SYNDECAN-1 IN DECOMPENSATED HEART FAILURE: ASSOCIATION WITH RENAL FUNCTION AND MORTALITY

Fernanda Macedo de Oliveira Neves[1], Tacyano Tavares Leite[1], Gdayllon Cavalcante Meneses[1], Nazareth Herminia Araujo De Souza[1], Alice Maria Costa Martins[1], Marcelo Coelho Parahyba[2], Rafaela Elizabeth Bayas Queiroz[3], Alexandre Liborio[1]

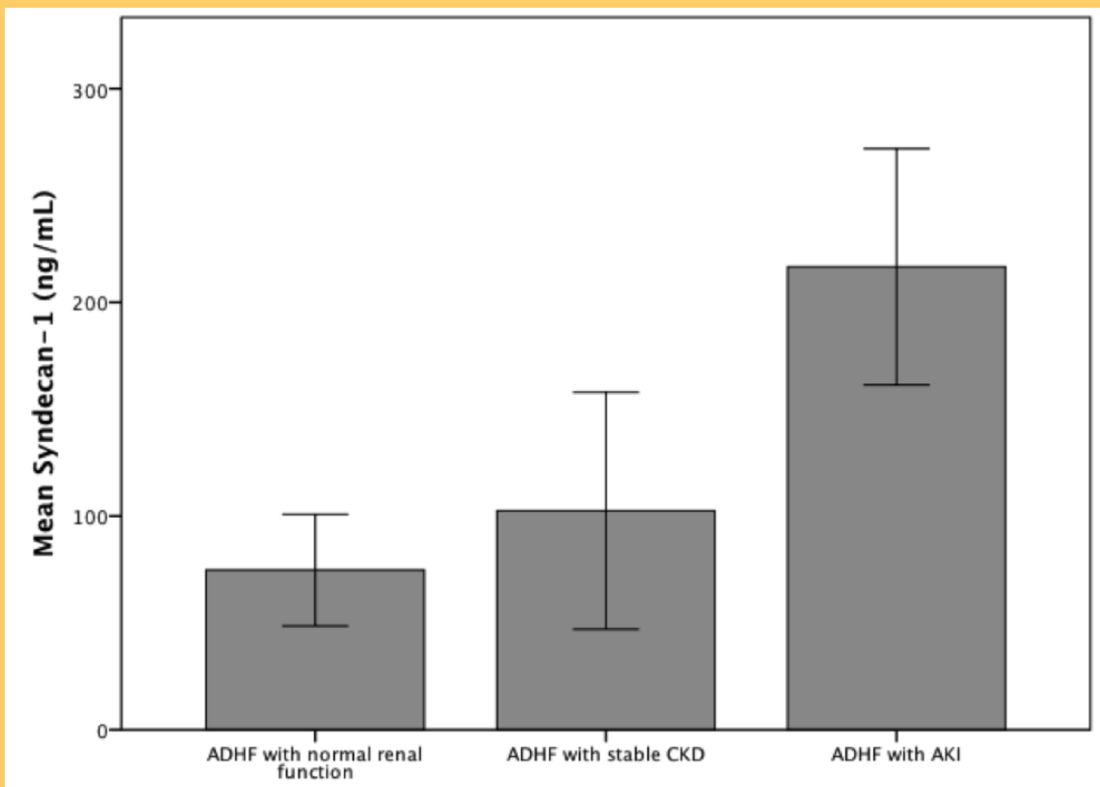
[1]University Federal of Ceara, Fortaleza, Brazil[2]Hospital do Coração - Messejana, Fortaleza, Brazil[3]University of São Paulo, São Paulo, Brazil

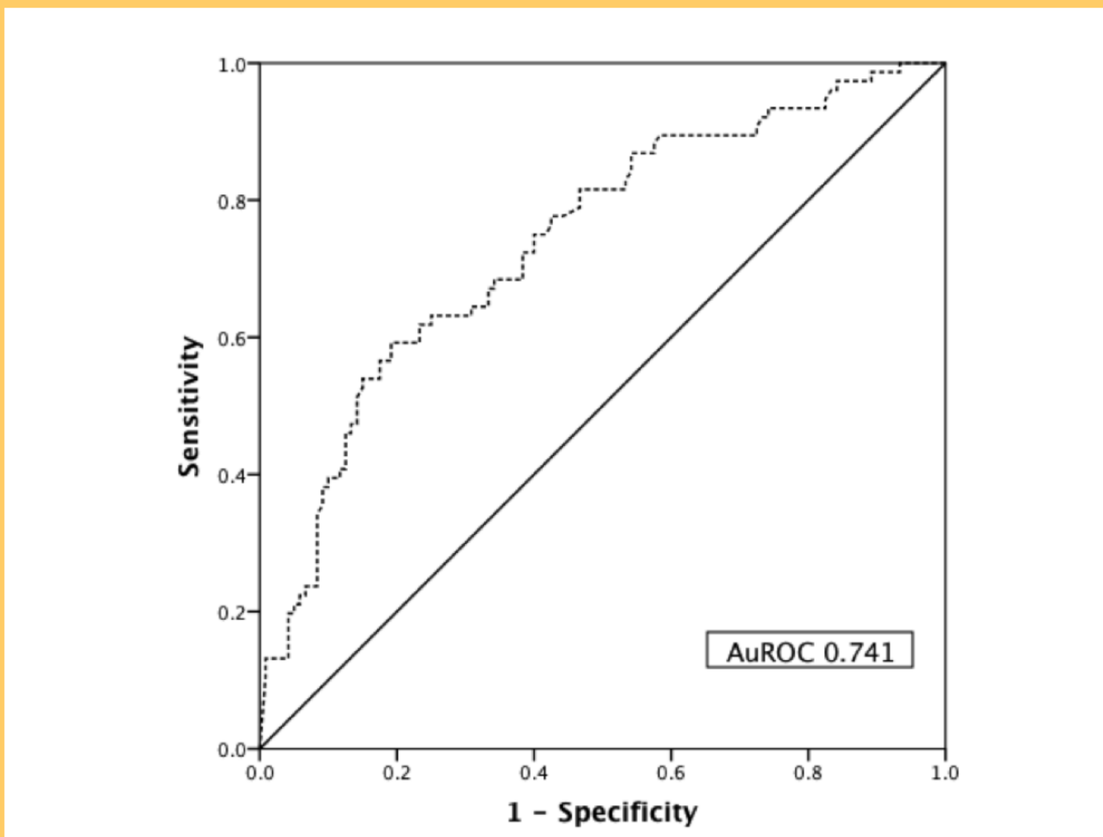
Introduction and Aims:

Despite modern heart failure (HF) therapy, the prognosis of patients with HF remains poor. During hospital stay acute kidney injury (AKI can complicate HF with ominous prognostic implications. Endothelial dysfunction is present in both HF and renal disease. Moreover, endothelial activation biomarker as vascular cell adhesion molecule-1 (VCAM-1) has been recent associated with HF patient's mortality. However, endothelial glycocalyx damage has not been studied in HF patients. In the present study, we aimed to investigate endothelial glycocalyx damage in patients admitted in the emergency department because decompensated HF; its association with acute and chronic kidney disease; and its capacity to predict mortality

Methods:

Prospective study with consecutive patients admitted because acute decompensated HF (ADHF) patients in a reference center. The following parameters were collected in the emergency department (ED): age, sex, New York Heart Association (NYHA) functional class, previous history of diabetes mellitus, arterial hypertension and drug prescription. Additionally, syndecan-1 (a biomarker of glycocalyx damage) was measured at ED. During the hospital stay, patients were evaluated daily and AKI or worsening renal function (WRF) were recorded according KDIGO criteria





Results:

We enrolled 201 patients (54% male). The mean age was 64.2 ± 13.5 years and the calculated ejection fraction was 39.4 ± 13.3% at admission. Including all patients, 80 (39.8%) had CKD and 62 patients (37.8%) developed AKI/WRF during hospital stay. Majority of patients had AKI stage 1 (n=52) and only 2 had AKI stage 3. Another group of 14 patients were admitted with AKI in the ED but recovery renal function in less than 72h. From patients with CKD, 43 patients had stable renal function during hospital stay. Hospital mortality was 5.5%. In comparison to a healthy control group, ADHF patients had higher syndecam-1 at ED (133.7±95.0 vs. 18.3±9.2, p<0.001). This increment was greater in those patients with higher pre-admission NYHA classification (class III/IV). Although syndecan-1 it was high in AKI/WRF patients (p<0.01 vs. others), there was no difference between patients with stable CKD and those with normal renal function (p=0.61) -figure 1. The AUC for AKI/WRF prediction was 0.741 (95%CI 0.669-0.812, p<0.001) - figure 2. The results improved with higher grades of severity (AKIN ≥ 2 grade) - AUC 0.840 (95%CI 0.733-0.948, p<0.001). After adjustment for age, gender, admission serum sodium, ejection fraction and AKI severity, syndecan-1 concentration remained associated with hospital mortality. It also had a good discriminative ability to predict hospital mortality (AUC 0.788 95%CI 0.673-0.903, p<0.001)

Conclusions:

In ADHF patients, syndecan - 1 measured at ED is an effective biomarker to predict AKI/WRF and hospital mortality

References:

1. Savic-Radojevic A, Radovanovic S, Pekmezovic T, et al. The role of serum VCAM-1 and TNF-α as predictors of mortality and morbidity in patients with chronic heart failure. *J Clin Lab Anal.* 2013;27:105-112.
2. Lipowsky HH. The endothelial glycocalyx as a barrier to leukocyte adhesion and its mediation by extracellular proteases. *Ann Biomed Eng.* 2012;40:840-848.
3. Curry FE, Adamson RH. Endothelial glycocalyx: permeability barrier and mechanosensor. *Ann Biomed Eng.* 2012;40:828-839.
4. Ostrowski SR, Pedersen SH, Jensen JS, Mogelvang R, Johansson PI. Acute myocardial infarction is associated with endothelial glycocalyx and cell damage and a parallel increase in circulating catecholamines. *Crit Care.* 2013;17:R32.
5. Ho KK, Anderson KM, Kannel WB, Grossman W, Levy D. Survival after the onset of congestive heart failure in Framingham Heart Study subjects. *Circulation.* 1993;88:107-115.
6. Cortas NK, Wakid NW. Determination of inorganic nitrate in serum and urine by a kinetic cadmium-reduction method. *Clin Chem.* 1990;36:1440-1443.
7. Marti CN, Gheorghiade M, Kalogeropoulos AP, Georgiopoulou VV, Quyyumi AA, Butler J. Endothelial dysfunction, arterial stiffness, and heart failure. *J Am Coll Cardiol.* 2012;60:1455-1469.
8. Yin WH, Chen JW, Jen HL, et al. The prognostic value of circulating soluble cell adhesion molecules in patients with chronic congestive heart failure. *Eur J Heart Fail.* 2003;5:507-516.
9. Tsutamoto T, Hisanaga T, Fukai D, et al. Prognostic value of plasma soluble intercellular adhesion molecule-1 and endothelin-1 concentration in patients with chronic congestive heart failure. *Am J Cardiol.* 1995;76:803-808.
10. Rehm M, Bruegger D, Christ F, et al. Shedding of the endothelial glycocalyx in patients undergoing major vascular surgery with global and regional ischemia. *Circulation.* 2007;116:1896-1906.
11. Grundmann S, Fink K, Rabadzhieva L, et al. Perturbation of the endothelial glycocalyx in post cardiac arrest syndrome. *Resuscitation.* 2012;83:715-720.
12. Jacob M, Saller T, Chappell D, Rehm M, Welsch U, Becker BF. Physiological levels of A-, B- and C-type natriuretic peptide shed the endothelial glycocalyx and enhance vascular permeability. *Basic Res Cardiol.* 2013;108:347.
13. Constantinescu AA, Vink H, Spaan JA. Endothelial cell glycocalyx modulates immobilization of leukocytes at the endothelial surface. *Arterioscler Thromb Vasc Biol.* 2003;23:1541-1547.
14. Takishima I, Nakamura T, Hirano M, et al. Predictive value of serial assessment of endothelial function in chronic heart failure. *Int J Cardiol.* 2012;158:417-422.

DOI: 10.3252/pso.eu.51era.2014
Poster presented at: 51 ERA-EDTA CONGRESS AMSTERDAM 2014