Evaluation of HMGB1 protein in cerebrospinal fluid to predict treatment outcome in subarachnoid hemorrhage patients

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neurymal subarachnoid hemorrhage (SAH) is a life threatening and disabling condition. Early prognostication of treatment outcome would enable optimized care (1). HMGB1 protein, key mediator of neuroinflammation in SAH was found to be novel biomarker of neurological outcome (2). In group of 13 SAH patients with acute hydrocephalus HMGB1 level correlated with GOS at 3 months.

Patients & methods

Study design

- Aneurymal subarachnoid hemorrhage 1/2013-2/2014
- Aneurysm site: AcoA 4 (31%), ACA 2 (15%), ICA 2 (15%), PCA 1 (8%), PICA 1 (8%), BA 3 (23%)
- Aneurysm site: AcoA 4 (31%), ACA 2 (15%), ICA 2 (15%), PCA 1 (8%), PICA 1 (8%), BA 3 (23%)

- In initial HMGB1 level in CSF of SAH patients is statistically significant difference between those two groups

- Initial HMGB1 level correlates with treatment outcome and was found to be reliable predictive marker

- HMGB1 level gradually declines in survivors, but remains elevated among non-survivors

- Among non-survivors elevated HMGB1 level remains constant in consecutive samples. This suggest active inflammation fueled by cytokine vicious cycle (6). Expected chain of events presented above.

Results

- In our study, we have found:
- trace amounts of HMGB1 in CSF from Control Group
- high level of HMGB1 in CSF from Study Group

- statistically significant difference among non-survivors among non-survivors patients

- HMGB1 level in CSF of SAH patients is significantly elevated.

Discussion

- SAH treatment outcome may be predicted with high accuracy by HMGB1 level in CSF.
- WFN5 scale was found to be useful tool.
- Hunt&Hess grading, Fisher scale, modified Fisher scale, WBC, CRP, fibrinogen and body temperature were found to be poor prognostic factors in SAH patients.

In survivors group HMGB1 level differs in consecutive samples. There is decreasing trend in HMGB1 concentration in time. This suggests progressive expiring of inflammation.

Conclusions

- HMGB1 protein can be found in every brain cell nucleus (3).
- Extracellular HMGB1 functions:
  - Damage associated molecule (DAMP) & Alarmin
  - Proinflammatory mediator

References


