

rhythm disorders were evaluated with Pearson's chi square. **Results:** Sixty patients were finally selected (53M; 7F); mean age of 77 (+9.9). 48.3% of them had sinus rhythm, while 31 pts had different arrhythmias (permanent and paroxysmal atrial fibrillation 30% and 16.7%; atrial flutter 1.7%). Mean left anteroposterior atrial diameter was 46mm (+6.3mm). Out of 60, twenty-seven pts (45%) were still ongoing diagnosis pathway for amyloidosis (i.e. differential diagnosis between ATTRvs.AL), while 32 pts (55%) had ATTR and 1 with AL. An overall left ventricular cardiac uptake was observed in 60/60 by each two observers, with IA between mild versus moderate/severe uptake of 0.90 ( $p < 0.0001$ ). AU was observed in planar images in 36/60 and 42/60 respectively by each two physicians, with an IA of 0.49 ( $p < 0.0001$ ). SPECT/CT was performed in 17/60 pts; AU was observed in 14/17 and 15/17 pts respectively, IA=0.77 ( $p = 0.001$ ). No significant correlation was observed between AU and current presence or history of supraventricular arrhythmias, nor with left atrial enlargement. **Conclusion:** Standard planar images of bone scintigraphy are a validated approach for detection and differentiation of CA. Our analysis evidenced limitations of this technique in identifying atrial involvement that can be at least mitigated by adoption of SPECT/TC scan. The association of AU with atrial enlargement and/or arrhythmias was not evidenced by our analysis but larger prospective studies systematically adopting SPET/TC are needed. Gaining insight into these possible relationships may help to better understand the real meaning of cardiac uptake, which still remains eclipsed. **References:** None

## EPS-065

### Electromechanical Decoupling Associated With Cardiac Transthyretin Amyloidosis. A Small Case Series Characterization of Left Ventricle Dyssynchrony Applying Gated-SPECT Phase Analysis

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**Aim/Introduction:** Myocardial amyloid deposition can alter the regional cardiac mechanics of the left ventricle (LV). Recent findings of Doppler tissue velocity imaging suggest that patients with early light-chain cardiac amyloidosis have increased segmental dyssynchrony compared to controls. (1) However, LV mechanical dyssynchrony (LVMD) has not

been assessed in transthyretin cardiac amyloidosis (ATTR). **Materials and Methods:** Consecutive patients with high clinical and imaging suspicion of ATTR and no coronary artery disease referred to bone-seeking scintigraphy during the last 6 months were included. Patients were studied using <sup>99m</sup>Tc-DPD and <sup>99m</sup>Tc-PYP with planar imaging and gated-SPECT/CT obtained 1-3 hours after injection. Peak amplitude (PA), phase standard deviation (PSD) and phase bandwidth (PBW) were calculated from phase histogram applying SyncTool (Emory Cardiac Toolbox®) and compared with normal values obtained with perfusion tracers as previously reported (2) and with a group of patients with normal gated-SPECT <sup>99m</sup>Tc-MIBI images (n = 24). The site of the onset of mechanical LV contraction (OMC) was detected in a digital video of contractile dynamics. **Results:** Six patients were included, 4 with <sup>99m</sup>Tc-DPD and 2 with <sup>99m</sup>Tc-PYP, all men, aged 70-89 years, LVEF = 41 + 18%. Two patients exhibited left bundle branch block in baseline ECG. The mean H/CL score was 2.83, all cases were graded as Perugini category 3. Patients with ATTR presented a marked LVMD (PA = 137.5 + 64.6, PSD = 57.1 + 21.9, PBW = 184.5 + 64.4 degrees ( $p$ -value < 0.05 for comparisons of PSD and PBW with both control groups). A multisite OMC was found in 33% of cases. **Conclusion:** Results of gated-SPECT phase analysis obtained using bone-seeking radiotracers suggest an underlying mechanical substrate of marked LVMD that could be correlated with a severe amyloid burden. This could be an unrecognized mechanism contributing to heart failure in ATTR subjects. However, phase histogram measures obtained with bone-seeking tracers should be validated by comparison with perfusion imaging tracers through large series, ideally on a per-patient, dual-isotope basis. **References:** 1) Migrino RQ, Harmann L, Woods T, et al. Intraventricular dyssynchrony in light chain amyloidosis: a new mechanism of systolic dysfunction assessed by 3-dimensional echocardiography. *Cardiovasc Ultrasound* 2008;7:40. 2) Chen J, Garcia EV, Folks RD, et al. Onset of left ventricular mechanical contraction as determined by phase analysis of ECG-gated myocardial perfusion SPECT imaging: development of a diagnostic tool for assessment of cardiac mechanical dyssynchrony. *J Nucl Cardiol* 2005;12:687-695.

## EPS-066

### The Importance Of Monoclonal Proteins Determination For The Correct Diagnosis Of Transthyretin Cardiac Amyloidosis By [<sup>99m</sup>Tc]Tc-diphosphonates

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**Aim/Introduction:** To analyze the influence of the determination of free monoclonal proteins in blood and urine in the final diagnosis of Transthyretin Cardiac

Amyloidosis (TTRA). **Materials and Methods:** We have analyzed 200 [99mTc]Tc-diphosphonates scans: 192 performed on 190 patients under suspicion of TTRA and 7 patients with grade II-III radiotracer myocardial deposit as a casual finding (November/2013 - January/2020). Likewise, clinical and laboratory characteristics (heart failure, LVEF, proBNP levels, immunofixation in serum and/or urine for the detection of monoclonal chains and chronic renal failure) have been evaluated. A positive case has been considered for TTRAwT or senile (Score Perugini II-III scan, negative immunofixation in serum and/or urine, negative genetic study), positive case for hereditary TTRA (Score Perugini II-III scan, negative immunofixation and positive genetic study), positive case for secondary amyloidosis (positive immunofixation and presence of hematologic malignancy) and undetermined amyloidosis (immunofixation not performed or positive and absence of haematologic malignancies at follow-up). **Results:** 59 positive scans have been detected, 47 men (79.7%) and 12 women (20.3%). The mean age of the group of positives was 82.66 years, while that of the negatives was 72.15. The mean proBNP levels in the positives are 7561, compared to 5869 in the negative group. Immunofixation (serum and/or urine for detection of kappa or lambda monoclonal chains at 30 (50.8%) has been performed on these patients. Finally, 37.2% (22/59) resulted in ATTRwt, 3.4% (2/59) hereditary ATTR (genetic study: variant E54Q and mutation c.424> A (p.Val.122Ile) in exon 4 of TTR) and 1.7% (1/59) secondary amyloidosis. The remaining 34/59 (57.7%) cases were undetermined amyloidosis (6 positive immunofixation and 27 without monoclonal proteins determination). **Conclusion:** Determination of monoclonal bands in blood and urine is mandatory to correctly characterize cases of cardiac amyloidosis and, in presence of monoclonal bands, to assess the existence of underlying haematological malignancies. **References:** None

## EPS-067

### Left Ventricle Mechanical Response to Induced Ischemia In Patients With Narrow QRS and Normal Systolic Function Derived To Gated-SPECT

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**Aim/Introduction:** Gated-SPECT phase analysis is a novel,

noninvasive and reliable method to quantify left ventricular mechanical dyssynchrony. However, the contributions of this technique as ancillary criteria to the diagnosis of induced myocardial ischemia have been scarcely evaluated. In this research, we characterized the contractile response of the left ventricle associated with post-stress myocardial ischemia in subjects without baseline electrical dyssynchrony. **Materials and Methods:** Phase histograms were obtained under basal and post-stress conditions in a sample of consecutive patients referred to gated-SPECT with normal systolic function and narrow QRS complex in 12-lead ECG. Gated-SPECT myocardial perfusion imaging with 99mTc-MIBI was performed following a two-days stress-rest protocol. Post-stress images were acquired 0.5 - 2.0 hours after exercise or vasodilator challenge. Patients in non-sinus rhythm, renal failure or mitro-aortic valve disease were excluded. The resting/post-stress changes (pre/post measurements) in phase standard deviation (PSD) and phase bandwidth (PBW) indices were compared between patients with and without myocardial ischemia on images. Continuous variables were expressed in means + SEM. The magnitude of these changes was evaluated using paired "t" test. **Results:** A total of 118 consecutive patients were included, 61% male, 68 + 12 years old; 46% of them completed a treadmill exercise protocol (Bruce). An increasing trend in the post-stress mechanical dyssynchrony indices was observed in patients with perfusion defects interpreted as ischemia, although not reaching statistical significance (PSDpre = 24.38 + 1.85, PSDpost = 26.36 + 2.12 degrees, p = 0.22; PBWpre = 73.04 + 6.17, PBWpost = 82.38 + 7.68 degrees, p = 0.08). The biggest change was observed in patients with reversible defects interpreted as ischemia and fixed defects compatible with infarct sequelae, either remote or perilesional (PBWpre = 79.11 + 9.37, PBWpost = 91.50 + 11.79 degrees, p = 0.06). **Conclusion:** Induced myocardial ischemia tended to be associated with increased dyssynchrony measured by gated-SPECT phase analysis obtained in post-stress images, especially in the subgroup of patients with myocardial scar. This response should be tested by acquiring immediate post-stress images and correlated with the amount (quantum) of ischemic burden, the extension of stenotic coronary lesions, and the presence of microvascular dysfunction. **References:** None

## EPS-068

### The Diagnostic Role Of <sup>99m</sup>Tc-DPD Scintigraphy In TTR Cardiac Amyloidosis And Its Corelation With Clinical And Radiological Findings, Our Experience

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