PET imaging of sympathetic innervation with [^{18}F]Flurobenguan vs [^{11}C]*m*HED in a patient with ischemic cardiomyopathy

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INTRODUCTION

Although reduced ejection fraction defines a high risk subset, most current risk assessment approaches fail to identify the majority of patients with ischemic cardiomyopathy at risk of sudden arrhythmic death (SAD).[1] Nuclear imaging of the cardiac sympathetic nervous system offers the potential for improving the prediction of SAD in post-MI subjects and guiding therapy to improve survival. [^{123}I]*meta*-iodobenzyl-guanidine (MIBG) for planar and SPECT imaging and [^{11}C]*meta*-hydroxyephedrine (*m*HED) for PET have been the most widely used to characterize sympathetic nervous system (SNS) function in humans. Their utility in prognostication and risk stratification has been demonstrated in prospective trials.[2,3] They have also been used as endpoints to evaluate effectiveness of some therapies in small randomized studies.[4] However, widespread clinical use of PET SNS imaging is limited by the short half-life (20min) of ^{11}C-labeled tracers. A new ^{18}F-labeled tracer, such as Flurobenguan (N-[3-bromo-4-(3-[^{18}F]fluoro-propoxy)-benzyl]-guanidine), would take advantage of the high resolution and quantification advantages of PET, due to its longer half-life (110 min), allowing for wide distribution to maximize patient and clinical impact.

CASE SUMMARY

We report the first comparison of Flurobenguan (or LMI-1195) vs *m*HED PET images in a 74-year-old man with a previous anterior MI and ischemic cardiomyopathy. The patient has NYHA class 3 dyspnea, with impaired LV function (EF: 34%) and had received primary prevention ICD therapy. *m*HED and Flurobenguan PET/CT imaging was performed on two separate imaging visits within one week. A focal defect was identified on *m*HED revealing a zone of denervation in the area of previous infarct within the anteroseptal wall (Figure 1A). The size and severity of regional denervation were closely recapitulated using the new tracer Flurobenguan (Figure 1B). The definitive assessment of whether Flurobenguan yields a similar estimate of cardiac sympathetic innervation as measured by mHED is the subject of our ongoing trial.

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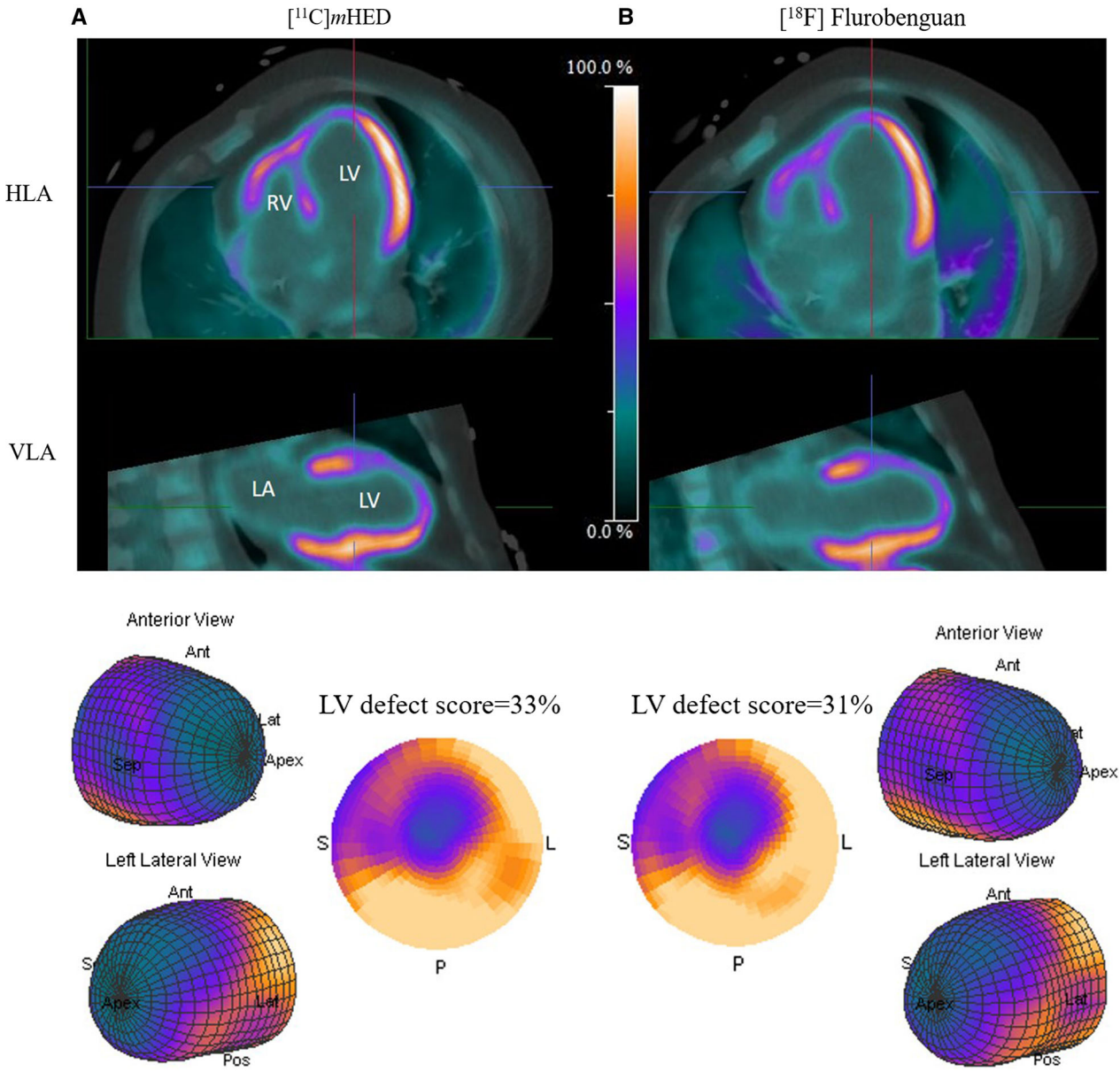

Figure 1. Representative *m*HED (**A**) and Flurobenguan (**B**) PET images in a patient with ischemic cardiomyopathy and previous anterior STEMI. The size and severity of the regional denervation were similar when assessed with both *m*HED and Flurobenguan.

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Disclosure

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