Introduction:
Prediction of severe events in clinical sepsis is challenging. For such prediction we aimed to compare the novel biomarker calprotectin in plasma, with routine biomarkers.

Methods:
In a prospective study, blood samples were collected from consecutive patients who triggered the sepsis alert in the emergency department in our hospital. C-reactive protein (CRP), procalcitonin, neutrophils, and lymphocytes were analysed according to routine practice. P-calprotectin was analysed using a specific particle enhanced turbidimetric assay (Gentian Diagnostics AS). The composite endpoint, which was termed severe event, was defined as death or admission to the intensive care unit (ICU)/high dependency unit (HDU) within 48 hours from arrival.

Results:
The study included 367 patients with written informed consent, of whom 335 were considered to have infection (defined as obtained blood culture and subsequent antibiotic therapy for at least 4 days or until discharge or death), and 32 had no infection. Seventy-four patients (22%) with infection developed a severe event.

Mean p-calprotectin was 2.99 mg/L (standard deviation (SD) 2.10) among patients with infection and 2.35 mg/L (SD 2.64) among patients without infection (p=0.02). In patients with infection mean p-calprotectin was 3.81 mg/L (SD 3.18) among those with and 2.75 mg/L (SD 2.50) among those without a severe event (p=0.006).

Analysis of area under the receiver-operating characteristic (ROC) curve for prediction of severe events showed superiority for p-calprotectin compared with procalcitonin and neutrophil-lymphocyte-ratio, both regarding all sepsis alert cases and regarding the patients with infection (p<0.05 for all comparisons), fig 1. In addition, there was a trend toward superior performance compared to CRP (p=0.10 and 0.15).

Conclusion:
In sepsis alert patients, p-calprotectin was elevated in those who subsequently developed severe events. P-calprotectin was superior to traditional biomarkers for prediction of severe events.
Figure 1
Prediction of early severe event

A. All sepsis alert patients
B. Patients with infection

Source of the Curve
- C-reactive protein (CRP)
- Procalcitonin (PCT)
- Neutrophil-Lymphocyte ratio

Figur 1. Prediction of early severe event