Regional cerebral oxygen saturation is a useful predictive factor of postoperative cerebral infarction for acute aortic dissection involving the aortic arch

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【Background】

Cerebral malperfusion is a serious complication in the anesthetic management of patients with acute type A dissection of aorta (DA). Especially, cerebral perfusion can be restricted if the dissected area involves the aortic arch and the cervical branches.

Previous studies have reported that operation time and an intraoperative depression of regional cerebral oxygen saturation (rSO_2) can be predictive factors for detecting cerebral malperfusion in patients with DA. However independent risk factors other than rSO_2 for cerebral malperfusion in patients with **DA involving the aortic arch** are not clear.

【Aim】

This retrospective observational study was aimed to investigate the factors which are correlated with postoperative cerebral infarction (CI) in patients with DA involving the aortic arch.

【Materials and Methods】

The study was approved by the Institutional Ethics Committee of Kurashiki Central Hospital (October,2016).

Subjects: Patients who underwent urgent aortic surgery involving arch dissection.

Study duration: December 1st 2010 - October 30st 2016.

Measurement: Operation (Op) time, cardiopulmonary bypass time, aortic clamping time, selective cerebral perfusion time, circulatory arrest (CA) time, amount of bleeding, amount of transfusion, and rSO_2 values.

Statistical analysis: Non-paired t-test, logistic regression, and receiver operating characteristic (ROC) curve analysis.

A p value of less than 0.05 was considered as significant.

【Results】

Independent risk factors for CI

	OR	95% CI	P-value
Op time(min)	1.010	1.00-1.02	0.00251
CA time(min)	0.985	0.934-1.04	0.963
Bleeding(ml)	1.000	1.000-1.00	0.535
Transfusion(ml)	1.000	1.000-1.00	0.699
$rSO_2 < 50\%$ (min)	1.010	1.000-1.02	0.00738

Independent risk factors for CI: operation time (OR=1.01, 95%CI 1.00-1.02), and time duration of rSO_2 below 50% (OR=1.01, 95%CI 1.00-1.02).

ROC curve analysis: rSO_2 depression below 50% of longer than 39 minutes was a significant independent predictor of postoperative CI (Sensitivity: 75% Specificity: 67%, $P=0.0003$).

【Conclusion】

These results indicate that **prolonged depression in rSO_2 and operation time** are useful predictors for postoperative CI in patients with DA involving the aortic arch.

ROC curve

Demographic data

	CI group (n=28)	Non - CI group (n=57)
Male/Female	16/12	29/28
Age	68.1±12.1	65.8±12.9
Hypertension	23	51
Diabetes mellitus	2	5
Dyslipidemia	11	13
Smoking	12	20
History of CI	10	4
Shock	7	2

Mean ± SD

KCH