SUMMARY

Role of blood biomarkers in spontaneous intracerebral hemorrhage

Background:

The study of blood biomarkers can offer new possibilities in diagnostics, prognostication, determination of etiology, and management of spontaneous intracerebral hemorrhage. The aim of our study was to assess the relationship between a panel of selected blood biomarkers and clinical and radiodiagnostic parameters in patients with spontaneous intracerebral hemorrhage. Primarily, the aim was to find a prognostic biomarker which could help in deciding on the optimal categorization of treatment.

Patients and methods:

A total of 70 patients were prospectively included in this study. The following blood biomarkers were determined: glial fibrillary acidic protein, S100B protein, matrix metalloproteinase 9, interleukin 6, interleukin 10, 25-hydroxyvitamin D, 1,25-dihydroxyvitamin D, total cholesterol, leukocyte counts, blood glucose and C-reactive protein. These were then correlated with selected clinical and radiodiagnostic parameters.

Results:

Relative to hematoma volume a statistically significant positive correlation was found for S100B, interleukin 10, interleukin 6 and blood glucose (S100B: $\rho= 0,54$, $p< 0,001$, IL-10: $\rho= 0,43$, $p< 0,001$, IL-6: $\rho= 0,26$, $p= 0,027$, blood glucose: $\rho= 0,24$, $p= 0,045$).

Using multivariate analysis, a significantly positive correlation was found between hematoma progression and matrix metalloproteinase 9 [ug/ml] (OR 0,10; $p=0,007$) - lower values predict hematoma progression, and also S100B above 0,15 [μg/l] (OR 6,77; $p=0,011$) - higher values predict hematoma progression.

Patients with S100B above 0,15 μg/l are four times less likely to achieve a favorable outcome (OR 0,26; $p=0,034$).

None of the evaluated laboratory parameters were shown by multivariate analysis to have a significant association with three-month mortality.

Conclusion:

Higher levels of S100B are associated with larger hematoma volume. They predict hematoma progression and an unfavorable outcome. One other positive correlation was found between hematoma volume and interleukin 6, interleukin 10 and blood glucose. Lower levels

of matrix metalloproteinase 9 are an independent prognostic factor for hematoma progression in patients with spontaneous intracerebral hemorrhage.

Clinical consequences and the future:

Despite of studies published so far, no blood biomarker of intracerebral hemorrhage has been implemented into clinical routine yet. Numerous blood biomarkers are associated with different pathophysiological pathways of intracerebral hemorrhage and some of them have potential to be useful in the management of patients with this diagnosis. For the future well-designed, large-scale (multicentric) studies are needed.