tion) to type I flow. The procedure has proven safety in larger studies in COPD patients. Further exploration of this technique as a possible new approach for treating pharmacotherapy resistant hypertensive patients is warranted in a larger randomized trial.

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Procedural parameters during renal denervation and change of blood pressure in patients with resistant hypertension

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Background: Catheter-based renal denervation (RDN) is a promising novel treatment option for patients with resistant hypertension. Procedural parameters indicating an effective ablation of sympathetic nerve fibers located in the adventitia and thereby successful renal denervation are lacking.
Methods: In a total of 201 patients (age 64.2±9.6 years, 56% male, BP 174±22/92±16 mmHg) with resistant hypertension RDN with the Symplicity radiofrequency (RF) catheter (Medtronic) was performed. Follow-up examinations were conducted after 3 (n=178) and 6 (n=162) months. Procedural data consisted of duration of procedure, radiation dose, number of ablations, used guide catheters, amount of contrast medium, medication, impedance and temperature during RF ablation, and complications.
Results: The mean procedure time was 63.2±1.5 min. During RDN a mean of 92.7±2.9 ml contrast medium and a radiation dose of 4978±247 cGy*cm^2 was needed. On average 9.9±0.2 ablations were performed per patient, while 5±0.1 ablations were made in the right and 4.9±0.2 ablations in the left renal artery. Three (3M) and 6 months (6M) after RDN systolic blood pressure (SBP) was reduced by 18±2 ($p<0.0001$) and 20±2 mmHg ($p<0.0001$), respectively. Neither total number of ablations (r=0.15; p=0.053) nor number of right-sided (r=0.128; p=0.098) or left-sided ablations (r=0.113; p=0.145) correlated with the change of SBP after 6 months. A total of 53 patients (26%) had a reduction of SBP <10 mm Hg (non-responders). Concerning procedural parameters non-responders significantly differed from responders in dose of radiation (4003±354 vs. 5336±290 cGy*cm^2; p=0.011) and amount of contrast medium (81±4 vs. 96.4±3.4 ml; p=0.013). No correlation existed between change of SBP and impedance or temperature during ablation. During the procedures no serious adverse events were reported.
Conclusion: Catheter-based RDN is a safe and effective in reducing blood pressure in patients with resistant hypertension. Parameters during procedure, in particular number of ablations, were not associated with change of SBP during follow-up.

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Renal sympathetic denervation increases urinary sodium excretion in patients with treatment resistant hypertension

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Purpose: Activation of the renal sympathetic nerve system contributes to the maintenance and progression of arterial hypertension. The underlying mechanisms include an increase in sodium and water retention via alpha1B receptor activation. Renal sympathetic denervation (RDN) lowers blood pressure and reduces efferent sympathetic activity in patients with treatment resistant hypertension. We hypothesized that RDN might influence urinary sodium excretion or/and sodium intake by central mechanisms.
Patients and methods: In 140 patients aged 63±1 years with treatment resistant hypertension undergoing RDN, 24-hour urinary sodium excretion (UNa) was estimated at baseline and after 6 months using the Kawasaki-formula. UNa was adjusted for cystatin C GFR. Furthermore, fractional sodium excretion (FENa) indicating the proportion of the filtered sodium excreted in the urine was assessed.
Results: Mean office systolic blood pressure (SBP) at baseline was 172±2 mmHg despite an intake of 5.0±0.1 antihypertensive drugs. Six months after RDN, SBP was reduced by 18±2 mmHg ($p< 0.0001$). After 6 months 24-hour urinary sodium excretion was increased by 41% compared to baseline (234.44±8.59 vs. 334.62±13.91 mmol/day, $p< 0.0001$). This increase in sodium excretion remained significant after adjustment for cystatin C GFR (3.4±0.35 vs. 4.2±0.30 mmol/day/ml/min, $p< 0.0001$). These findings were paralleled by a significant increase in fractional sodium excretion (1.17±0.10 vs. 1.61±0.13%, $p< 0.0001$).
Conclusions: In patients with treatment resistant hypertension undergoing RDN, an increased urinary sodium excretion was observed even 6 months after RDN. This effect remained significant after adjustment for renal function.

RIGHT VENTRICULAR FUNCTION FROM ASSESSMENT TO PROGNOSIS

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Bidimensional evaluation of right ventricular function using fractional area change in the prognostic stratification of heart failure patients

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Background: Clinicians usually rely upon longitudinal estimates of right ventricular (RV) function in the evaluation of heart failure (HF) patients; however, RV remodeling in systolic HF may have different patterns and a low tricuspid annular antero-posterior motion (TAPSE) may only represent one aspect of right ventricular dysfunction.
Purpose: This study aimed at comparing the prognostic predictivity of different echocardiographic indices of RV dysfunction in patients with HF due to low LVEF.
Methods: 105 consecutive patients with NYHA class II-IV systolic HF (LVEF<45%,age 65±12) were evaluated with standard transthoracic echo; RV basal, mid- and longitudinal diameters, TAPSE, RV area and its fractional area change (FAC%), and tricuspid annulus S wave velocity were measured. The pattern of RV remodeling was stratified using RV-sphericity index. Patients were followed for death and/or HF-related hospitalizations (events).
Results: After a median of 18 months,29 patients experienced death or HF-related hospitalization (table). After univariate and multivariate logistic regression analysis, FAC% was the best predictor of events at 1 year ($p<0.001$), outperforming all other RV parameters as well as measures of LV systolic and diastolic dysfunction; FAC% seemed more predictive than TAPSE at backward stepwise regression. When stratifying patients based on RV-sphericity, FAC% proved as the most important predictor in patients in the two upper tertiles (with a more spherically remodelled RV)while not providing significant prediction in patients in the lowest tertile (with a normal shaped RV).

	With events (n=29)	Without events (n=76)	p
LVEF (%)	27±7	31±7	ns
RV basal diameter (mm)	38±6	37±5	ns
RV sphericity index	50±12	47±11	ns
TAPSE (mm)	17±3	20±3	0.001
FAC%	36±7	45±8	<0.0001
RV TDI S wave (cm/s)	8.5±2.0	9.8±1.7	0.005
E wave Dec Time (ms)	174±67	216±65	0.01

Conclusions: 2-Dimensional evaluation of RV performance using FAC% seems to predict events better than traditional m-mode TAPSE in subjects with systolic HF. This effect seems to be more evident, the more reshaped the RV is.

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Two and 3-dimensional global longitudinal strain of right ventricular free wall using transthoracic echocardiography could be an accurate indicator of 3-dimensional right ventricular systolic function

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Purpose: To evaluate the usefulness of two- and three-dimensional (2D, 3D) global longitudinal strain (GLS) of the right ventricle (RV) using transthoracic echocardiography (TTE) for RV systolic function, we compared results from this approach with conventional RV parameters in pulmonary hypertensive (PH) patients relative to controls.
Methods: A total of 18 subjects (9 PH patients confirmed by right heart catheterization within the previous 6 months (8 female, mean age 52±17 yrs, 4 chronic thromboembolic pulmonary hypertension and 5 pulmonary arterial hypertension) and 9 controls (6 female, mean age 40±20 yrs)) underwent TTE (Vivid E9, GE Healthcare) to measure 2D and 3D GLS of whole RV and only RV free wall not including inter-ventricular septum and each RV parameter using TOMTEC software.
Results: RV end-systolic volume (ESV) and 3D GLS of RV were significantly greater in PH patients than controls (57.0±17.6 ml vs 29.6±11.5 ml, P=0.002 and -13.2±6.4% vs -22.7±6.7%, P=0.007. RV ejection fraction (EF) was significantly