Differential recovery between Regional Cerebral Oxygen Saturation (rSO_2) and physiological parameters in cardiopulmonary arrest (CPA) patients after return of spontaneous circulation

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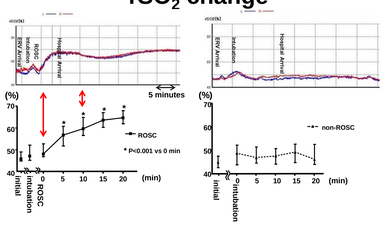
Backgrounds

- rSO_2（regional cerebral SO_2）may predict neurological outcome or return of spontaneous circulation (ROSC) （Ahn et. al *Resuscitation* 2013 ）
- We clarified that rSO_2 increased immediately in ROSC patients but not in non-ROSC patients. (Tajima et al. *Acute Medicine and Surgery* 2014)

rSO_2 change



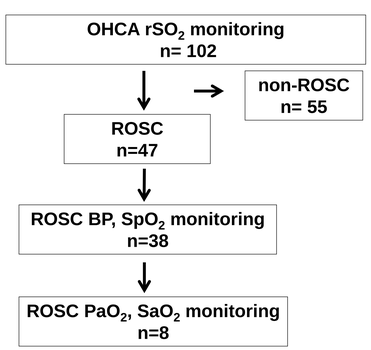
Objective

We aimed to clarify the change in rSO_2, blood pressure (BP) and arterial oxygen saturation (SpO_2) in CPA patients who got return of spontaneous circulation (ROSC).

Methods

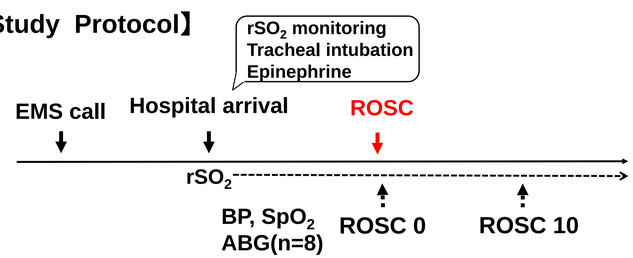
We measured rSO_2 in CPA patients who were transferred to two tertiary emergency medical centers. On arrival, rSO_2 sensor(HAND ai TOS, TOSTEC, Tokyo, Japan) was attached to the forehead of patients, and monitored continuously during cardiopulmonary resuscitation. In the patients who got ROSC, we compared change in rSO_2 and BP, SpO_2 just after ROSC shown as ROSC0, and 10 minutes after ROSC shown as ROSC10. And correlation between rSO_2 and BP, SpO2 was also evaluated in 8 patients.

Patients



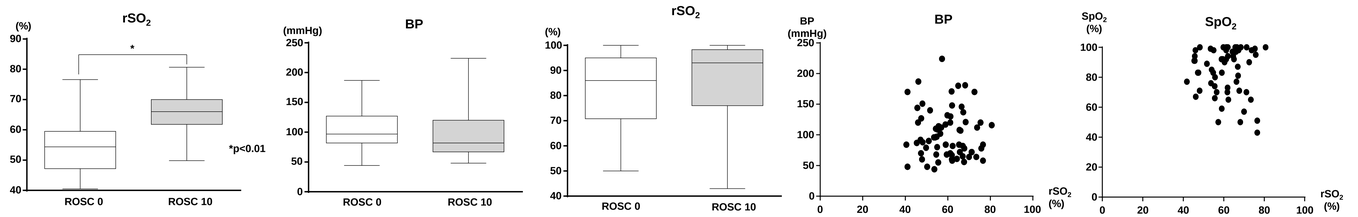
【Portable NIRS】

【Study Protocol】



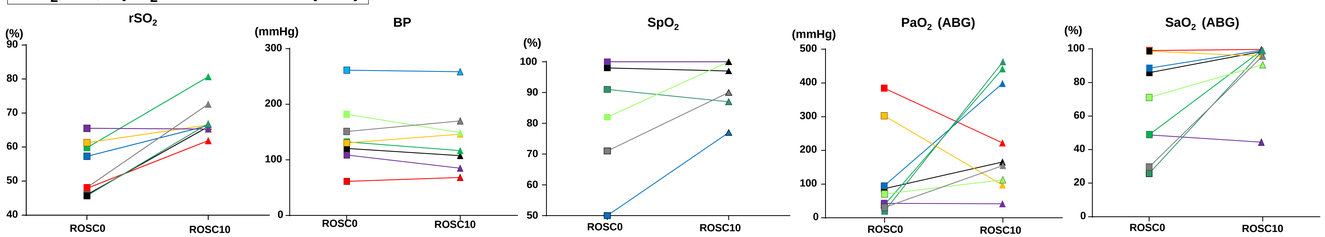
Results

rSO_2 vs BP, SpO_2



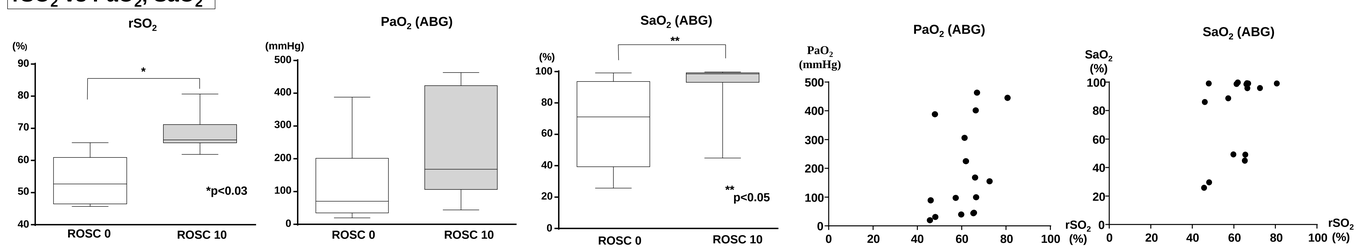
rSO_2 increased immediately after ROSC, and showed the significance. However, in BP and SpO_2, there were no significant differences between in ROSC 0 and ROSC 10. BP rather showed lower tendency in ROSC 10 compared to ROSC 0. We made scatter plots for each time points, and compared the rSO_2 and BP, SpO_2. There was no significant correlation between rSO_2 and neither BP nor SpO_2.

rSO_2, BP, SpO_2 with ABG data (n=8)



There were 8 patients whose ABG data was obtained at the comparable time point with BP and SpO_2. The graphs show PaO_2 and SaO_2 in addition to BP and SpO_2. rSO_2 increased significantly after ROSC as shown before. rSO_2 increased even PaO_2 in two patients decreased in ABG, if patients had their own heartbeat.

rSO_2 vs PaO_2, SaO_2



rSO_2 increased immediately after ROSC, as shown in the previous slide. In PaO_2 and SaO_2, there were no significant differences between in ROSC 0 and ROSC 10. We made scatter plots for each time points, and compared the rSO_2 and PaO_2, SaO_2. There was no significant correlation between rSO_2 and neither PaO_2 nor SaO_2.

Conclusion

- We clarified that there is a differential recovery between rSO_2 and BP, SpO_2 change after ROSC in CPA patients.
- Further study is required to clarify the factors which contribute to rSO_2 increase.