

Background and Objective

- Acute decompensated heart failure (ADHF) is one of the leading causes of hospitalization worldwide^{1,2}
- The development of acute kidney injury (AKI) is associated with poor outcomes^{1,2}
- There is a strong need to detect AKI before the increase in serum creatinine (SCr)
- The aim of the study was to determine the prevalence of AKI in patients with ADHF and to evaluate the association of urine neutrophil gelatinase associated lipocalin (uNGAL) and kidney injury molecule-1 (KIM-1) with changes in kidney function and outcomes³

Inclusion criteria

- Patients hospitalized with ADHF
- Age 45-80 years

AKI criteria

- Increase in SCr ≥ 0.3 mg/dl (≥ 26.5 $\mu\text{mol/l}$) within 48 hours; or
- Increase in SCr ≥ 1.5 times baseline within the prior 7 days
- If SCr did not decrease during hospitalization, it was considered persistent AKI

Methods

- Detection and classification of AKI:
 - ✓ KDIGO Guidelines 2012⁴
- The level of uNGAL, urine KIM-1 and SCr on admission
- Poor outcomes: 30-days mortality and rehospitalization for ADHF during 6 month

¹ Adams K., Fonarow G.C., Emerman C. et al. Am. Heart. J. – 2005; 149:209-216.

² Ronco C., Cicoira M., McCullough P.A. J Am Coll Cardiol 2012; 60: 1031-42

³ McCullough P.A., Kellum J.A., Mehta R.L. et al. Contrib Nephrol. Basel, Karger, 2013, vol 182, pp I-XII

⁴ KDIGO Clinical practice guideline for acute kidney injury. Kidney Int. 2012; 2(1): 1-141

Study population (n=51)

Parameters	Value
Male, n (%)	18 (35.3)
Age, years (M SD)	70.3 \pm 9.1
Arterial hypertension, n (%)	47 (92)
Ischemic heart disease, n (%)	29 (56)
Myocardial infarction, n (%)	34 (67)
Atrial fibrillation, n (%)	34 (67)
Diabetes mellitus, n (%)	14 (27)
Known chronic kidney disease, n (%)	17 (33)

Results

- 53% of patients developed AKI (Fig. 1)
- Patients with AKI had higher SCr and uNGAL. Levels of KIM-1 did not differ (Tabl. 1)
- uNGAL >184 ng/ml (odds ratio 3.85; 95% confidential interval 2.4-6.1) was determined to be significant and independent factor for development of AKI
- Urine KIM-1 >0.41 ng/ml (odds ratio 2.85; 95% confidential interval 1.8-5.9) was determined to be significant and independent factor for ADHF rehospitalization after AKI
- Of 27 patients with AKI 15% had two criteria of AKI [NGAL(+)/KIM-1(+)], 18,5% - isolated increase of SCr, 29,5% two criteria [SCr(+)/KIM-1(+)] and 37% - two criteria [SCr(+)/NGAL(+)] (Fig. 2)
- Patients with NGAL(+)/KIM-1(+) and patients with SCr(+)/NGAL(+) compared with other groups demonstrated persistent character of AKI and the higher risk of 30-days mortality: all patients with AKI and NGAL(+)/KIM-1(+), 50% of patients with AKI and NGAL(+)/SCr(+) died in 30 days. There were no deaths in 30 days in patients with AKI with isolated increase of SCr and patients with AKI and SCr(+)/KIM-1(+)

Figure 1. Prevalence of AKI in patients with ADHF

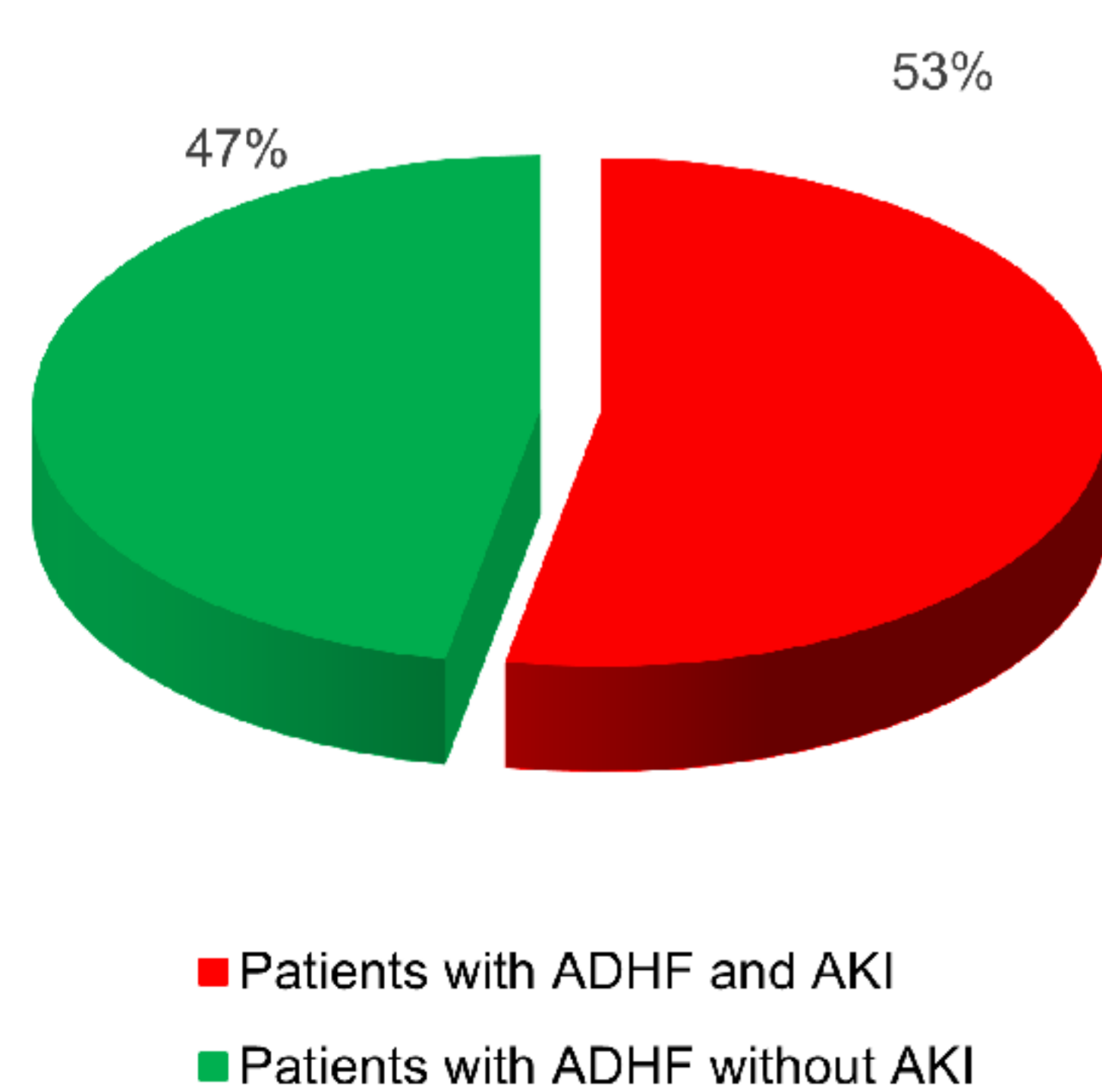
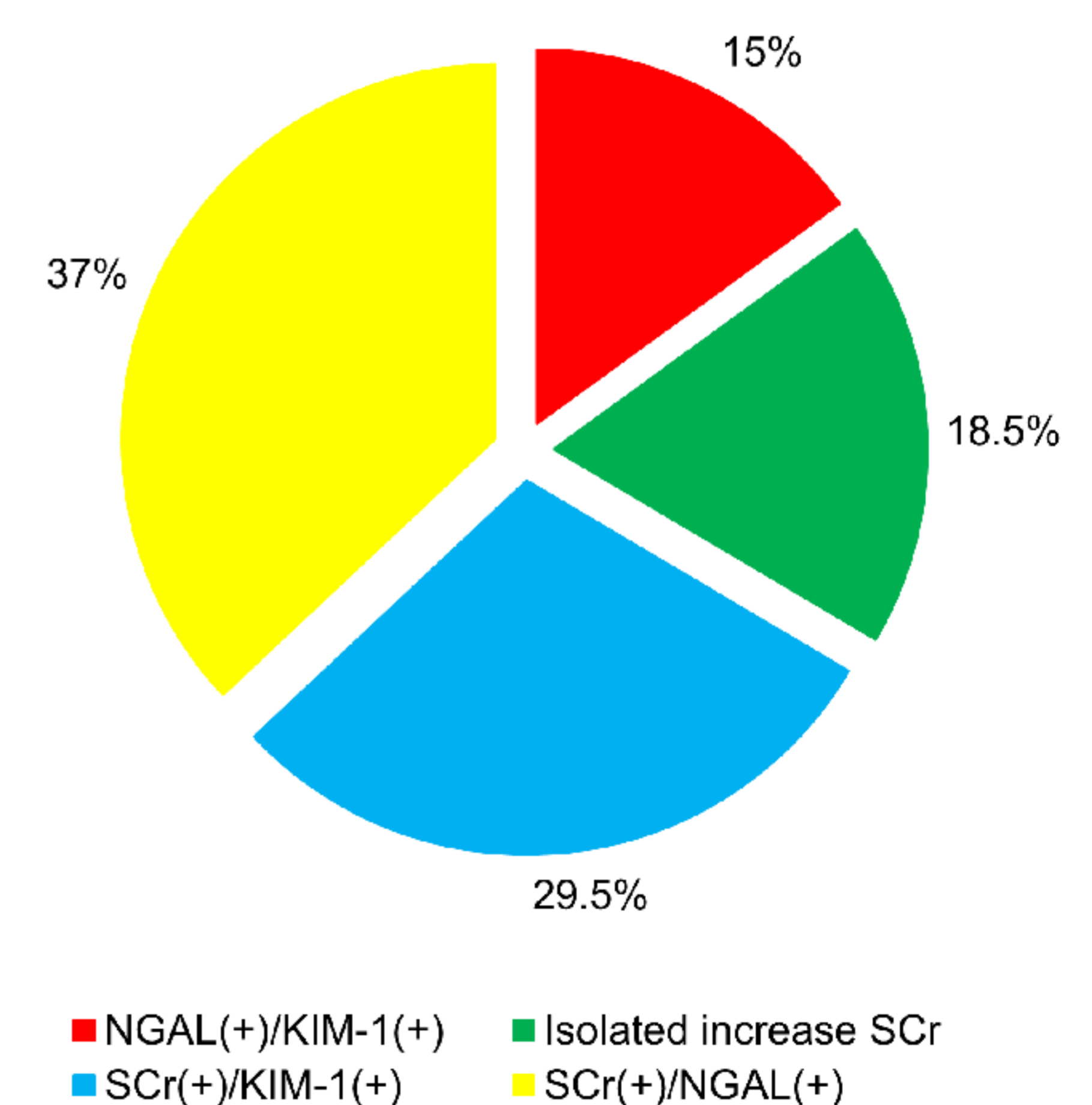


Table 1. Renal function, uNGAL and KIM-1 in patients according to presence of AKI

Parameters	ADHF with AKI	ADHF without AKI
SCr, $\mu\text{mol/l}$	188.8 \pm 94.3	114.5 \pm 50.2***
uNGAL, ng/ml	203.3 \pm 270.7	11.4 \pm 5.6**
KIM-1, ng/ml	0.454 \pm 0.266	0.305 \pm 0.208

p <0,01, *p<0,001, compared to ADHF patients with AKI

Figure 2. Patients with AKI according to levels of SCr, uNGAL and KIM-1



Conclusions

- ✓ 53% of patients admitted to the hospital with ADHF developed AKI
- ✓ Combine elevation of uNGAL >184 ng/ml and KIM-1 >0.41 ng/ml in patients with AKI is associated with persistent character of AKI and higher risk of 30-days mortality
- ✓ The use of uNGAL and KIM-1 might be useful for the clinician to suspect the subgroup with high risk of poor outcomes in patient population with ADHF and AKI

Disclosure: none