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

Neuromyal 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.

Summary

In our study, we have found:

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

Patients & methods

Study design

Study Group

- Aneurysmal subarachnoid hemorrhage/2015-2016
- Confirmation by CT
- Treated endovascularly
- n=13

Control Group

- Minor non-inflammatory neurological disorders
- No chronic inflammatory diseases
- Low plasma inflammatory markers
- n=8

Aneurysm site: ACoA 4 (31%), ACA 2 (15%), ICA 2 (15%), PCA 1 (8%), PICA 1, BA 3 (23%)

Angiographic lumbar puncture

Cerebrospinal fluid samples:

- Study group: first sample on admission, next samples - randomly during ICU stay
- Control group: One sample per patient

ELISA test

0,003-10,0 ng/ml

Study group:

- Group A: first sample, 25% of patients
- Group B: second sample, 25% of patients
- Group C: third sample, 50% of patients

Control group:

- Group A: first sample, 25% of patients
- Group B: second sample, 25% of patients
- Group C: third sample, 50% of patients

Results

HMGB1 level

Study Group vs Control Group

P=0,006 Mann–Whitney test

Study Group Favorable vs Unfavorable

P=0,003 Mann–Whitney test

Median & quartiles

Survivors vs non-survivors

In-hospital mortality

HMGB1 level in time

hospital survivors

P=0,241 Page exact test

Correlation

HMGB1 & GOS at 3 months

R=-0.882 P=0.001 Spearman’s correlation test

Correlation GOS at 3 months & other examined parameters

Spearman's correlation test

Discussion

In our study, we have found:

1. HMGB1 level in CSF of SAH patients is significantly elevated.
2. Initial HMGB1 level correlates with treatment outcome and was found to be reliable predictive marker.
3. HMGB1 level gradually declines in survivors, but remains elevated among non-survivors.

Conclusions

References