similar (p=0.109). All these neurohormones decreased from LVEF 25–40% to 40–49% (p=0.001, 0.023, <0.001, 0.012), while being similar across the 50% LVEF threshold (p=0.192, 0.213, 0.471, 0.395). By contrast, E levels were lower and did not differ significantly across LVEF categories. No interaction with drugs for neurohormonal antagonism was found.

Among patients with HfEF, NT-proBNP was increased in 80% of cases, PRA in 31%, aldosterone in 23%, NE in 19%, and E in 11%, whereas these neurohormones were increased in 85%, 19%, 28%, 19%, and 10% of patients with HfPEF, respectively. When considering only PRA, aldosterone, and NE, the percentages of patients with increases in all three biomarkers declined from 18% (LVEF <25%) to 8% (LVEF 25–39%), 3% (HfMrEF), and 6% (HfPEF).

Conclusions: Neurohormone levels decline from HfPEF (especially the LVEF range corresponding to severe systolic dysfunction) to HfMrEF and HfPEF, with no significant difference between the last two categories. Nevertheless, patients with HfPEF still have NT-proBNP increased in 85% of cases, aldosterone in 21%, NE in 19%, and PRA in 19% as well. Therefore, therapies for neurohormonal modulation may prove effective in selected subgroups of patients with HfPEF.

P5659 How does mechanical dyssynchrony affect the efficiency of the left ventricle?

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Background: The left ventricle (LV) converts metabolic energy into external mechanical work. The amount of metabolic energy needed to perform a certain mechanical work can be considered as efficiency. Little is known, how LV efficiency is affected by mechanical dyssynchrony.

Study plan: We therefore compared invasively measured LV external mechanical work and myocardial glucose metabolism by 18F-fluorodeoxyglucose (FDG) positron emission tomography (PET) in an animal model of LV dilatation with and without pacing-induced left bundle branch block (LBBB)-like dyssynchrony.

Methods: Twelve sheep were subjected to 8 weeks of rapid (180 bpm) pacing on the right atrium and right ventricular free wall, causing LV dilatation with LBBB-like dyssynchrony. All animals underwent invasive haemodynamic pressure-volume analysis and FDG-PET scans at week 8. High-resolution PET images were acquired with ECG- and respiratory gating, and resolution remodelling. Global LV glucose metabolism was assessed by the FDG activity, measured as standardised uptake ratio (SUR) of the entire LV myocardium and corrected for glycaemia level. External mechanical work was calculated from pressure-volume-loop areas, acquired with a conductance and pressure tip catheter. Volumes were calculated by magnetic resonance imaging. The ratio of LV external mechanical work and FDG activity was considered to represent LV the mechanical efficiency ratio (MER). All data was acquired at 110 bpm, during normal contraction (AAI pacing) and LBBB-like dyssynchrony (DDD pacing).

Results: Switching from AAI to DDD pacing caused on average a 14% decrease in LV external mechanical work (2085±549 vs 1787±423 mmHg*ml, p<0.01). Global LV FDG activity on the other hand, was on average 5% higher (0.088±0.048 vs 0.096±0.038 SUR, p=0.3). Consequently, LV MER dropped by 27% during DDD pacing, when compared to AAI pacing (1.47±0.7 vs 1.07±0.5, p<0.05).

Conclusions: In our animal model, LV mechanical dyssynchrony decreased the efficiency of the ventricle by approximately one third. This was mainly due to a decrease in external mechanical work while the total glucose uptake was only slightly elevated. These findings may explain a progression of LV dilatation and heart failure symptoms in dysynchronous hearts despite preserved contractility of the myocardium.

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P5660 Reduced left ventricular lateral wall contractility leads to recovery of septal function in left bundle branch block

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Introduction: Reduced septal work is a main feature of left bundle branch block (LBBB) and considered as a target for cardiac resynchronization therapy (CRT). We have realized that septal contractile function in LBBB is modified by crosstalk with the left ventricular (LV) lateral wall.

Purpose: To test the hypothesis that reduced LV lateral wall contractility leads to recovery of septal function in LBBB.

Methods: In 10 anaesthetized dogs we induced LBBB by radiofrequency ablation and occluded the circumflex coronary (CX) artery to reduce LV lateral wall contractility. Septal and LV lateral wall segment lengths were measured by sonomometry and regional work calculated as the area of the pressure-segment relationship. Work performed during counterclockwise rotation of the loop was defined as positive, whereas work performed during clockwise rotation of the loop was defined as negative (figure).

Furthermore, we used speckle-tracking echocardiography to study 24 LBBB patients referred for CRT implantation: 8 patients with LV lateral wall scar and 16 patients with non-ischaemic cardiomyopathy. There was no difference in LV ejection fraction between the two groups. Using a previously validated method for non-invasive estimation of LV pressure, regional work was calculated by pressure-strain analysis.

Results: Induction of LBBB caused characteristic regional work distribution with high values of LV lateral wall work and low values of septal work in all animals. CX occlusion, however, resulted in a major loss of LV lateral wall work, which declined from 417±84 (mean±SD) to 74±65 mmHg*ml (p<0.001). This was followed by a marked increase in septal work from 52±8 to 108±47 mmHg*ml (p<0.001) (figure).

Results from the clinical study resembled findings from the experimental study. In patients with non-ischaemic cardiomyopathy LV lateral wall work was 3144±1425 % in patients with LV lateral wall scar (p<0.01). On the other hand, septal work was only 272±922 in non-ischaemic cardiomyopathy patients as compared to 1722±851 mmHg*% in LV lateral wall scar patients (p<0.01) (figure).

Conclusions: In LBBB, septal function is markedly improved or normalized in hearts with LV lateral wall dysfunction. Since recovery of septal function is one of the main mechanisms of improved LV function with CRT, hearts with lateral wall infarcts may have limited potential for response.