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Early diagnosis of AKI in the ICU: urinary chitinase 3-like protein 1 as a novel renal troponin

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Introduction

Our group recently validated urinary chitinase 3-like protein 1 (**UCHI3L1**) as novel biomarker for acute kidney injury (**AKI**) in septic mice [1].

Objectives

This ensuing study aimed to investigate whether our preclinical finding could be translated to humans and whether UCHI3L1 performed equally to the AKI biomarker urinary neutrophil gelatinase-associated lipocalin (**UNGAL**) [2].

Methods

Prospective cohort study at the surgical and medical ICUs of the University Hospital Ghent from Sept. 2012 till Aug. 2014. Patients were **included if**: age ≥18 y; arterial and urinary catheter present; expected ICU stay ≥48 h; and respiratory or cardiovascular SOFA score ≥2 resp. ≥1. Participation was **excluded if**: AKI $KDIGO_{Full}$ stage ≥2 at inclusion; chronic kidney disease stage 5; or no written informed consent.

Blood and urine were collected at inclusion. Each patient was sampled a 2nd time at 6 pm if the 1st collection was before noon, then at 6 am and pm on days 2-4, and at 6 am on days 5-7. The study stopped if the patient was discharged from the ICU before day 7. Reference serum creatinine (SCr) was defined as the lowest SCr value within the last 3 months prior to enrollment.

The **primary endpoint** was **AKI $KDIGO_{Full}$ stage ≥2** within **12 h** after enrollment. Secondary endpoints were: AKI $KDIGO_{Full}$ stage ≥2 within 24 h and 7 d after

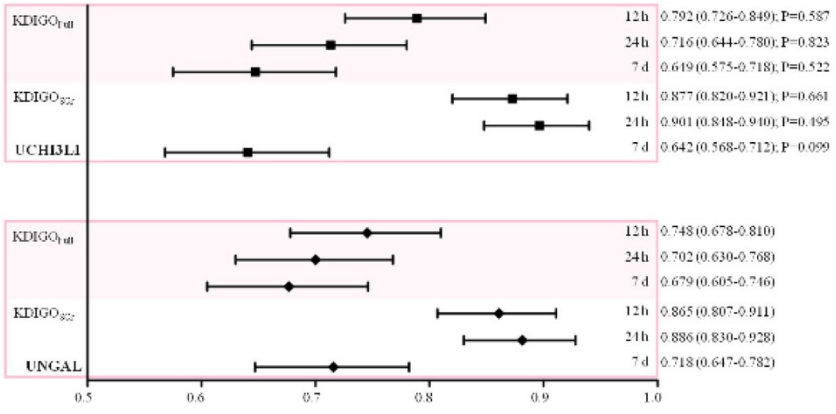

Figure 1

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enrollment; and AKI $KDIGO_{SCr}$ stage ≥2 within 12 h, 24 h and 7 d after enrollment.

Results

In total 181 patients were included, of which 6 (**3%**) reached the primary endpoint. Baseline characteristics showed no differences with the exception of age (70.5 y [IQR: 65.8-78.0] vs. 59.0 [50.0-70.0] for endpoint pos. resp. neg.; P = 0.040). At ICU admission, the only significant difference was the proportion of patients referred from another department (66.7 vs. 22.3% for endpoint pos. resp. neg.; P = 0.029).

Both UCHI3L1 and UNGAL measured at inclusion were good predictors of the primary endpoint, with an AUC-ROC of 0.792 (95% CI: 0.726-0.849) resp. 0.748 (0.678-0.810). The difference between both areas was not significant (P = 0.587). Results for all endpoints are shown in Figure 1.

Conclusions

UCHI3L1 was a valuable diagnostic biomarker for moderate or severe AKI in this adult ICU cohort, and performed similar to UNGAL.

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