Prognostic Value of the Nutritional Risk Index in Candidates for Continuous Flow Left Ventricular Assist Device Therapy.

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PURPOSE

• Malnutrition has been shown to affect clinical outcomes in patients with heart failure. The aim of our study was to analyze the impact of preoperative nutritional status assessed by nutritional risk index (NRI) on the prognosis in patients who received a continuous-flow left ventricular assist devices (cf-LVAD).

OBJETIVE

• The objective of our study was to analyze the prognostic value of preoperative NRI in patients with advanced heart failure receiving a cf-LVAD.

METHODS

• We performed a retrospective study of 279 patients that underwent cf-LVAD implantation (HVAD, HeartWare Inc.) between 2009 and 2015 in our center.

• NRI was calculated as: (1.5 x serum albumin [grams-per-liter]) + (current-body-weight/ideal-weight).

• An NRI >100 indicates no evidence of malnourishment, 97.5 to 100 indicates mild malnourishment, 83.5 to 97.5 moderate malnourishment and < 83.5 severe malnourishment.

• Patients were followed for 1 year.

• The association between preoperative NRI and postoperative clinical events was analyzed using multivariable logistic regression and Cox regression models.

RESULTS

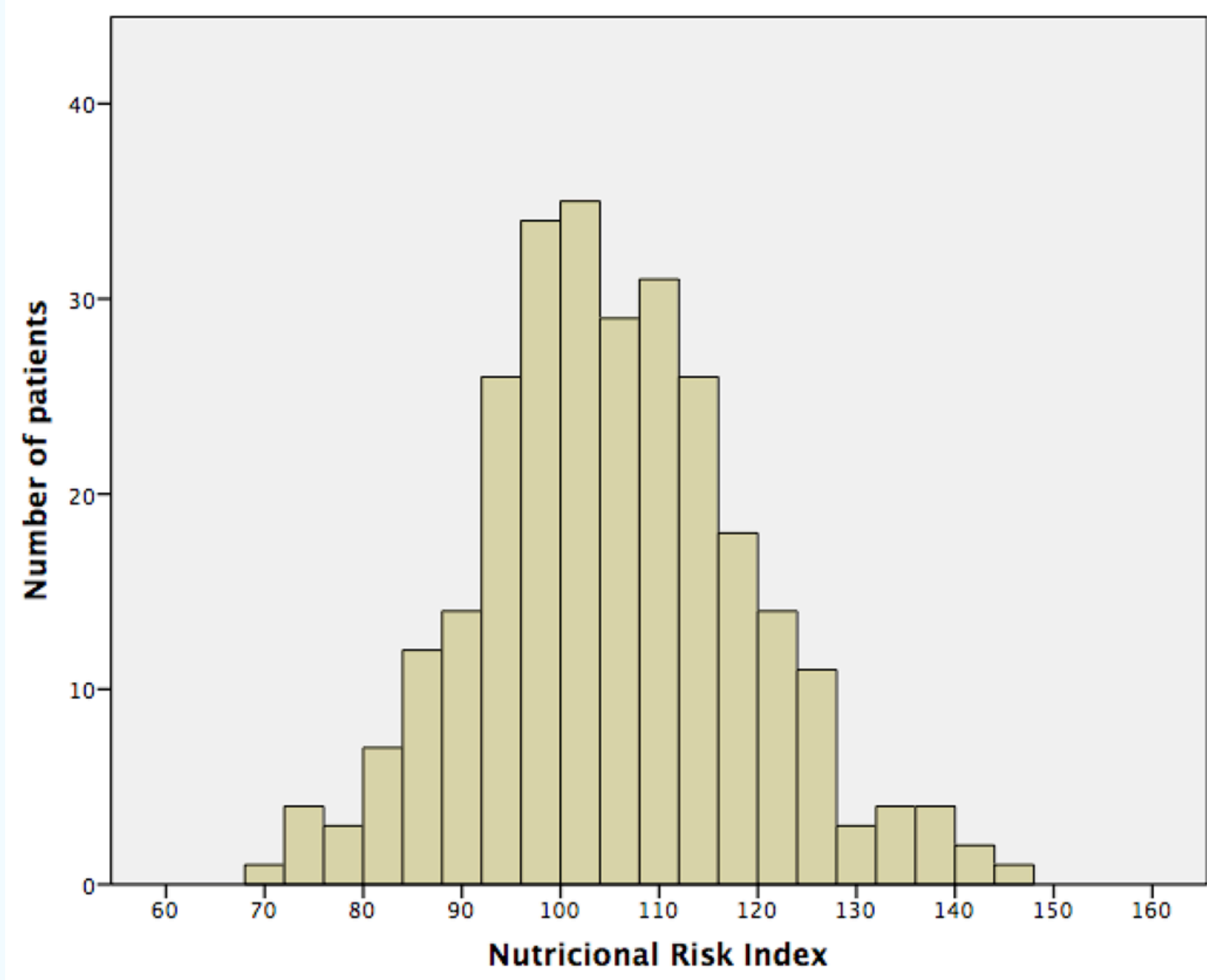**Figure 1: Distribution of the preoperative values of the NRI in the study population.**

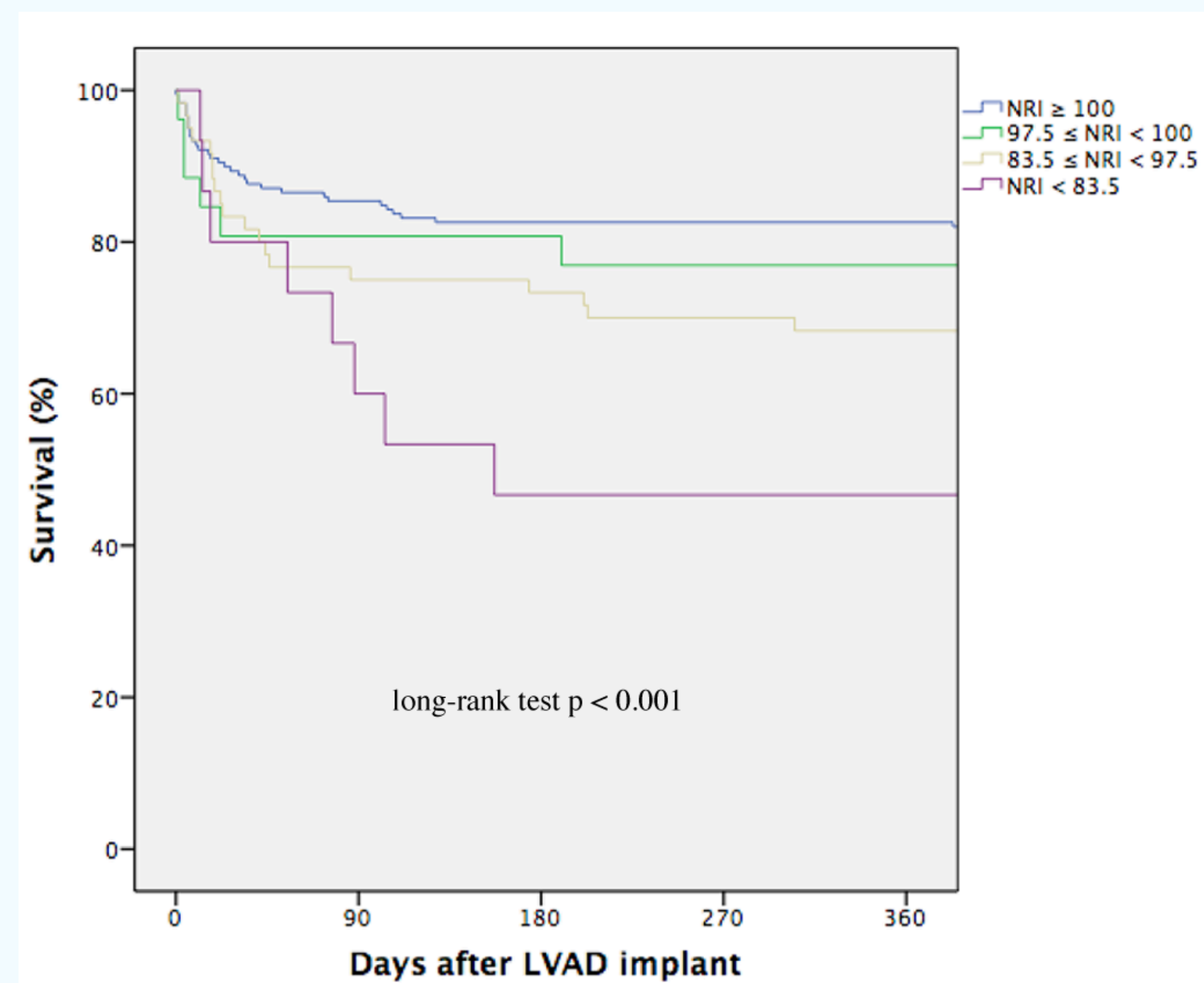**Figure 2: Survival curve**

long-rank test p < 0.001

Table 1: Clinical characteristics of the study patients according to their nutritional risk prior to LVAD implantation

	Severe Malnourishment NRI < 83.5 n=15	Moderate Malnourishment 83.5 ≤ NRI < 97.5 n=60	Mild malnourishment 97.5 ≤ NRI < 100 n=26	No evidence of malnourishment NRI ≥ 100 n=178	p
Age (years)	50.7±14.4	53.9±14.6	51.4±16.4	55.1±11.8	0.356
Sex (male)	11 (73.3%)	54 (90.0%)	22 (84.6%)	146 (82.0%)	0.351
BMI	19.6±2.7	22.8±2.5	24.2±3.0	28.7±5.1	<0.001
BSA	1.69±0.25	1.87±017	1.91±0.22	2.05±0.19	<0.001
NRI	78.4±3.6	91.8±3.5	98.7±0.7	113.1±9.9	<0.001
Ischemic cardiomyopathy	6 (40.0%)	29 (49.2%)	9 (34.6%)	84 (47.2%)	0.460
Stroke preLVAD	0 (0.0%)	4 (6.8%)	1 (3.8%)	15 (8.7%)	0.540
Diabetes	1 (6.7%)	5 (8.3%)	4 (15.4%)	30 (16.9%)	0.331
Previous surgery	2 (13.3%)	18 (30.0%)	9 (34.6%)	55 (30.9%)	0.511
INTERMACS 1	2 (13.3%)	12 (20.0%)	7 (26.9%)	29 (16.3%)	0.543
INTERMACS 2	3 (20.0%)	5 (8.3%)	3 (11.5%)	20 (11.2%)	0.642
INTERMACS ≥ 3	10 (66.7%)	43 (71.7%)	16 (61.6%)	129 (72.5%)	0.690
Mechanical support preLVAD	2 (13.3%)	12 (20.0%)	6 (23.1%)	31 (17.4%)	0.856
Need of catecholamine preLVAD	7 (46.7%)	31 (51.7%)	12 (46.2%)	87 (48.9%)	0.962
Albumin	27.1±2.8	32.3±3.6	35.0±4.2	38.9±5.1	<0.001
Creatinine (mg/dl)	1.6±1.3	1.3±0.8	1.0±0.5	1.4±1.1	0.282
Bilirubin (mg/dl)	16±0.8	18±0.7	18±0.5	15±0.7	0.876
BUN (mg/dl)	107±63	100±73	115±89	112±68	0.757
CI (L/min per m2 BSA)	2.2±0.6	1.9±0.5	2.0±0.5	1.9±0.5	0.155
PVR (dyn.cm.s⁻⁵)	299±338	237±183	231±149	249±159	0.838
PAPi	1.5±1.1	2.3±1.8	2.1±1.0	2.7±2.8	0.402
LVEDD (mm)	61.8±13.4	68.9±11.7	76.9±9.2	70.5±10.6	**0.007**

Table 2: Independent predictors during the first year after LVAD implantation: multivariable analysis.

	OR (CI 95%)	p
Right Heart Failure		
NRI (per 1 unit)	0.963 (0.934-0.992)	0.014
Previous cardiac surgery	2.325 (1.065-5.078)	0.034
Pulmonary Hypertension pre-implant	2.652 (1.238-5.683)	0.012
Bilirubin (per 1 mg/dL)	1.011 (1.001-1.021)	0.042
INTERMACS 1 vs INTERMACS>2	2.270 (1.128-4.569)	0.022
INTERMACS 2 vs INTERMACS>2	1.983 (0.993-4.272)	0.057
Respiratory failure		
NRI (per 1 unit)	0.961 (0.936-0.987)	0.004
Diabetes Mellitus	4.495 (0.979-20.642)	0.053
Previous cardiac surgery	3,838 (1.852-7.952)	<0.001
INTERMACS 1 vs INTERMACS>2	3.831 (1.553-9.453)	0.004
INTERMACS 2 vs INTERMACS>2	2.203 (1.004-4.835)	0.049
Infection		
NRI (per 1 unit)	0.968 (0.946-0.991)	0.007
INTERMACS 1 vs INTERMACS>2	2.359 (0.095-5.963)	0.051
INTERMACS 2 vs INTERMACS>2	2.019 (0.993-4.105)	0.052
Mechanical support preLVAD	2.112 (1.221-3.896)	0.023
Diabetes Mellitus	1.522 (1.020-2.984)	0.047
Predictors of mortality during the first year after LVAD implantation		
NRI (per 1 unit)	0.961 (0.941-0.981)	<0.001
Previous cardiac surgery	2.154 (1.295-3.583)	0.034
INTERMACS 1 vs INTERMACS>2	3.995 (2.253-7.082)	<0.001
INTERMACS 2 vs INTERMACS>2	3.230 (1.638-6.370)	0.001
Creatinine (per 1mg/dL)	1.452 (1.104-3.790)	0.021
Age (per 1 year)	1.029 (0.999-1.060)	0.056

CONCLUSIONS

• Malnourished patients are at increased risk for postoperative complications and death after LVAD implantation.

• The assessment of nutritional risk can help a better selection of patients before the implantation of an LVAD and to initiate adequate nutritional support to the patients who need it prior the implant.