

2023 대한심장혈관흉부외과학회

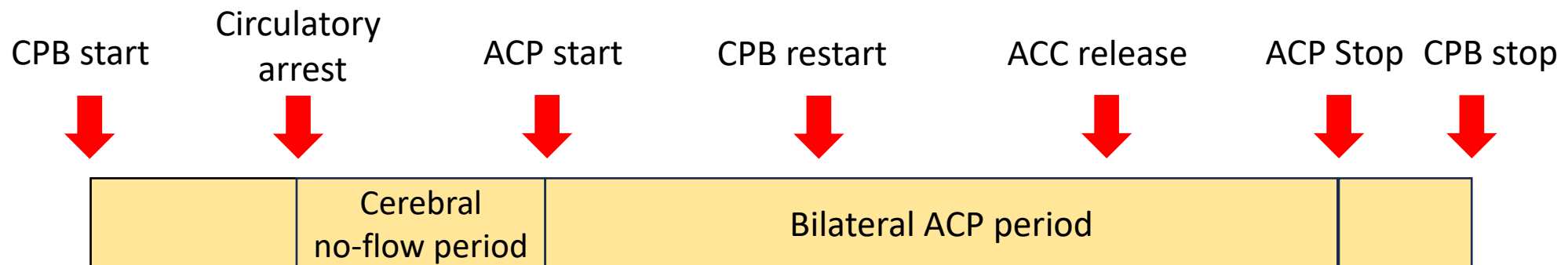
제55차 추계학술대회 & APELSO 2023

2023. 11. 02 (Thu) - 11. 04 (Sat), 그랜드 인터컨티넨탈 파르나스 서울

The Impact of Antegrade Cerebral Perfusion Flow Rate on postoperative neurologic deficits in Aortic Arch Surgery



- The optimal flow rate of antegrade cerebral perfusion (ACP) in aortic arch surgery is controversial.
- A flow rate of 8-10 ml/kg/min is generally recommended.
- The ACP strategy in our center
 - Initial cerebral no-flow period (15-20 min) during circulatory arrest for bloodless surgical field
 - Bilateral ACP using balloon occlusion catheters with an in-line pressure of ≤ 200 mmHg
 - Performing the proximal anastomosis before arch vessels anastomosis
- This study aimed to investigate the impact of ACP flow rate on postoperative neurologic deficits.
(ischemic stroke and delirium)



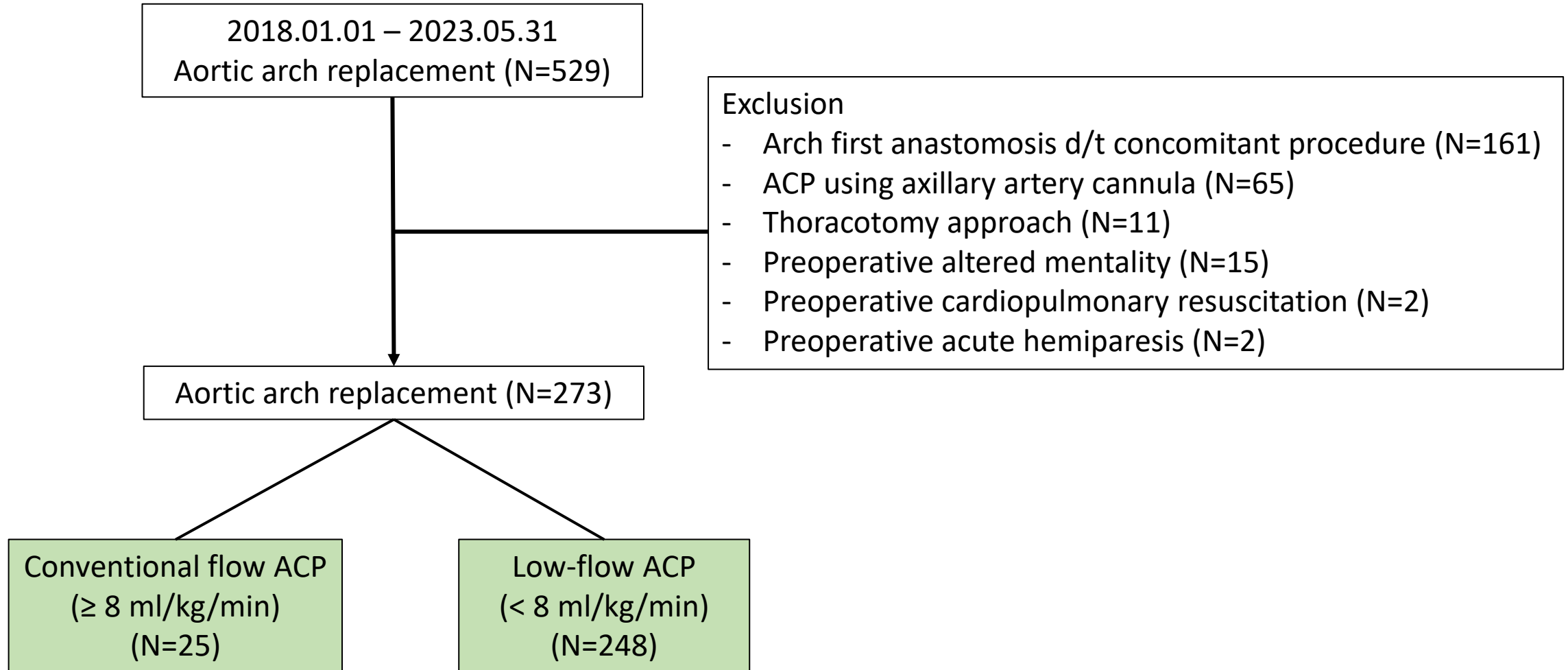


Table 1. Preoperative characteristics and operative details

Variables	Conventional flow (N=25)	Low-flow (N=248)	P-value
Age	76.0 [70.0;80.0]	71.0 [62.0;79.0]	0.029
Male	6 (24.0%)	139 (56.0%)	0.004
Weight	48.0 [45.0;53.1]	65.2 [58.3;74.0]	<0.001
BMI	20.3 [18.9;22.1]	24.8 [22.6;27.2]	<0.001
Diagnosis			0.073
Acute aortic syndrome	14 (56.0)	126 (50.8)	
Aneurysm or chronic dissection	8 (32.0)	114 (46.0)	
Others	3 (12.0)	8 (3.2)	
Carotid artery malperfusion	0 (0.0)	9 (3.6)	1.000
Total arch replacement	15 (60.0)	190 (76.6)	0.112
Lowest body temperature			
Rectal (°C)	24.2 [22.8;25.6]	24.6 [23.4;25.9]	0.181
Nasopharyngeal (°C)	19.2 [17.5;20.0]	19.1 [18.1;20.1]	0.544
Operation time			
Total circulatory arrest time (min)	47.9 ± 11.5	54.3 ± 14.0	0.030
Cerebral no-flow time (min)	15.0 [11.0;18.0]	19.0 [14.0;24.0]	0.006
ACP time (min)	89.0 [81.0;100.0]	88.0 [76.5;101.0]	0.669
ACP			
ACP flow (ml/min)	400.0 [400.0;500.0]	350.0 [250.0;400.0]	<0.001
ACP flow (ml/kg/min)	8.7 [8.3; 9.4]	5.4 [3.7; 6.4]	<0.001
ACP pressure (mmHg)	46.0 [36.0;53.0]	34.0 [28.0;43.0]	<0.001

In low-flow group,

- young
- male
- high weight
- high BMI

→ Median ACP flow
5.4 ml/kg/min

Table 2. Early postoperative outcomes

Variables	Conventional flow (N=25)	Low-flow (N=248)	P-value
Recovery time			
Obey command (hour)	5.0 [3.0; 9.5]	4.0 [2.0; 6.0]	0.158
Extubation (hour)	14.0 [8.0;24.0]	11.0 [6.0;18.0]	0.107
Postoperative neurologic deficits			
Ischemic stroke	1 (4.0)	9 (3.6)	1.000
Delirium	0 (0.0)	36 (14.5)	0.056
In-hospital mortality	2 (8.0)	11 (4.4)	0.338



Total (N=273)	
Ischemic stroke	10 (3.7)
Delirium	36 (13.2)

Table 3. Risk factor for ischemic stroke

	Univariable	
	OR (95% CI)	P-value
Age	1.00 (0.95-1.05)	0.852
Male	2.11 (0.57-1.00)	0.286
Carotid malperfusion	3.54 (0.18-22.6)	0.256
Cerebral no-flow time	1.06 (0.99-1.15)	0.079
ACP time	1.02 (1.00-1.03)	0.019
ACP flow (ml/kg/min)	0.98 (0.70-1.35)	0.885

Table 4. Risk factor for delirium

	Univariable		Multivariable	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Age	1.01 (0.99-1.04)	0.354	1.03 (1.00-1.06)	0.067
Male	1.92 (0.93-4.13)	0.084		
Carotid malperfusion	0.82 (0.04-4.66)	0.852		
Cerebral no-flow time	1.04 (1.00-1.08)	0.067		
ACP time	1.01 (1.00-1.02)	0.135	1.01 (1.00-1.03)	0.071
ACP flow (ml/kg/min)	0.83 (0.68-1.00)	0.047	0.78 (0.64-0.95)	0.016

- The ACP strategy in our center resulted in low-flow ACP in 90.8% of the patients.
- Although this strategy demonstrated favorable neurologic outcomes,
(ischemic stroke 3.7% and delirium 13.2%)
 - ✓ a prolonged duration of ACP time was a significant risk factor for ischemic stroke,
 - ✓ a low ACP flow rate was a significant risk factor for delirium.