



# COVID-19 related multisystem inflammatory syndrome in children (MIS-C): Role of $^{18}\text{F}$ -FDG PET/CT to assess myocardial involvement

Swayamjeet Satapathy, MBBS,<sup>a</sup> Rajender Kumar, MD,<sup>a</sup> Anwin Joseph Kavanal, MD,<sup>a</sup> Venkata Subramanian Krishnaraju, MD,<sup>a</sup> Arivan Ramachandran, MBBS,<sup>a</sup> Prateek Deo, MD,<sup>b</sup> Varun Dhir, DM,<sup>b</sup> and Bhagwant Rai Mittal, MD<sup>a</sup>

<sup>a</sup> Department of Nuclear Medicine, Post Graduate Institute of Medical Education and Research, Chandigarh, India

<sup>b</sup> Department of Internal Medicine, Post Graduate Institute of Medical Education and Research, Chandigarh, India

Received Jan 5, 2021; accepted Jan 8, 2021  
doi:10.1007/s12350-021-02540-x

## INTRODUCTION

Novel coronavirus 2019 (COVID-19) infection related multisystem inflammatory syndrome in children (MIS-C) has been recently described.<sup>1,2</sup> In this case report, we present the utility of  $^{18}\text{F}$ -FDG PET/CT in identifying myocardial inflammation in the setting of MIS-C.

## CASE SUMMARY

A 14-years old male child, without any co-morbidities, presented with history of fever, and sore throat at the height of COVID-19 pandemic. This was followed by acute onset diarrhoea, arthralgia, dyspnea and bilateral angular conjunctivitis. Laboratory investigations revealed normal hemogram, renal and liver functions; however, his erythrocyte sedimentation rate (100 mm/h) and C-reactive protein (134 mg/L) levels were markedly high. COVID-19 reverse transcription–polymerase chain reaction (RT-PCR) assay was negative, but chest radiograph showed opacities in the lower lobes of bilateral lungs. Directed investigations for common infectious aetiologies were negative, as were the autoimmune

markers. ECG showed tachycardia and PR segment depression while echocardiography revealed global hypokinesia with left ventricular ejection fraction of 45 to 50%. The patient also had elevated serum troponin t (348 pg/mL), ferritin (603 ng/mL) and procalcitonin (0.86 ng/mL) levels. COVID-19 antibody assay showed significantly high serum Immunoglobulin G (IgG) levels (> 10000 IU/mL). A provisional diagnosis of COVID-19 related MIS-C was made<sup>1</sup> and the patient was referred for  $^{18}\text{F}$ -FDG PET/CT to assess myocardial inflammation.  $^{18}\text{F}$ -FDG PET/CT, performed after 18 hours of fasting and high-fat, low-carbohydrate diet preparation,<sup>3</sup> demonstrated hypermetabolism in the inferolateral wall of the LV myocardium suggestive of active inflammation (Figure 1A, B, C, D). The patient was managed conservatively on oxygen, inotropes, diuretics and steroids. A second  $^{18}\text{F}$ -FDG PET/CT with the abovementioned protocol, performed six weeks later, showed resolution of hypermetabolism in the inferolateral wall (Fig. 1E, F, G, H) and was consistent with clinical and biochemical improvement.  $^{18}\text{F}$ -FDG PET/CT can thus have incremental role in the timely diagnosis and follow-up of this potentially life-threatening hyperinflammatory syndrome.

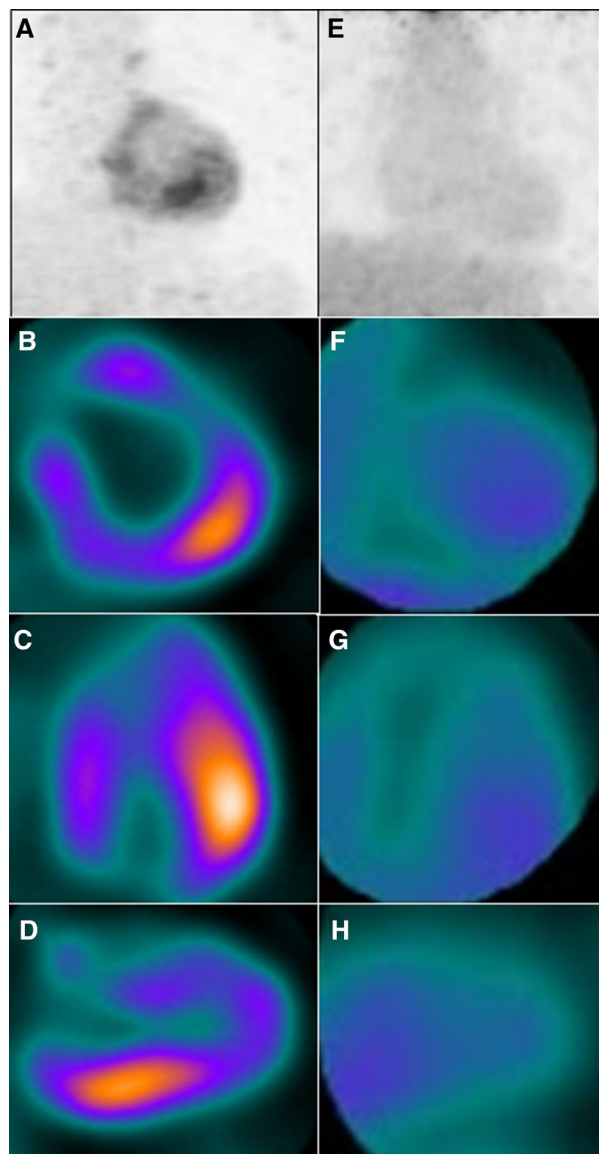
**Funding** There are no sources of funding.

Reprint requests: Bhagwant Rai Mittal, MD, Department of Nuclear Medicine, Post Graduate Institute of Medical Education and Research, Chandigarh160012, India; [brmittal@yahoo.com](mailto:brmittal@yahoo.com)

J Nucl Cardiol 2022;29:3546–7.

1071-3581/\$34.00

Copyright © 2021 American Society of Nuclear Cardiology.



**Figure 1.** Baseline maximum intensity projection (A), short axis (B), horizontal long axis (C) and vertical long axis (D) images showing increased <sup>18</sup>F-FDG uptake in the inferolateral wall of the LV myocardium. Corresponding follow-up images (E to H) after six weeks showing resolution of hypermetabolism in the inferolateral wall with no other FDG avid focus.

## Disclosure

*The authors declare no conflict of interest.*

## References

1. Nakra NA, Blumberg DA, Herrera-Guerra A, Lakshminrusimha S. Multi-system inflammatory syndrome in children (MIS-C) following SARS-CoV-2 infection: Review of clinical presentation, hypothetical pathogenesis, and proposed management. *Children*. 2020;7:69.
2. Kaushik A, Gupta S, Sood M, Sharma S, Verma S. A systematic review of multisystem inflammatory syndrome in children associated with SARS-CoV-2 infection. *Pediatr Infect Dis J*. 2020;39:e340–6.
3. Harisankar CN, Mittal BR, Agrawal KL, Abrar ML, Bhattacharya A. Utility of high fat and low carbohydrate diet in suppressing myocardial FDG uptake. *J Nucl Cardiol*. 2011;18:926–36.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.