

## Value of $^{18}\text{F}$ -FDG PET/CT in the Diagnosis and Assessment of Response to Treatment of Lupus Myocarditis

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Systemic Lupus Erythematosus (SLE) is an autoimmune disease with a wide spectrum of clinical manifestations. The cardiovascular system has relevant clinical importance among the affected organs because it is associated with higher mortality in these patients. The heart can be affected in any structure, and lupus myocarditis is a major diagnostic challenge in clinical practice.<sup>1</sup>

Non-invasive tests such as electrocardiograms and echocardiograms are not sensitive or specific enough for this diagnosis. Cardiac magnetic resonance imaging (CMR) is the preferred imaging modality for diagnosing myocarditis, but it has contraindications, such as patients with metallic implants or using gadolinium in chronic kidney disease.

Despite being considered the gold standard, myocardial biopsy has the great disadvantage of being an invasive procedure with inherent risks.<sup>2</sup> Thus, diagnostic alternatives with greater sensitivity, specificity, and less risk to the patient have been studied. The use of positron emission tomography associated with computed tomography with fluorodeoxyglucose ( $^{18}\text{F}$ -FDG PET/CT) emerges as a new imaging method for evaluating inflammatory processes in rheumatologic diseases, including SLE.<sup>3,4</sup>  $^{18}\text{F}$ -FDG PET/CT combines the technique of nuclear medicine with computed tomography imaging.

Although the myocardium can capture glucose as an energy substrate, in the investigation of cardiac

inflammatory processes, the preparation with fasting of at least 12 hours, a low-carbohydrate diet, fat and use of heparin 15 minutes before injection of  $^{18}\text{F}$ -FDG suppresses physiological glucose uptake by cardiomyocytes. Thus, if we visualize cardiac uptake of  $^{18}\text{F}$ -FDG, uptake by inflammatory cells is inferred since they do not suffer interference in glucose uptake with this preparation.<sup>5</sup> Few studies associate  $^{18}\text{F}$ -FDG PET/CT with the diagnosis and follow-up of lupus myocarditis.<sup>3,4</sup> The image of this case is of a female patient, 16 years old, hospitalized with persistent fever, significant weight loss, cough, edema, and menstrual delay. She initiated research for several infectious diseases, including tuberculous pericarditis and autoimmune diseases. Among the tests performed, the transthoracic echocardiogram showed a biventricular deficit, pulmonary arterial hypertension, and severe mitral regurgitation. It was decided to perform  $^{18}\text{F}$ -FDG PET/CT during the diagnostic investigation due to renal dysfunction. After performing this examination, which showed a marked and diffuse cardiac hyperuptake of FDG (Figure 1), the possibility of lupus myocarditis was raised, which was later confirmed by serological tests, given the entire clinical context. The patient was treated with immunosuppressants (Methylprednisolone and mycophenolate mofetil), and after 2 months, the exam was repeated, showing complete regression of myocardial uptake (Figure 2). Considering the clinical case in question and a literature review, it is suggested that the use of  $^{18}\text{F}$ -FDG PET/CT may be useful and promising in the diagnosis and follow-up of patients with lupus myocarditis.

### Keywords

Lupus Erythematosus, Systemic/complications; Lupus Myocarditis; Diagnostic, Imaging; Tomography Computed Emission Positrons Tomography/methods; Immunosuppressive Agents/therapeutic use.

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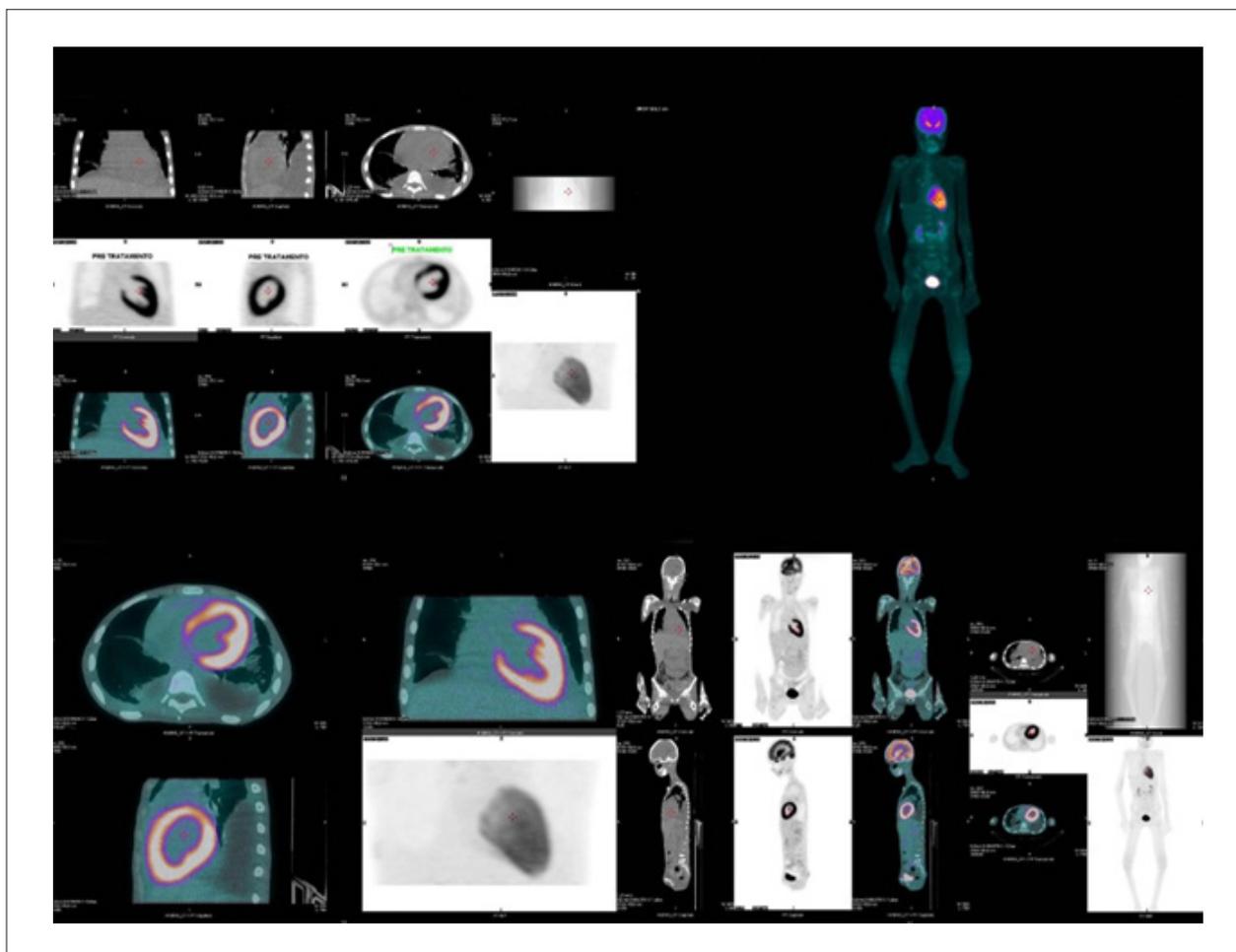
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### Author Contributions

Conception and design of the research: Perazzo AM, Andrade LGF, Venancio LGA; Acquisition of data: Perazzo AM, Venancio LGA, Brandão SCS, Gouveia PAC, Galvão MFR; Analysis and interpretation of the data: Perazzo AM, Andrade LGF, Lins EM, Brandão SCS, Neto FM; Writing of the manuscript: Perazzo AM, Andrade LGF, Venancio LGA, Brandão SCS; Critical revision of the manuscript for intellectual content: Perazzo AM, Andrade LGF, Venancio LGA, Lins EM, Brandão SCS, Neto FM, Gouveia PAC, Galvão MFR.

## Image



**Figure 1** –  $^{18}\text{F}$ -FDG PET/CT in pre-treatment lupus myocarditis: There is intense diffuse uptake of  $^{18}\text{F}$ -FDG in the left ventricle, suggesting myocarditis.

### Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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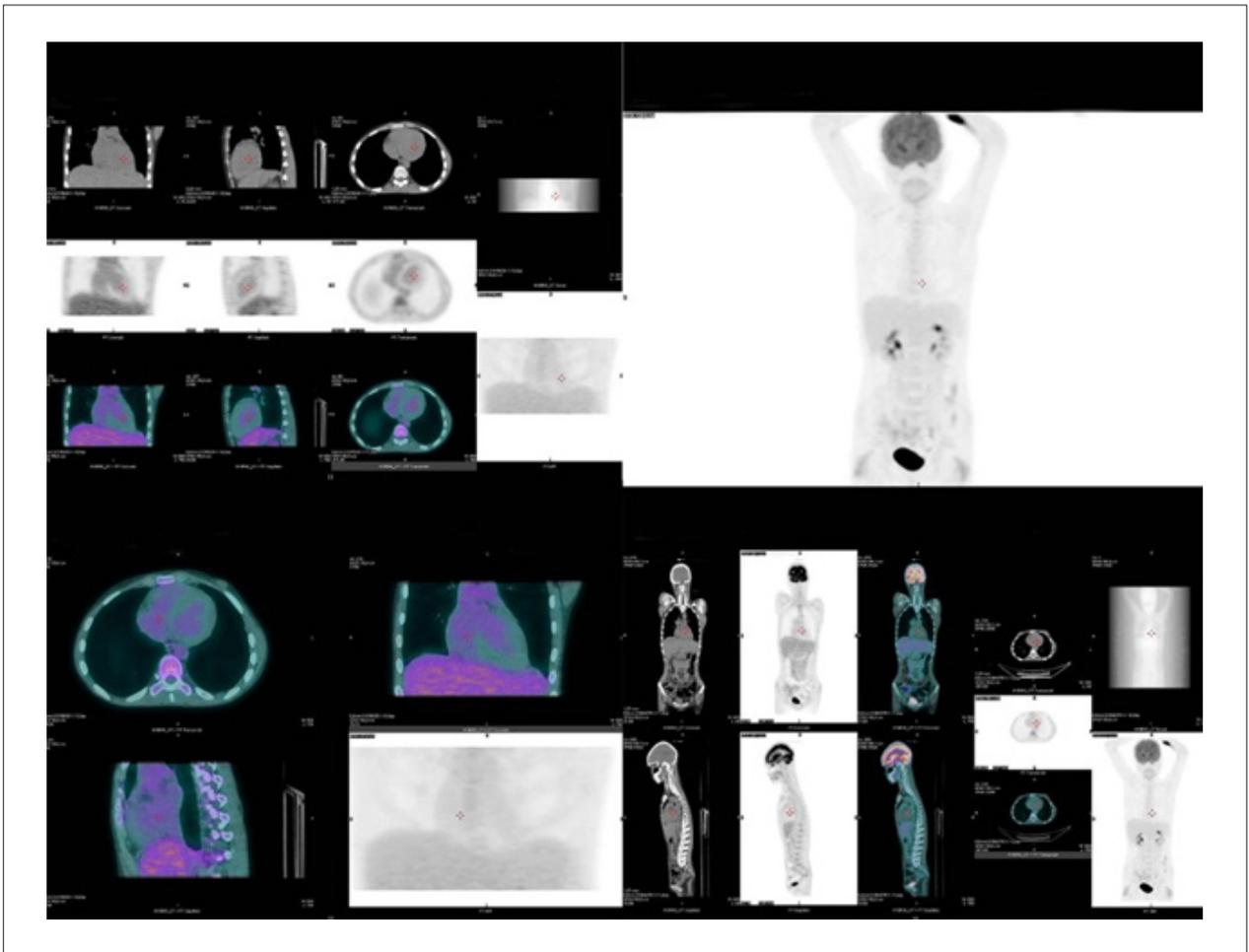
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### Study Association

This study is not associated with any thesis or dissertation work.

### Ethics approval and consent to participate

This article does not contain any studies with human participants or animals performed by any of the authors.



**Figure 2** – <sup>18</sup>F-FDG PET-CT in post-treatment lupus myocarditis: Complete regression of uptake is observed after 2 months of immunosuppressant treatment.

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