**Supplemental Appendix**

1. **Methods Appendix**
2. **Suppl. table 1**: **Baseline echocardiographic characteristics in different AS subtypes**
3. **Suppl. table 2: Baseline clinical and echocardiographic characteristics in the subgroup of patients with LGE-quantification by CMR** (total cohort, LGE below and LGE above the median of 24 g)
4. **Suppl. fig. 1**: **MF Burden in AS-patients dependent on CAD status;** box plots indicating minimum, maximum, median, and 25th+75th percentile
5. **Suppl. fig. 2**: **MF burden in different AS subtypes dependent on presence of severe CAD** (prior MI and/ or CABG); box plots indicating minimum, maximum, median, and 25th+75th percentile
6. **Suppl. fig. 3:** **Reverse LV remodeling**: Mixed-effects analysis regarding change over time, MF status and interaction between these variables for the echocardiographic parameters EF (A), GLS (B), LVMI (C), and LVEDV (D) in the complete cohort
7. **Suppl. fig. 4: All-cause and cardiovascular mortality in dependence of fibrotic burden; MF-stratification by tertiles**; Kaplan-Meier curves displaying all-cause (above) and cardiovascular mortality (below) in patients with myocardial fibrosis in the lowest (red), the medium (blue) and the highest tertile (green)
8. **Suppl. fig. 5: Multivariate Cox regression analysis for prediction of cardiovascular mortality during follow-up after TAVI; MF-stratification by tertiles;** hazard ratios with 95% confidence intervals, displayed as forest plot);NEF-HG: normal EF, high gradient; LEF-HG: reduced EF, high gradient; LEF-LG: reduced EF, low gradient (classic low-flow, low-gradient); PLF-LG: paradoxical low-flow, low-gradient
9. **Suppl. fig. 6**: **Multivariate Cox regression analysis for prediction of all-cause mortality during follow-up after TAVI;** hazard ratios with 95% confidence intervals, displayed as forest plot);NEF-HG: normal EF, high gradient; LEF-HG: reduced EF, high gradient; LEF-LG: reduced EF, low gradient (classic low-flow, low-gradient); PLF-LG: paradoxical low-flow, low-gradient
10. **Suppl. fig. 7**: **MTC-stained endoymyocardial biopsies (left column), CMR ECV images (middle column) and CMR LGE images (right column) of 3 patients**

**A**: 73 years-old male patient with **NEF-HG AS**, CAD excluded, no diabetes, baseline EF 60%, LVEDV 91 ml, LVMI 124 g/m²; low MF burden (5%), predominantly interstitial (including perivascular) localization; **MRI measurements: ECV 27%, LGE 1,3 g**; uneventful follow-up with favorable outcome

**B**: 67 years-old male patient with **LEF-HG AS**, CAD excluded, no diabetes, baseline EF 18%, LVEDV 175 ml, LVMI 224 g/m²; high MF burden (42%) with sub-endocardial and interstitial localization; **MRI measurements: ECV 32%, LGE 95 g**; uneventful follow-up with very good clinical and echocardiographic recovery (EF at 6 months 52%)

**C**: 82 years-old male patient with LEF-HG AS, insignificant CAD, baseline EF 47%, LVEDV 107 ml, LVMI 178 g/m²; high MF burden (21%) with sub-endocardial and interstitial localization; **MRI measurements: ECV 29.5%, LGE 22.4 g**; sudden unexplained death d 67 post TAVI

**Methods:**

**Echocardiographic evaluation:**

Ejection fraction (EF) was obtained by biplane method of disks, and LV mass was calculated by the ASE-recommended cube formula as recommended7. Calculation of relative wall thickness (RWT) with the formula (2 × posterior wall thickness)/ LVEDD allowed categorization of an increase in LV mass as either concentric (RWT >0.42) or eccentric (RWT ≤0.42) hypertrophy, as well as the identiﬁcation of concentric remodelling (normal LV mass with increased RWT)7. The LV mass-to-end-diastolic-volume ratio was also calculated as a secondary index of concentric remodelling.

Speckle-tracking echocardiography-derived global longitudinal strain (GLS, endocardial deformation) was measured in the three standard apical views and averaged. Strain measurements were obtained off-line by the same operator using the same software in all cases (Philips Q Station 3.8.5).

Stroke volume was measured by pulsed wave Doppler in the LV outflow tract and was indexed for body surface area (SVI).

**CMR imaging:**

Cardiovascular magnetic resonance (CMR) imaging was performed on a 3 Tesla MR scanner (Magnetom Skyra, Siemens Healthcare, Erlangen, Germany) using a 32-channel surface coil. Myocardial fibrosis was assessed using native and post contrast T1 mapping (using a modified 5(3)3 Look-Locker inversion recovery [MOLLI] sequence with motion correction) and an inversion recovery sequence with magnitude and phase-sensitive inversion recovery covering the entire ventricle 10 minutes after intravenous administration of 0.15 mmol/kg gadolinium-diethylenetriaminepentacetate (DTPA) for late gadolinium enhancement imaging (LGE). LGE was quantified in grams using a 3 standard deviations (SD) threshold (adapted from Treibel et al., Eur Heart J 2018). For T1 mapping, a mid-ventricular short axis T1 map was manually contoured for endo- and epicardial borders with careful exclusion of the LV blood pool. Extracellular volume fraction was defined as ECV = (1-Hct) x [DeltaR1myocardium]/ [DeltaR1blood]. All analyses were performed by operators blinded to clinical parameters using commercially available software (Medis Suite, Medis Medical Systems, Leiden, The Netherlands).