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Diagnostic and Prognostic Value of suPAR in Patients with Sepsis in Comparison to Presepsin and Procalcitonin

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E. Spanuth[1], B. Ivandic[1,2], H. Ebelt[3], K. Werdan[3]

[1)] DIAneering®, Diagnostics Engineering & Research GmbH, Friedrichstr. 26, 69221 Heidelberg-Dossenheim, Germany; [2)] Dept. of Medicine III, Div. of Cardiology, University of Heidelberg, Heidelberg, Germany; [3)] Department of Medicine III, University Clinics Halle (Saale), Martin-Luther-University Halle-Wittenberg, Germany

Background. Urokinase plasminogen activator receptor (suPAR) concentrations are increased in critical ill patients especially with infectious diseases and sepsis.

Aim of the study. We intended to examine the prognostic value of suPAR in comparison to presepsin (PSEP) and procalcitonin (PCT) and to the APACHE II score in patients presenting with sepsis in the emergency room (ER).

Methods. suPAR (suPARnostic® ELISA, ViroGates, Danmark**)**, PSEP (PATHFAST Presepsin (Mitsubishi, Japan), PCT (Elecsys BRAHMS PCT, Roche Diagnostics AG, Switzerland) and APACHE II score were determined in 69 patients with sepsis at admission to the ER. Primary endpoint was death within 30 days. The combined endpoint "major adverse event" (MAE) consisted of at least either the primary or at least one of the secondary endpoints (intensive care, mechanical ventilation or dialysis).

Tab. 1: Biomaker values in sepsis, severe sepsis and septic shock

	Sepsis, n=41 Median (IQR)	Severe sepsis, n=18 Median (IQR)	Septic shock, n=10 Median (IQR	P=
suPAR, µg/L	**8.6** (6.5-12.0)	**9.7** (6.7-18.4)	**13.4** (9.3-18.9)	**0.0752**
PCT, µg/L	**1.4** (0.5-3.2)	**3.4** (0.6-8.6)	**30.9** (1.5-78.0)	**0.0100**
PRE, ng/L	**803** (514-1375)	**1817** (747-3036)	**1778** (1266-3184)	**0.0028**

Tab. 2: Biomarker values in survivors vs non-survivors and patients with and without MAEs

	PCT, µg/L Median (IQR)	PSEP, ng/L Median (IQR)	suPAR, µg/L Median (IQR)
No MAE, n=43	**1.35** (0.46-3,76)	**782** (428-1496)	**8.6** (5.8-11.6)
MAE, n=26	**2.17** (0.74-21.4)	**1777** (832-3504)	**11.0** (7.5-18.9)
P-value (Mann-Whitney test)	**0.1083**	**0.0003**	**0.1096**
Alive, n=50	**1.56** (0.66-4.93)	**804** (527-1606)	**8.6** (5.6-12.3)
Dead, n=19	**2.78** (0.37-21.9)	**2124** (1301-3686)	**13.2** (8.1-18.9)
P-value (Mann-Whitney test)	**0.6917**	**0.0001**	**0.0643**

Results. 41, 18 and 10 patients developed sepsis, severe sepsis and septic shock, of whom 3 (7.3%), 8 (44.4%) and 8 (80%) died during 30-day follow-up. The overall mortality was 27.5%.

PSEP and PCT differed significant between patients with sepsis and septic shock (p-values were 0.0028 and 0.01) whereas the difference of suPAR was only slightly significant (p = 0.0752). (**Tab. 1**).

PSEP differed highly significant between patients with favourable and worse outcome (MAE or death, p-values 0.0003 and 0.0001) (**Tab. 2**). The receiver operating curves from ROC analysis for prediction of death and MAEs are displayed in **Fig. 1, A,B**. PRE showed AUC values similar to APACHE II score followed by suPAR, whereas PCT showed less predictive power.

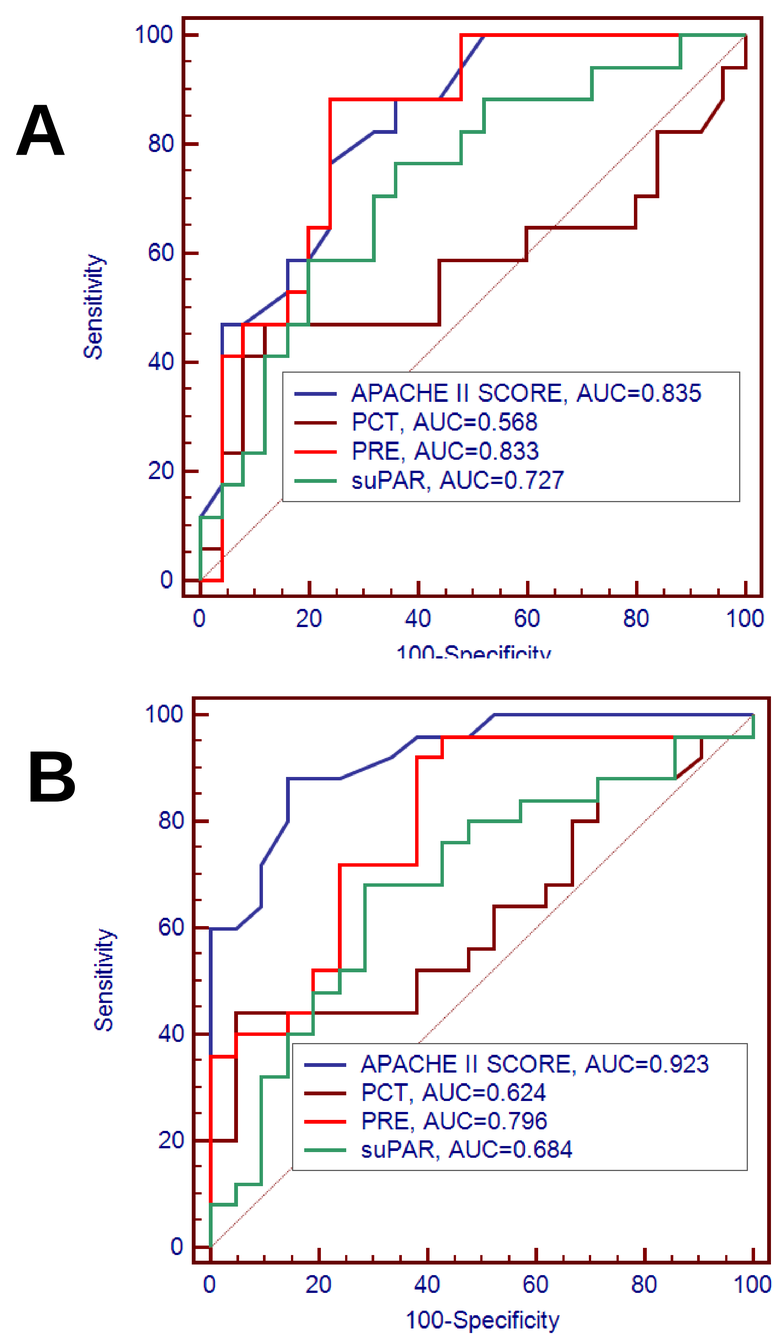

Fig. 1: Results of ROC analysis, A: endpoint death, B: endpoint MAE

Conclusion

The prognostic accuracy of suPAR was superior to PCT but not to PSEP. Although suPAR provided reliable prognosis and prediction of 30-day mortality, the diagnostic accuracy of PSEP was superior to PCT and suPAR and similar to APACHE II score for prediction of outcome (mortality and MAEs) including additional procedures like dialysis or mechanical ventilation (data not shown). PSEP was also superior in discrimination between sepsis, severe sepsis and septic shock.