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Survival but not severity of hypoxic-ischemic encephalopathy is associated with higher mean arterial blood pressure after cardiac arrest

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Background:

To study the association between vasopressor-supported mean arterial blood pressure (MAP) and severity of hypoxic-ischemic encephalopathy (HIE) evaluated by neurological status in survivors and brain autopsy in non-survivors of cardiac arrest (CA).

Materials and methods:

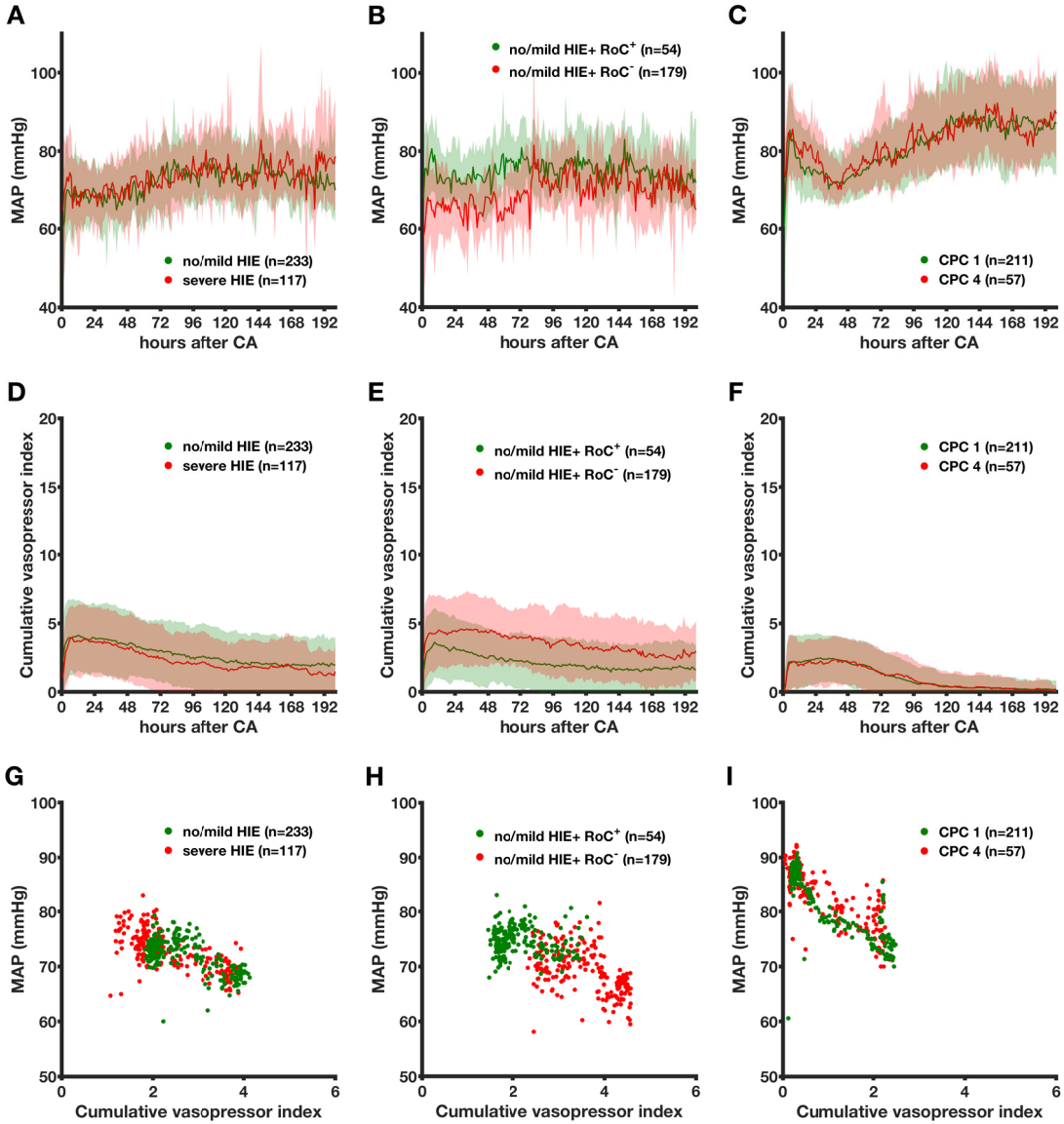
We retrospectively investigated two CA cohorts with initially successful resuscitation between 2008 to 2017. In non-survivors, we quantified the histopathological HIE severity, dichotomized into no/mild and severe HIE, using the selective eosinophilic neuronal death classification. In survivors, we dichotomized the clinical HIE severity into no/mild (CPC 1) and severe HIE (CPC 4). Furthermore, regain of consciousness was investigated. We analyzed MAPs 200 hours after CA and quantified vasopressors using the cumulative vasopressor index (CVI).

Results:

Of 350 non-survivors, we found no differences in MAP (73.1 vs. 72.0 mmHg, p=0.639) in 117 histopathologically severe HIE and 233 no/mild HIE non-survivors. Non-survivors showed lower MAPs compared to survivors with CPC 1 (n=211) and CPC 4 (n=57) who had no clinically relevant MAP differences (81.2 vs. 82.3 mmHg, p<0.001). 54 no/mild HIE non-survivors regaining consciousness before death had higher MAPs compared to 179 no/mild HIE non-survivors with permanent coma (74.7 vs. 69.3 mmHg, p<0.001). No/mild HIE non-survivors regaining consciousness required less vasopressors (CVI 2.1 vs. 3.6, p<0.001). Survivors were faster weaned from vasopressors independently from HIE severity.

Conclusion:

Survival but not HIE severity was associated with higher MAPs in CA patients treated with a vasopressor-supported MAP-target above 65 mmHg. Less vasopressors were associated with coma awakening. We found no evidence of neuroprotection by MAP-targets above guideline recommendations.


A
B
C
D
E
F
G
H
I
MAP (mmHg)
hours after CA
Cumulative vasopressor index
Cumulative vasopressor index
no/mild HIE (n=233)
severe HIE (n=117)
no/mild HIE+ RoC+ (n=54)
no/mild HIE+ RoC- (n=179)
CPC 1 (n=211)
CPC 4 (n=57)