

THE PARAMOUNT IMPORTANCE OF RENAL FUNCTION IN HEART FAILURE PROGNOSIS - CONCLUSIONS FROM THE REFERENCE STUDY

Luiz Menezes Falcão^{1,2}, Mário Barbosa³, Andreia Matos^{4,5}, Manuel Bicho^{4,5}

¹ Faculty of Medicine, University of Lisbon; ² Department of Internal Medicine, Santa Maria Hospital, Lisbon, Portugal; ³ Department of Internal Medicine, Hospital Lusíadas Lisboa, Lisbon, Portugal; ⁴ Genetics Laboratory and Environmental Health Institute-ISAMB, Faculty of Medicine, University of Lisbon, Portugal; ⁵ Instituto de Investigação Científica Bento da Rocha Cabral.



BACKGROUND: In heart failure (HF) patients renal dysfunction represents impaired tissue perfusion and is a predictor of poor outcome.

OBJECTIVE: We investigated the association of customarily used renal function parameters with early (defined as the period of 90 days post-discharge) rehospitalization due to HF and all-cause mortality, and long-term all-cause mortality in HF patients.

METHODS: Baseline and admission urea, creatinine and glomerular filtration rate (GFR) and type 1 cardiorenal syndrome (CRS) were evaluated in patients hospitalized with acute decompensated HF in class III or IV of New York Heart Association (NYHA). Descriptive analysis was performed using t test or Wilcoxon Rank test as applicable. Categorical variables were compared using chi-squared test or Fisher's Exact test. Univariate Cox proportional hazard model was used to assess the relationship between variables and outcomes.

RESULTS

N=65 HF patients
Mean age: 79.2 (SD 10.8)

Median follow-up : 13.7 months
[Q1: 6.7 to Q3: 18.9]

- Increased risk for short-term mortality was associated with:
 - Baseline urea (HR: 1.145, 95% CI: 1.032-1.270, P-value=0.010),
 - Admission urea (HR: 1.076, 95% CI: 1.021-1.135, P-value=0.006),
 - Baseline creatinine (HR: 1.157, 95% CI: 1.009-1.328, P value=0.037),
 - Admission creatinine (HR: 1.127, 95% CI: 1.055-1.204, P-value<0.001),
 - Admission GFR <30 ml/min (HR: 9.791, 95% CI: 2.855-33.580, P-value<0.001).

Table 1 – General baseline characteristics

Characteristics	Patients (n=65)
Age, mean (SD)	79.2 ± 10.8
Female Gender, n (%)	37 (56.9)
Hypertension, n (%)	58 (89.2)
Type 2 Diabetes, n (%)	25 (38.5)
Dyslipidemia, n (%)	41 (63.1)
Obesity, n (%)	17 (26.2)
Atrial Fibrillation, n (%)	28 (43.1)
Family History of CVD, n (%)	31 (47.7)
Tabagism, n (%)	21 (32.3)
Chronic Kidney Disease, n (%)	34 (52.3)
GFR (Baseline), median	57.8 (43.8 - 82.2)
GFR (Admission), median	47.9 (33.2 - 68.1)
Urea (Baseline), median	47.0 (35 - 76)
Urea (Admission), median	64.0 (38 - 97)
Creatinine (Baseline), median	1.0 (0.8 - 1.4)
Creatinine (Admission), median	1.3 (1.0 - 1.8)
Cardiorenal Syndrome, n (%)	35 (53.8)
Previous Acute Myocardial Infarction, n (%)	27 (41.5)
Hypertensive Cardiomyopathy, n (%)	44 (67.7)
Ischemic Cardiomyopathy, n (%)	22 (33.8)
Valvular Cardiomyopathy, n (%)	56 (86.2)
LVEF, mean (SD)	50.38 ± 19.07
Tricuspid Annulus Plane Systolic excursion (TAPSE), mean (SD)	17.7 ± 4.0
Pulmonary Artery Systolic Pressure (PSAP), median	34.60 (25.94 - 50.05)
Systolic Blood Pressure (Admission), median	145.0 (121 - 163)
Diastolic Blood Pressure (Admission), median	145.0 (121 - 163)
NYHA class III, n (%)	43 (66.2)
ACE Inhibitor, n (%)	43 (66.2)
Beta Blocker, n (%)	38 (58.5)
Mineralocorticoid Receptor Antagonists, n (%)	19 (29.2)
Angiotensin II Receptor Blocker, n (%)	11 (16.9)
Loop Diuretic, n (%)	54 (83.1)
Digoxin, n (%)	8 (12.3)

Values are median (IQR), n (%), or mean±SD.

IQR: interquartile range and minimum/maximum, SD: standard deviation, CVD: cardiovascular disease, GFR: glomerular filtration rate.

- Variables associated with an increased risk for early rehospitalization were:
 - Baseline urea (HR: 1.098, 95% CI: 1.022-1.179, P-value=0.01)
 - Admission urea (HR: 1.048, 95% CI: 1.013-1.084, P-value=0.006)
 - Baseline creatinine (HR: 1.111, 95% CI: 1.004-1.229, P-value=0.041)
 - Admission creatinine (HR: 1.047, 95% CI: 1.005-1.092, P-value=0.027)
 - Admission GFR <30 mL/min (HR: 3.535, 95% CI: 1.467-8.518, P-value=0.005).

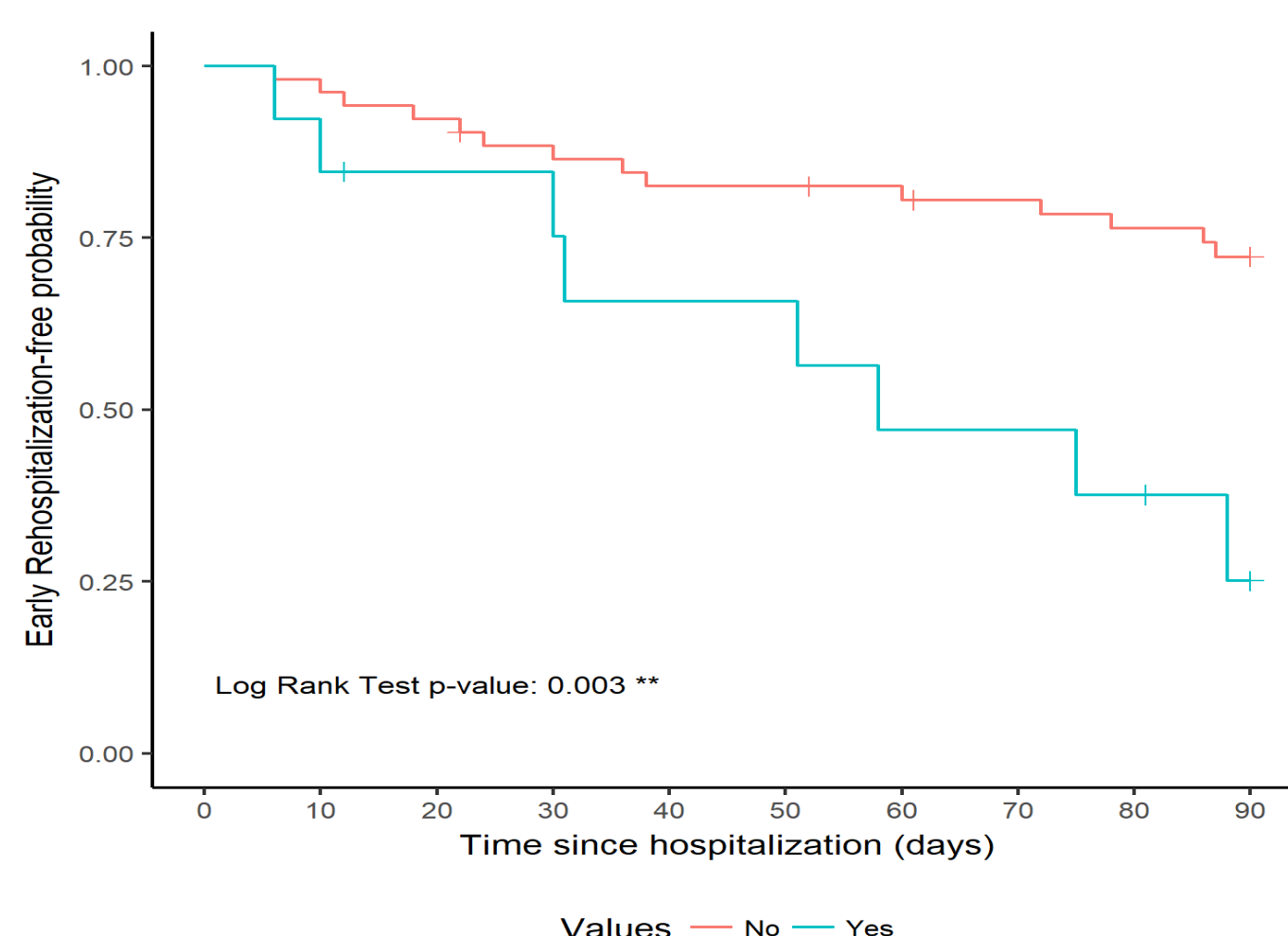


Figure 1- Early Rehospitalization - Kaplan Meier: admission GFR <30 ml/min

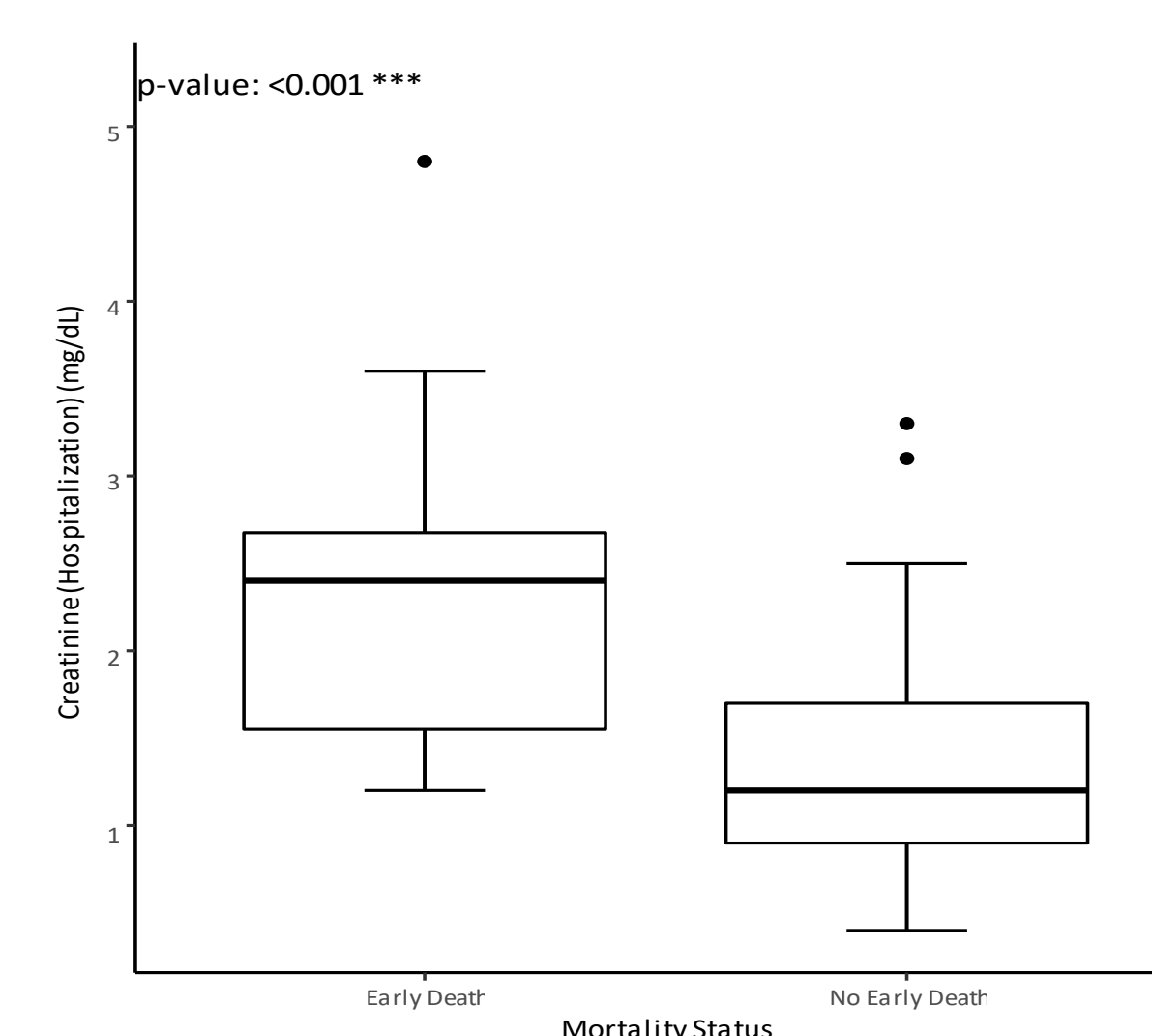


Figure 2- Baseline comparison of subjects by short-term mortality status: Admission creatinine

- Variables associated with an increased risk for long-term mortality were:
 - Admission urea (HR: 1.056, 95% CI: 1.019-1.094, P-value=0.003)
 - Admission creatinine (HR: 1.104, 95% CI: 1.054-1.156, P-value<0.001),
 - Admission GFR <30 ml/min (HR: 3.906, 95% CI: 1.7208.871, P-value=0.001).

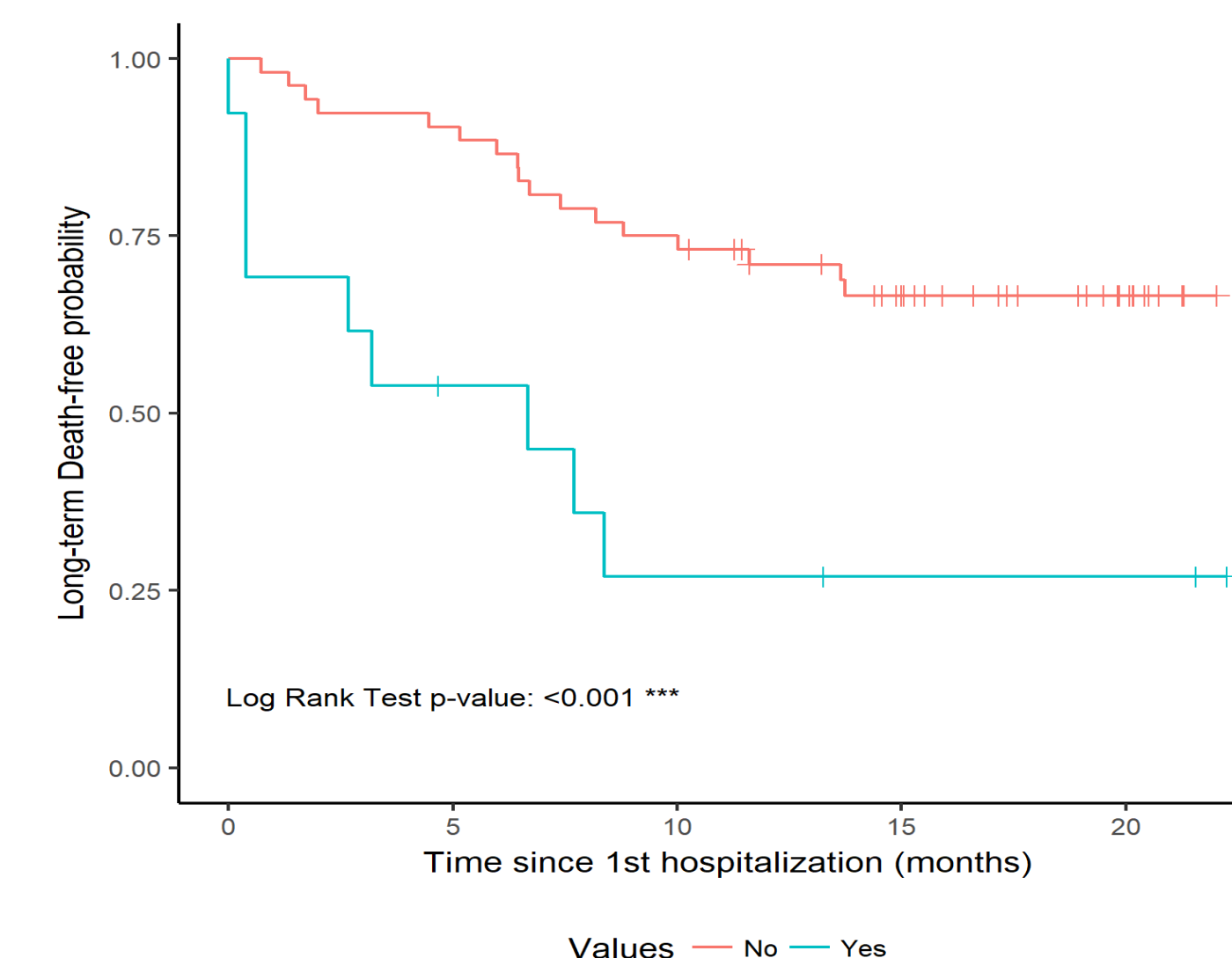


Figure 3- Long term mortality- Kaplan Meier: admission GFR <30 ml/min

- According to descriptive analysis short-term mortality risk was related with prior of chronic kidney disease (CKD) (P-value=0.024).

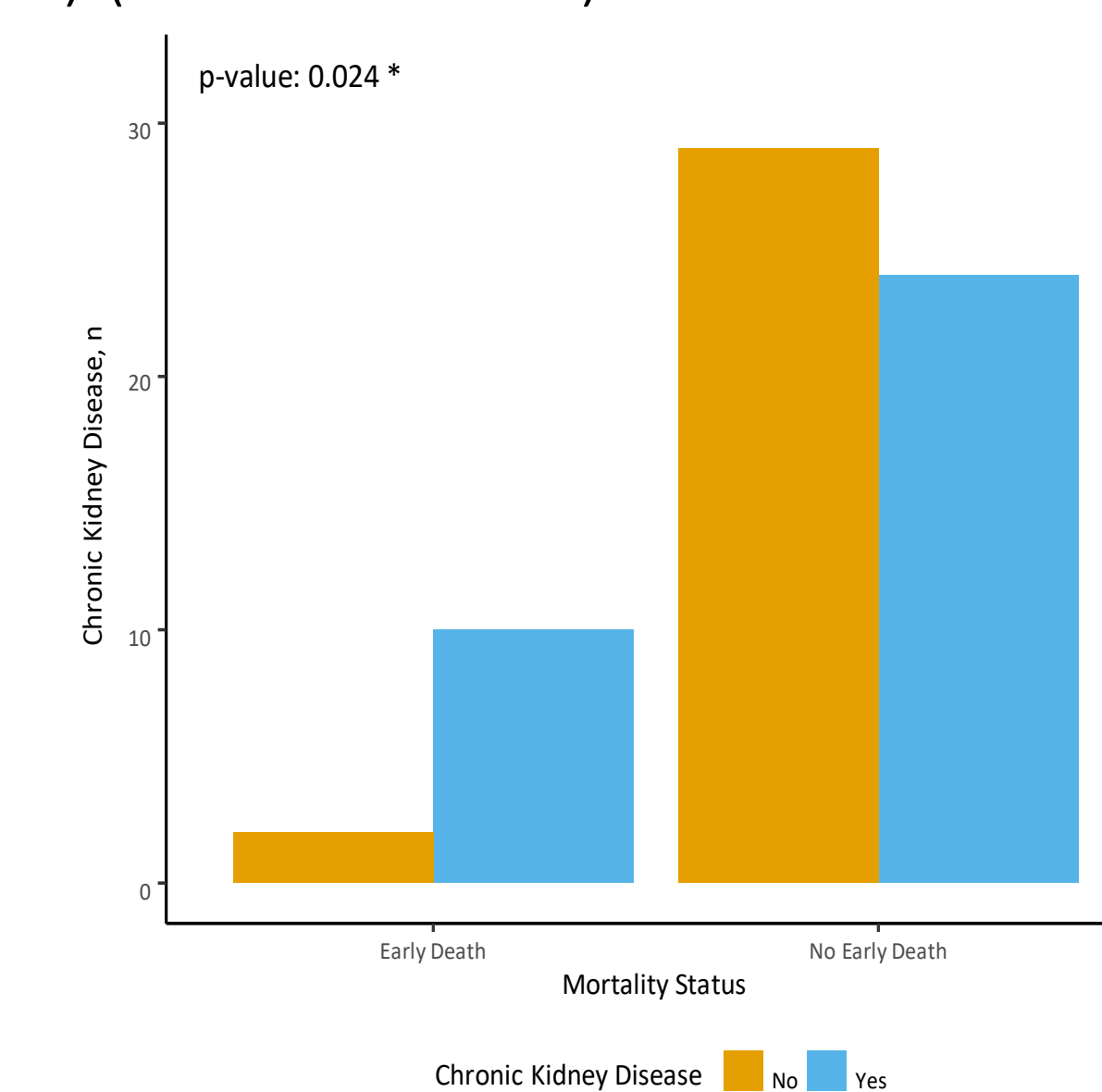


Figure 4 - Baseline comparison of subjects by short-term mortality status: Chronic kidney disease

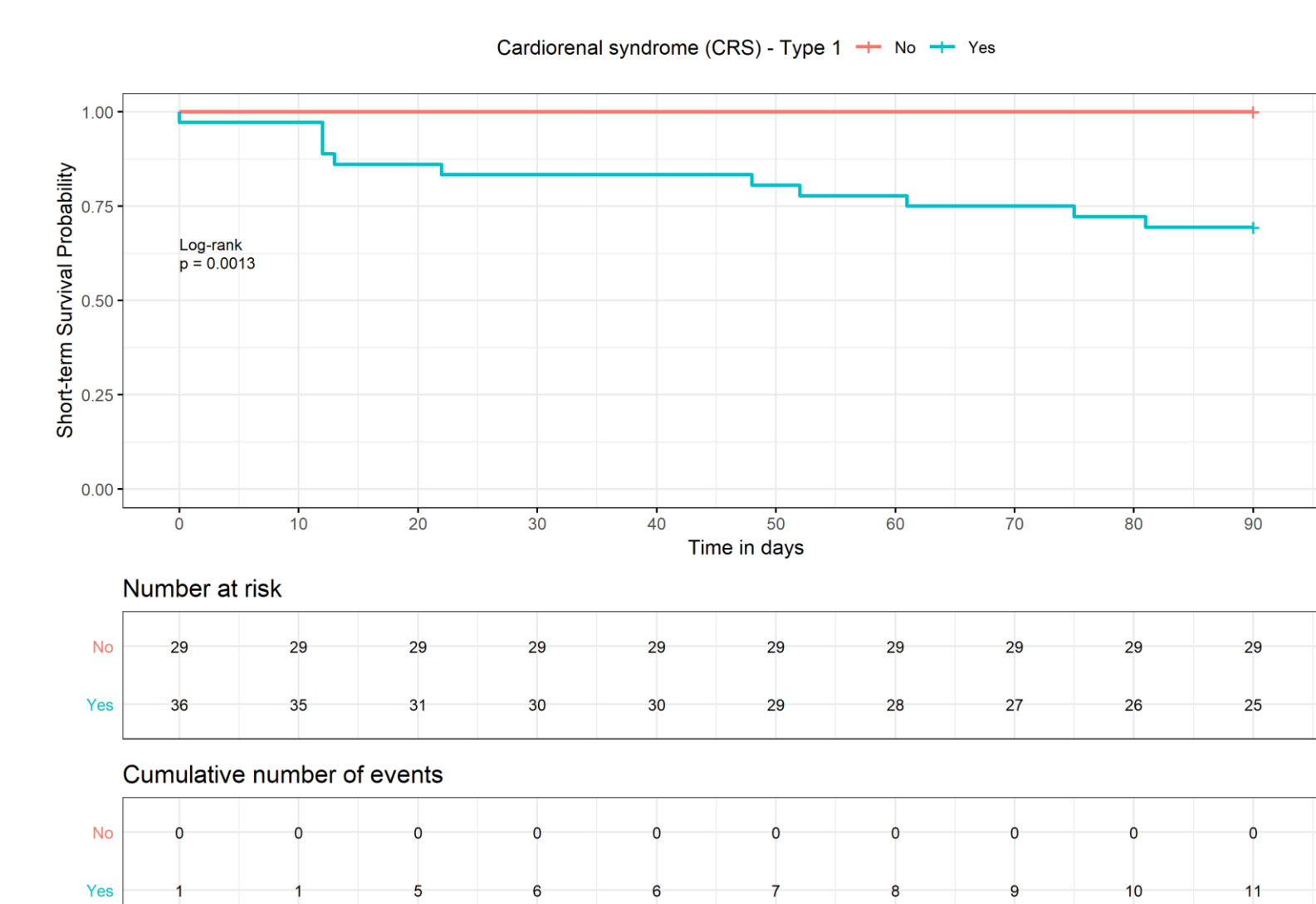


Figure 5 - Short-term mortality - Kaplan Meier: Cardiorenal syndrome