Utilising Fluorine-18 Florbetaben (^{18}F-FBB) as a diagnostic tool for the assessment of cardiac amyloidosis

Case Description: A 60-year-old male patient with a new diagnosis of amyloidosis was investigated for possible cardiac involvement after having cardiac symptoms. Initial presentation included prostate and carpal tunnel involvement, determined through biopsy of the prostate.

Procedures Performed: A ^{99m}Technetium diphosphono-propanodicarboxylic acid (^{99m}Tc-DPD) study was conducted to assist with classification between transthyretin (ATTR) and light chain (AL) amyloid subtypes. The patient also underwent a Fluorine-18 Florbetaben (^{18}F-FBB) positron emission tomography (PET)/ computed tomography (CT) scan to assess the effectiveness of this tracer in the evaluation of cardiac involvement in patients with AL amyloidosis. Dynamic PET images of the myocardium were acquired for 40 minutes to assess uptake and retention of tracer. The SUVmax of the myocardium was used to create time-activity curves. This allowed for quantitative analysis of the uptake and retention of tracer over the 40minutes.

Findings: Combining both the ^{99m}Tc-DPD and the ^{18}F-FBB study supported a diagnosis of AL amyloid. There was Grade 0 uptake of ^{99m}Tc-DPD within the myocardium as well as uptake and retention of ^{18}F-FBB. Quantitative analysis determined an SUVmax of 10.23 was reached at 25 minutes post-injection and plateaued with minimal wash out. Subsequent bone marrow biopsy confirmed diagnosis of AL amyloid.

Outcome: As the myocardium displays both a Grade 0 ^{99m}TcDPD uptake and retention of ^{18}F-FBB, this supports that a combination of these studies can be a tool in diagnosis and characterisation of cardiac amyloidosis.

Discussion: This case suggests inclusion of ^{18}F-FBB PET/CT studies into the current diagnostic pathway for cardiac amyloidosis as it would provide a more efficient and less invasive method of subtype classification. A definitive diagnosis allows for identification of the appropriate treatment pathway, improving overall patient outcomes.