

### Comparison of qSOFA (quick SOFA) Score, Presepsin, Procalcitonin and Lactate for Severity Assessment and Mortality Prediction in Patients with Initial Sepsis

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**Background** The SOFA score is associated with an increased probability of mortality in sepsis. The Third International Consensus Definitions for Sepsis and Septic Shock defined the qSOFA score, which can be assessed at admission without laboratory tests.

**Objective** To compare sepsis biomarkers with qSOFA for differentiation of sepsis, severe sepsis or septic shock and risk of mortality prediction.

**Methods** 66 Patients admitted with signs of sepsis were included. Severe sepsis and septic shock were defined according to current guidelines. qSOFA score was calculated from respiratory rate, GCS score and systolic blood pressure using the recommended thresholds. Presepsin (PSEP) and procalcitonin (PCT) were determined using the POC assay PATHFAST Presepsin, LSI Medicine Corporation and the BRAHMS luminescence immune assay.

**Results** Discrimination between sepsis (n=30, mortality=6.6%) and severe sepsis or septic shock (n=36, mortality=36.1%) revealed AUC values of 0.621, 0.627, 0.731, 0.740 and 0.781 for lactate, PCT, qSOFA, PSEP and the combination qSOFA+PSEP, respectively. 15 patients died during hospitalization. AUC values of mortality prediction were 0.715, 0.558, 0.734, 0.758 and 0.803 for lactate, PCT, qSOFA, PSEP and qSOFA+PSEP, respectively. qSOFA scores  $\geq 2$  should identify greater risk of death or prolonged ICU stay. Discrimination between qSOFA  $< 2$  and  $\geq 2$  revealed AUC values of 0.756, 0.669 and 0.606 for PSEP, lactate and PCT. Using the threshold  $\geq 2$  of qSOFA and  $\geq 500$  ng/L of PSEP, the combination qSOFA+PSEP detected 14 non-survivors (93%) and 33 (92%) patients of the high risk group (n=36), whereas qSOFA alone detected only 10 non-survivors (67%) and 21 patients of the high-risk group (58%).

**Conclusion** The results demonstrated that the qSOFA score is not a standalone criterion for risk stratification in sepsis at admission. Simultaneous assessment by combining qSOFA and PSEP improved the validity significantly. The POC assay PATHFAST Presepsin showed superior performance compared to lactate and PCT.

| Detection rate of non-survivors and severe sepsis or septic shock |            |                              |                   |                                    |                          |
|---|------------|------------------------------|-------------------|------------------------------------|--------------------------|
| Marker  | Criterion  | Non-survivors Detection rate | Non-survivors AUC | Severe Sepsis/shock Detection rate | Severe Sepsis/ Shock AUC |
| PCT   | 2 µg/L     | 47%                          | 0.558             | 20%                                | 0.627                    |
| Lactate   | 2 nmol/L   | 75%                          | 0.715             | 53%                                | 0.621                    |
| PSEP  | 500 ng/L   | 93%                          | 0.758             | 89%                                | 0.740                    |
| qSOFA   | 2          | 67%                          | 0.734             | 58%                                | 0.731                    |
| qSOFA+PSEP  | 2/500 ng/L | 93%                          | 0.803             | 92%                                | 0.781                    |