

Gene expression in septic patients manifest significant diagnostic signatures despite strong center-associated effects

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Sepsis represents the systemic response to the infection. Improvements of early diagnosis, the differentiation between infectious and non-infectious origins of systemic inflammatory response, the inclusion of surrogate markers for the systemic inflammatory response, are all the targets of many studies. In a previous study we were able to identify that robust gene activity pattern correlated to the severity of sepsis. Therefore, the aim of the present study was to evaluate whether (i) center-dependent effects on the gene expression pattern exist, and (ii) whether significant diagnostic gene expression profile can be identified.

Materials and methods:

50 patients were randomized and enrolled from three Czech and one German hospital. The ACCP/SCCM consensus conference definition was applied to predict the severity of sepsis in ICU patients. As controls we used post spinal and bypass surgery patients without signs of inflammation. Gene expression analysis using a specialized medium-density microarray (5500 inflammation relevant genes, SIRS-Lab Jena, Germany) was made. Differentially expressed gene activities were selected with a mean expression change outside the thresholds and with a corresponding p-value of <5% for at least one comparison.

Results:

Overall, 1236 of 5226 assessed gene activities showed strong center-dependent effects. However, 131 gene activities (2.5%) were differentially expressed in patients with sepsis as compared to the control group.

Conclusions:

The present data indicates that microarray technology is suitable for systematically identifying those genes that underly the attenuated inflammatory response in sepsis. Gene expression profiles were able to distinguish between infectious and non-infectious systemic inflammatory response, despite a magnitude of center-associated effects. Therefore, the gene expression pattern was robust and has a potential impact for future diagnosis and treatment of sepsis.