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The prognostic factors of perioperative stroke in cardiac, coronary artery and aorta surgery

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Introduction

- **Perioperative stroke Devastating complication of cardiac surgery and surgery of the coronary artery and thoracic aorta**
  - Incidence rates: thoracic aorta- 7.3%, Coronary Artery Bypass Grafting surgery (CABG)-1.87%
  - Significantly increased rates of mortality and morbidity and presents a significant financial burden to our healthcare system
- **To mitigate this burden, it is necessary to predict the prognosis following perioperative stroke and establish future rehabilitation and care plans**
- **Aim of this study**
  - To predict the prognostic factors of perioperative stroke occurring after cardiac surgery or surgery of the aorta and coronary artery

Methods

- **Subjects**
  - Patients with perioperative stoke after cardiac surgery or CABG and surgery of aorta
  - transferred to department of rehabilitation medicine in tertiary hospital
  - from February 2022 to January 2024
- **The demographic data**
  - age, gender, diagnosis, brain lesion, and Charlson Comorbidity Index (CCI)
- **Assess prognostic factors and the effectiveness of rehabilitation treatment**
  - Modified Barthel Index (MBI), National Institutes of Health Stroke Scale (NIHSS), Medical Research Council (MRC) sum score, Modified Rankin Scale (MRS) score, and Mini-Mental State Examination (MMSE)
  - Investigated before and after a three-week rehabilitation period
- **Statistical analysis**
  - Wilcoxon signed-rank test: for comparing pre- and post-treatment measures
  - Spearman rank correlation analyses: conducted to identify prognostic factors

Results

Table 1. Demographic data of the participants

Total 8 participants		Mean ± SD
Age (year)		63.63±17.84
Sex (Male: Female)		5:3
Diagnosis	Aortic dissection	4
	Aortic aneurysm	1
	CAOD s/p CABG	2
	Mitral regurgitation s/p valve replacement	1
Brain lesion	Supratentorial	3
	Infratentorial	1
	Dual	3
Charlson Cormorbidity Index		7.13±4.02

- **Total of 8 patients with perioperative stroke**
  - The average age of the patients: 63.63±17.84 years
  - With 5 male individuals
  - Aortic dissection was the most prevalent condition in 4 patients
  - The CCI averaged 7.13±4.02

Table 2. Comparison of outcomes before and after 3 weeks of rehabilitation

	Pre-treatment	Post-treatment	p-value
NIHSS	12.63±6.19	8.00±7.01	0.018*
MBI	18.50±23.20	35.00±31.51	0.018*
MMSE	10.125±11.40	17.88±9.57	0.018*
MRCsum	36.00±11.06	40.00±11.31	0.136
MRS	4.37±1.19	3.63±1.85	0.084

*: $p<0.05$

- There were statistically significant improvements in **NIHSS, MBI, and MMSE scores** before and after rehabilitation.

Table 3. Results of Spearman rank correlation analysis

	Diff NIHSS	DiffMBI	Diff MMSE	Diff MRCsum	DiffMRS
Age	0.077	0.349	0.933	0.977	0.055
Sex	0.063	0.039*	0.101	0.030*	0.314
Diagnosis	0.213	0.171	0.763	0.167	0.312
Brain lesion	0.497	0.296	0.140	0.600	0.270
CCI	9.414	0.670	0.272	0.704	0.044*

Diff=The value after 3-week rehabilitation –The value before 3-weeks of rehabilitation
*: $p<0.05$

- **According to the Spearman rank correlation analysis**
  - Age, location of brain lesions, and diagnosis : no significant association with improvement in patients' NIHSS, MBI, MMSE, MRC sum, and MRS scores
  - **Significant correlation between CCI and improvement in MRS score**

Discussion

- **The most crucial factor influencing the prognosis of perioperative stroke occurring after cardiac surgery and coronary artery or aorta surgery**
  - **The underlying comorbidity**
- **It would be essential to assess the CCI in patients with perioperative stroke, and subsequently establish long-term goals for rehabilitation treatment**