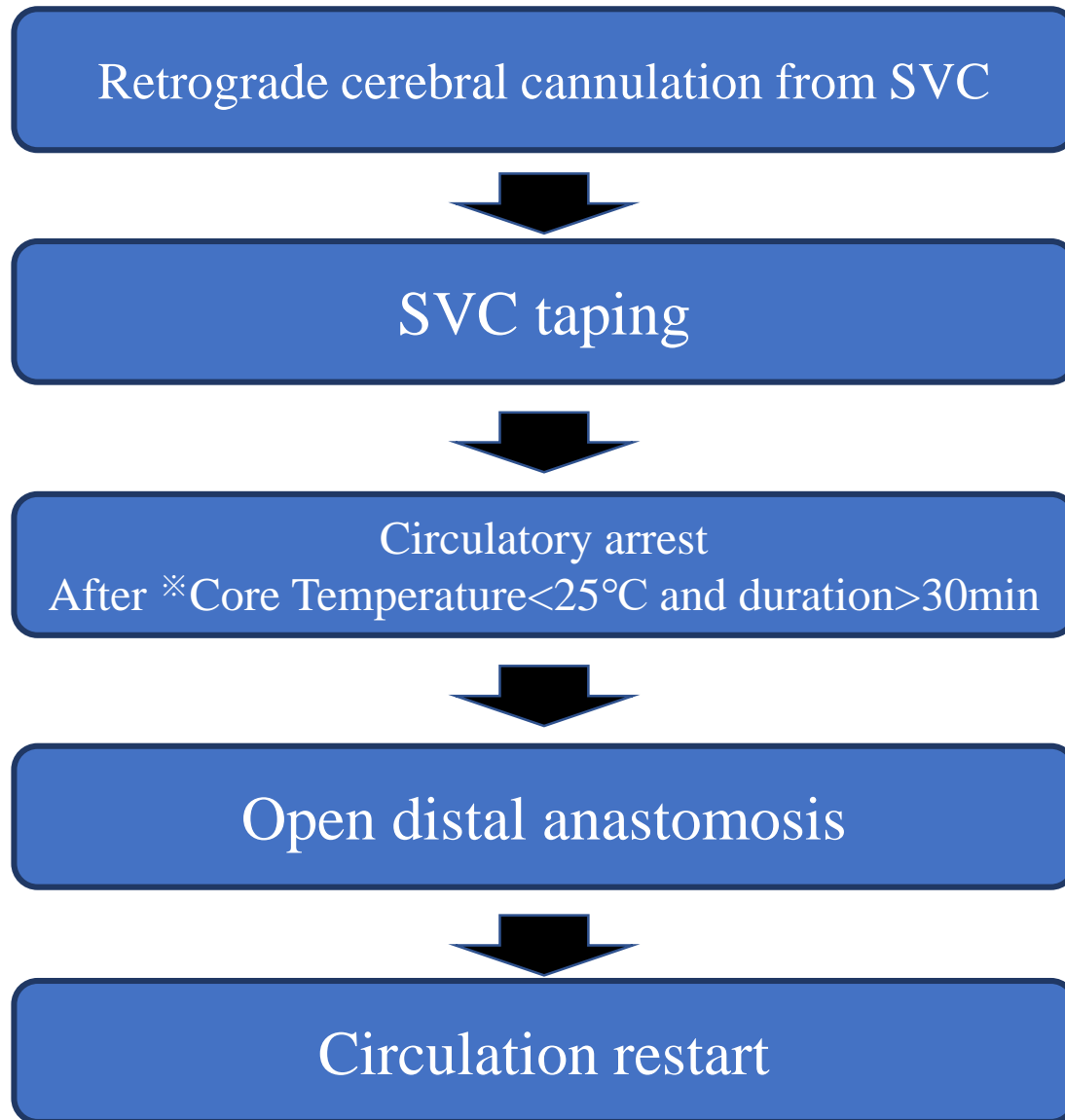
N=**222**

(Use RCP exclusively)

Method

- Combined cases included. (valve replacement, coronary artery bypass)
- Emergency surgery and aortic dissection cases were excluded.
- Primary endpoints were perioperative cerebral complications, 30-day mortality, remote arch reintervention, and all-cause mortality.

Cerebral protection strategies



※Core Temperature means bladder or rectum temperature.

Cerebral protection strategies

➤ Insertion catheter? → SP stud catheter 13Fr



➤ Where to take temperature?

→ bladder or rectum temperature $<25^{\circ}\text{C}$.

esophageal temperature is just monitoring.

➤ Flow rate? → 300ml/min regardless of BSA

➤ Monitoring central venous pressure(CVP)?

→ Yes. If CVP getting higher, confirming tip of the catheter.

The set point is about 10 cmH₂O .

Table 1. Preoperative characteristics

	Group C (n=88)	Group O (n=222)	P-value
Sex			
Female	18(20%)	73 (33%)	<0.001
Age (years)	61±14	66±13	0.004
Hypertension	56 (64%)	120(54%)	0.130
Diabetes mellitus	6 (7%)	22 (10%)	0.511
Coronary artery disease	6 (7%)	37(17%)	0.028
Preoperative renal failure during dialysis	1 (1%)	13(6%)	0.124
Previous cardiac surgery	11 (13%)	16(7%)	0.178
Bicuspid aortic valve	20 (23%)	73 (33%)	0.056
Severe aortic stenosis	14 (16%)	84 (38%)	<0.001
Severe aortic regurgitation	73 (83%)	120(54%)	<0.001
Preoperative ejection fraction (%)	59±19	59±11	0.705

Data are reported as number (%) or mean ± standard deviation.

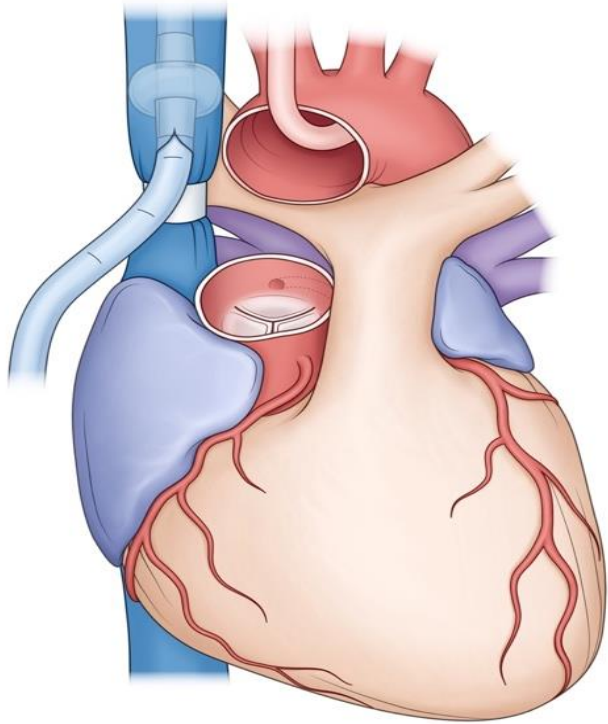
Table 2. Operative characteristics

	Group C (n=88)	Group O (n=222)	P-value
Aortic valve replacement	46 (52%)	195 (88%)	<0.001
Bioprosthesis	22	153	
Mechanical valve	24	42	
Aortic root replacement	76(86%)	80(36%)	<0.001
Biological	20	52	
Mechanical	19	23	
VSRR	37	5	
Mitral valve surgery	8(9%)	22 (10%)	0.827
CABG	7(8%)	21(9%)	0.827
Tricuspid valve surgery	2(2%)	11 (5%)	0.764
Pulmonary vein isolation	6(7%)	11 (5%)	0.581
Aortic cross-clamp time (min)	150±44	125±39	<0.001
CPB time (min)	194±57	169±52	0.001
LBCA time (min)	-	18±7	-
Core lowest temperature (°C)	±	23±9	

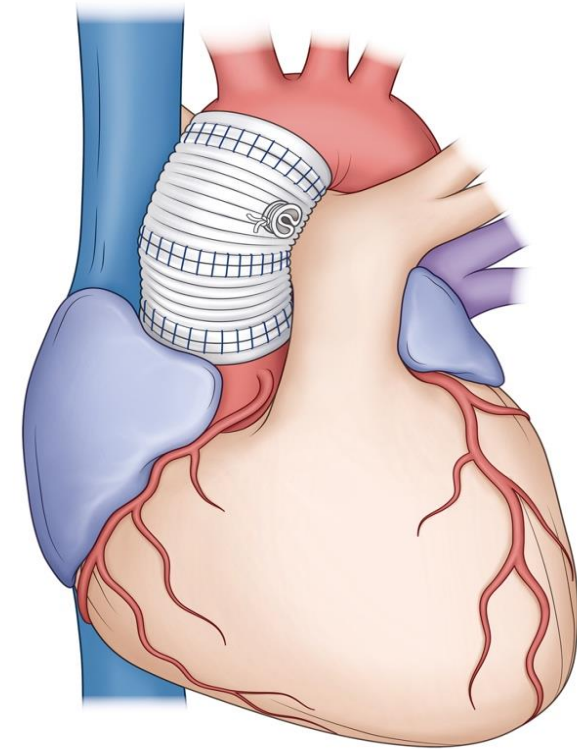
Table 3. Early outcomes for all patients

	Group C (n=88)	Group O (n=222)	P-value
Intubation time (h)	14 (4–625)	14.5 (1-576)	0.324
ICU stay (days)	4 (1–73)	3 (1–32)	0.016
Postoperative stroke	1(1%)	0	0.284
Re-exploration for bleeding	5 (6%)	14 (6%)	1.000
In-hospital mortality	2 (2%)	3 (1%)	0.150
30-day mortality	3 (3%)	2 (1%)	0.141

Figure 1A, 1B



A suprapubic stud catheter (13 Fr) was inserted into the SVC, and taping around the SVC just proximal to the insertion site was performed to prevent flow into the right atrium.



While of course reconstruction is possible with a single graft, kinking on the dorsal side of the graft is often a problem, so we dares to reconstruct with a two-piece graft.

Result1

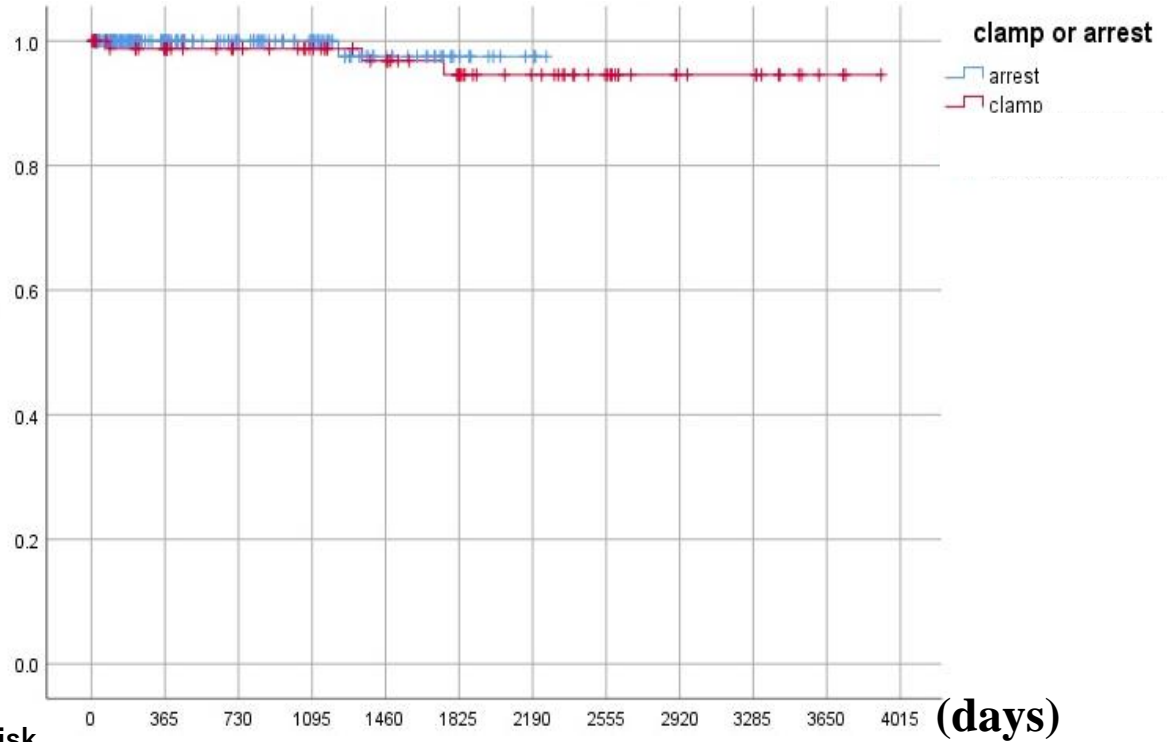
	Group C N=88	Group O N=222	P value
perioperative cerebral complications	1(1%)	0	0.284
30-day mortality	3(3%)	2(1%)	0.141

Result 2

Avoidance of re-intervention
in the distal arch

5yo Arrest: $97.5 \pm 2.5\%$
clamp: $94.6 \pm 3.1\%$

Log Rank=0.414



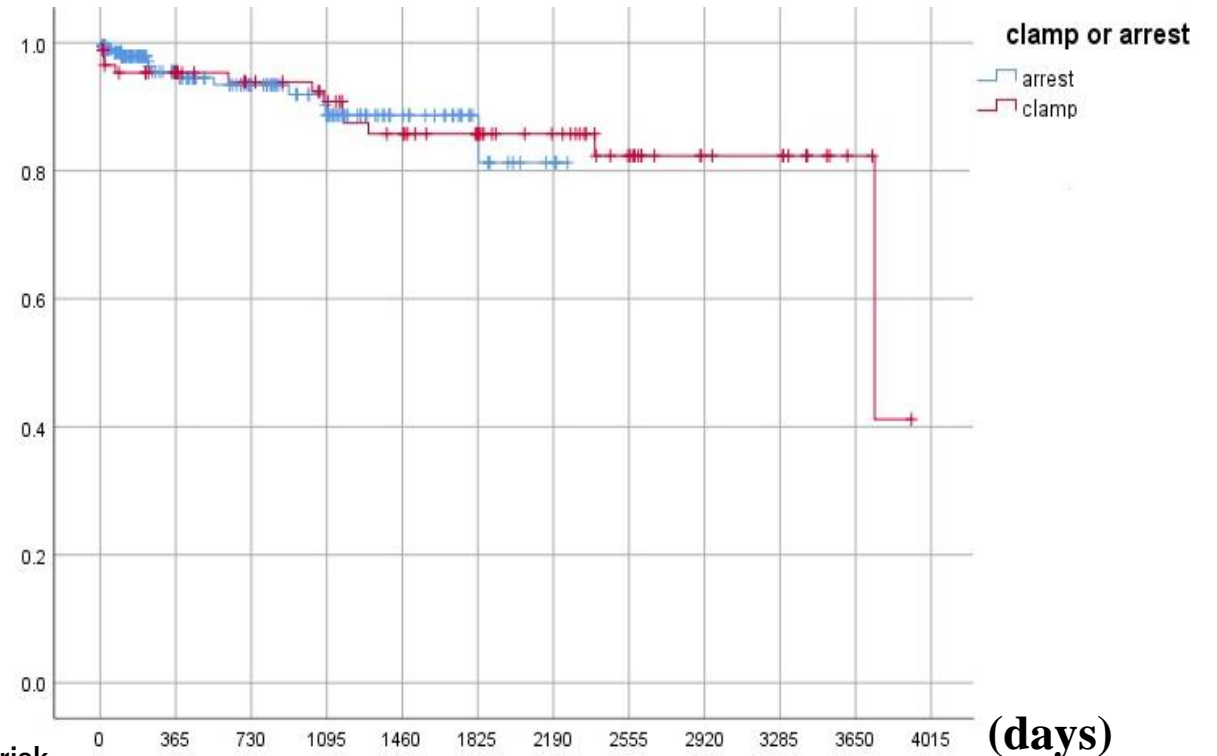
At risk	0	365	730	1095	1460	1825	2190	2555	2920	3285	3650	4015
Arrest	222	106	74	53	28	12	5					
Clamp	88	72	63	57	49	39	30	21	12	8	3	0

Result 3

All cause mortality

5yo Arrest: $88.7 \pm 3.4\%$
clamp: $90.8 \pm 3.3\%$

Log Rank=0.950



At risk	0	365	730	1095	1460	1825	2190	2555	2920	3285	3650	4015
Arrest	222	106	74	53	28	12	4					
Clamp	88	73	64	58	50	41	32	21	12	11	3	0

Conclusion

- There was no significant difference in endpoints between the two groups.
- Outcomes of ascending aortic replacement with open distal and circulatory arrest under moderately hypothermic conditions were favorable with fewer cerebral complications compared to previous ascending aortic replacement under closed distal conditions.