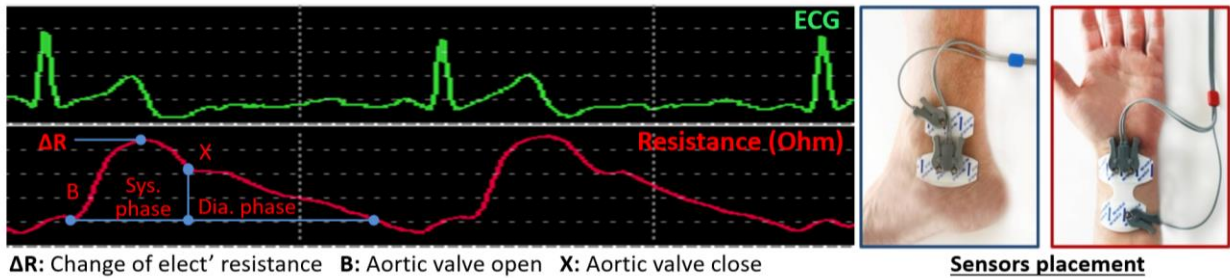


# **Supplemental Material**

**Figure S1 and Table S1:** The NICaS -whole body (regional) impedance cardiography- parameters derivation and formulas (courtesy of NImedical).



Parameter		Definition	Normal Range	Derivation/Formula
Heart Rate	HR	Number of heart beats each minute	60 - 90 bpm (beats per minute)	Measurement of the R-R interval on the ECG
Stroke Volume	SV	Amount of blood pumped by the left ventricle each heartbeat	60 - 130 ml	$SV \sim \Delta R / R$
Stroke Index	SI	Stroke volume normalized for body surface area	35 - 65 ml/m <sup>2</sup>	$SI = SV / BSA$
Cardiac Output	CO	Amount of blood pumped by the left ventricle each minute	4.0 – 8.0 l/min	$CO = HR \times SV / 1000$
Cardiac Index	CI	Cardiac Output normalized for body surface area	2.5 - 4.0 l/min/m <sup>2</sup>	$CI = CO / BSA$
Cardiac Power Index	CPI	An indicator of myocardial contractility	0.45 – 0.85 w/m <sup>2</sup>	$CPI = CI \times MAP \times 0.0022$
Granov Goor Index	GGI	An indicator of Left Ventricular Function, which is strongly related to Ejection Fraction	> 10.0 (equals an Ejection Fraction > 55%)	$GGI = \Delta R / R \times \alpha \times HR$
Total Peripheral Resistance	TPR	The resistance to the flow of blood in the arterial system ("Afterload")	770 - 1500 dynes x sec /cm <sup>5</sup>	$TPR = MAP / CO \times 80$
Total Peripheral Resistance Index	TPRI	The resistance to the flow of blood in the arterial system normalized for body surface area	1600 - 3000 dynes x sec /cm <sup>5</sup> x m <sup>2</sup>	$TPRI = MAP / CI \times 80$
Total Body Water	TBW	The amount of fluids as a % of body weight	Individually calculated as per gender and BMI	$TBW \sim Ht^2 / R$
Respiration Rate	RR	Number of breaths each minute	8 – 24 breaths / minute	

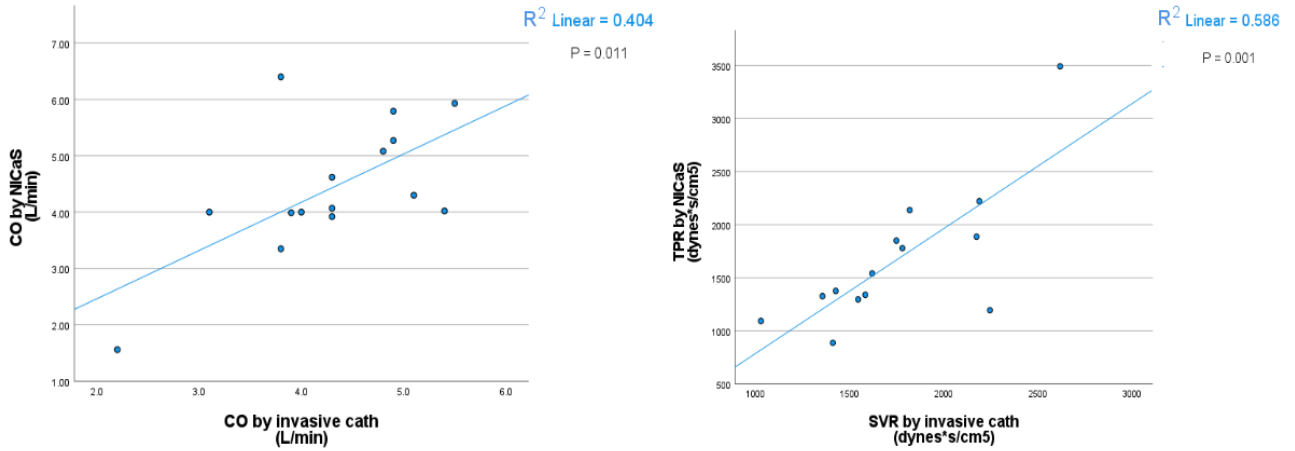
**Table S2:** NICaS parameters over time – 4-time points (n=67)

mean±SD	Baseline Nicase (1)	Nicase shortly Following TAVI (2)	Nicase before discharge (3)	Follow-up Nicase (4)	P-value
Systolic BP, mmHg	132.7±23.2	148.5±24.7	136.6±20.1	136.6±16.5	<0.001
Diastolic BP, mmHg	64.1±11.7	60.9±11.4	62.7±11.5	68.5±10.8	<0.001
MAP, mmHg	86.6±12.1	89.7±13.1	87±11.5	90.8±10.1	0.028
HR, bpm	68.5±12.4	69±13	76.6±13.4	68.8±10.1	<0.001
RR, breaths per minute	19.4±3.6	17.1±3.5	19.5±3.7	19.3±3.3	<0.001
SV, mL	62.3±14.2	56.1±15.5	57.7±19.6	63.3±18	0.002
SVi, mL/m <sup>2</sup>	34.8±7.2	31.2±7.5	32±9.7	35.3±8.8	0.001
CO, L/min	4.2±1.1	3.8±1.2	4.31.3	4.3±1.36	0.02
CI, L/min/m <sup>2</sup>	2.35±0.58	2.14±0.58	2.39±0.66	2.42±0.68	0.013
TPR, dynes*s/cm <sup>5</sup>	1762±484	2110±767	1769±801	1833±557	0.002
TBW, %	38.3±8.17	44.2±11.8	43.3±17.6	38.8±8.13	0.007

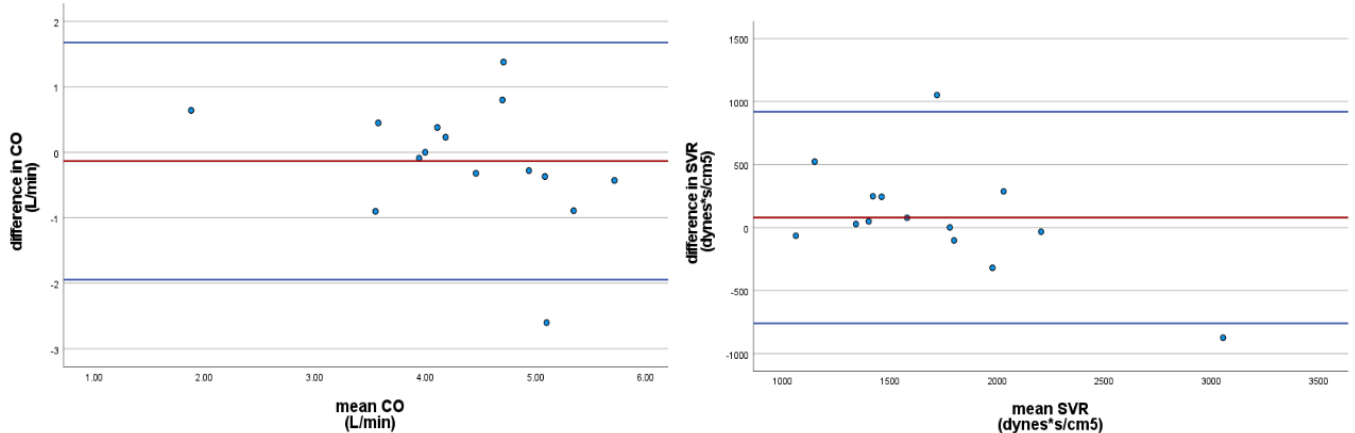
BP – blood pressure; CO – cardiac output; CI – cardiac index; HR – heart rate; MAP – mean arterial pressure; RR – respiratory rate; SD – standard deviation; SV – stroke volume; SVi – stroke volume index; TBW – total body water; TPR - total systemic peripheral resistance.

**Figure S2:**

**A. Correlation between hemodynamic measures assessed by invasive catheterization and NICaS in a validation cohort**



**B. Bland-Altman plot of agreement between hemodynamic measures assessed by invasive catheterization and NICaS in a validation cohort**

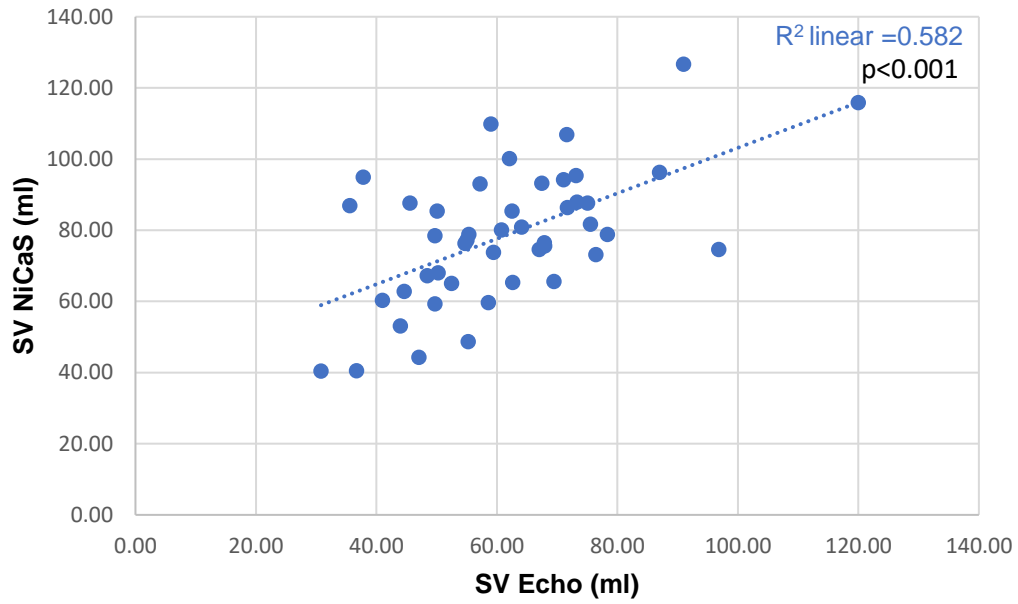


CO - cardiac output; SVR - systemic vascular resistance; TPR - total peripheral resistance.

The internal validation cohort consisted of 15 stable elective patients with advanced heart failure either before or after a heart transplant. Cardiac output calculations were performed using the Fick formula (indirect method) during invasive catheterization. The hemodynamic measures of CO and SVR (or TPR in the case of NICaS) correlated well between the invasive and non-invasive (i.e., NICaS) methods. The two methods showed a level of agreement concerning CO measurements but not concerning SVR measurements (i.e., there is a proportional bias between the two methods in SVR assessment).

**Figure S3:**

Correlation between hemodynamic SV measures assessed by non-invasive NICaS and echocardiography in 46 patients prior o discharge.



SV- stroke volume