

CASE REPORT

CLINICAL CASE

A Confounder in the Study of a Patient With Infective Endocarditis



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ABSTRACT

Positron emission tomography (¹⁸F-DG PET-CT) is a widely used method to help in the diagnosis of infective endocarditis (IE). Lipomatous hypertrophy of the interatrial septum (LHIS) is an uncommon fat deposition in the region of the interatrial septum. PET-CT images of LHIS may be indistinguishable from changes associated with IE. (J Am Coll Cardiol Case Rep 2023;28:102095) © 2023 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

HISTORY OF PRESENTATION

A 70-year-old woman went to the emergency room for dyspnea, detecting fever. A month earlier, a surgical aortic valve replacement has been performed. Ampicillin-susceptible *Enterococcus faecalis* was isolated from blood cultures. Transthoracic echocardiography and transesophageal echocardiography (TEE) were performed, and images suggestive of vegetations were not shown. However, thickening

interatrial septum was observed (**Figure 1**). The ¹⁸F-fluorodeoxyglucose positron emission tomography-computed tomography (¹⁸F-DG PET-CT) was not performed at this moment because it was not considered by the endocarditis team (ET). With the diagnosis of probable early prosthetic infective endocarditis (IE), she received 6 weeks of ampicillin (2 g/4 h), the first 2 weeks combined with gentamicin (240 mg/24 h) and subsequently with ceftriaxone (2 g/12 h) for another 2 weeks. Ceftriaxone was prematurely withdrawn because of leukopenia.

Twenty days after finishing the antibiotic regimen, she was admitted again for heart failure. Blood cultures were extracted, where *E faecalis* was isolated in 4 of 4 extractions. The transthoracic echocardiography at admission did not show changes with respect to previous ones. At the meeting of the ET, a consensus was reached on the performance of ¹⁸F-DG PET-CT, which showed a hypermetabolic focus in pericardial recesses, that began cranially in the pos-

LEARNING OBJECTIVES

- To understand that a heart uptake in ¹⁸F-DG PET-CT is not always an infection.
- To know that LHIS is a rare disorder associated with obesity and advanced age.
- To realize that the aging of the population and epidemic obesity may make the LHIS hyperuptake more common in the future.

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**ABBREVIATIONS
AND ACRONYMS****ET** = endocarditis team**¹⁸FDG PET-CT** = ¹⁸-fluorodeoxyglucose positron emission tomography-computed tomography**IE** = infective endocarditis**LHIS** = lipomatous hypertrophy of the interatrial septum**TEE** = transesophageal echocardiography

terior aortic recess between the superior cava and the right root wall, respecting the aortic prosthetic valve. It extended caudally to the transverse sinus, between the atria, until occupying the upper left atrial recess, with increased fat density that was related to infectious inflammatory activity (**Figures 2A and 2B**). No other uptakes were identified.

PAST MEDICAL HISTORY

The patient's medical history included insulin-dependent diabetes mellitus and morbid obesity (body mass index: 41 kg/m²) as well as symptomatic aortic stenosis. In November 2016, a Carpentier Magna Ease 21 (Edwards Lifesciences) bioprosthesis was implanted, and surgical revascularization of critical stenosis in the anterior descending artery was performed. In the immediate postoperative period, she had no incidents.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis included paravalvular abscess, lipomatous hypertrophy of the interatrial septum (LHIS).

INVESTIGATIONS

The ¹⁸FDG PET-CT images were jointly reviewed with those obtained in other imaging tests, performed previously—chest computed tomography (**Figure 2C**) and TEE (**Figure 3, Videos 1 and 2**), the findings being compatible with LHIS.

MANAGEMENT

After excluding paravalvular abscess, the patient was treated for 6 weeks with intravenous ampicillin (2 g/4 h) plus gentamicin (320 mg/24 h) during the first 2 weeks (suspended because of the appearance of hearing loss, attributable to gentamicin ototoxicity), with favorable clinical outcomes.

DISCUSSION

LHIS is a rare disorder associated with obesity and advanced age that was described in 1964 in post-mortem specimens.¹ It is a histologically benign cardiac lesion characterized by excessive fat deposition in the region of the interatrial septum that spares the fossa ovalis. It is an infrequent alteration, with an estimated prevalence of around 1% to 8%.² Its etiology remains unclear, though it may be associated with advanced age and obesity.

Although it is called LHIS, the fat accumulation does not actually occur within the true septal tissue but, rather, in infoldings of the atrial wall adjacent to the true interatrial septum. It can be formed mainly by brown fat, the main function of which is adaptive thermogenesis.³ A characteristic of LHIS is its high blood flow and, therefore, an increase in physiologic metabolism, which is why the consumption of ¹⁸FDG can increase by 440% when performing a positron emission tomography (¹⁸FDG PET-CT).

However, it is not an uncommon finding on transthoracic echocardiograms and can be similar to other cardiologic processes.⁴ A complete review of LHIS describes a complete differential diagnosis and complications of LHIS. This entity could be similar to some neoplasm. Also, when they are huge and reach the superior vena cava, they can obstruct the right atrial inflow. Because of the sparing of the fossa ovalis, LHIS has a pathognomonic dumbbell shape. Furthermore, LHIS could make interventional procedures harder, especially for those with access to the left atrium. It may interfere with a transeptal puncture because traversing the thickened area can reduce the maneuverability of catheters and devices.³

On the other hand, functional nuclear imaging has gained growing interest in the diagnosis and management of IE. ¹⁸FDG PET-CT is an aid tool in the diagnosis of IE, which is why it has been included as a major diagnostic criterion in the modified Duke criteria.⁵ Given its high sensitivity, the incidental finding of neoplasms and other inflammatory processes is not uncommon.² Nevertheless, interpretation of ¹⁸FDG PET-CT images requires proper exclusion of the potential confounding normal and

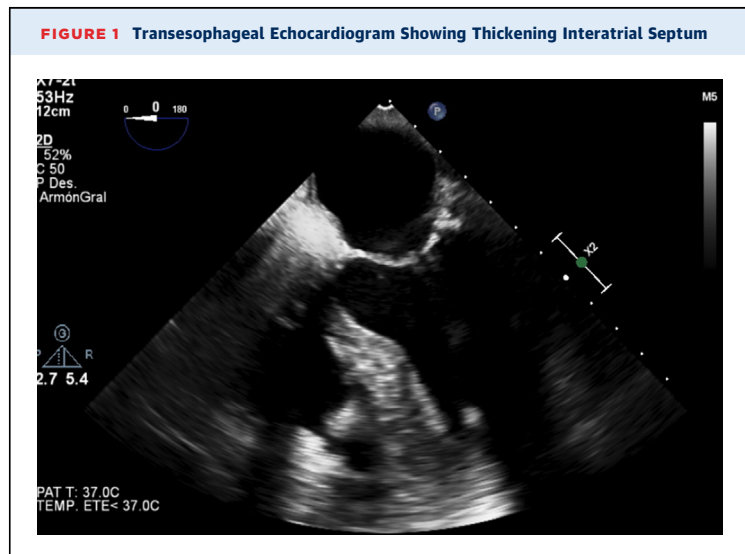
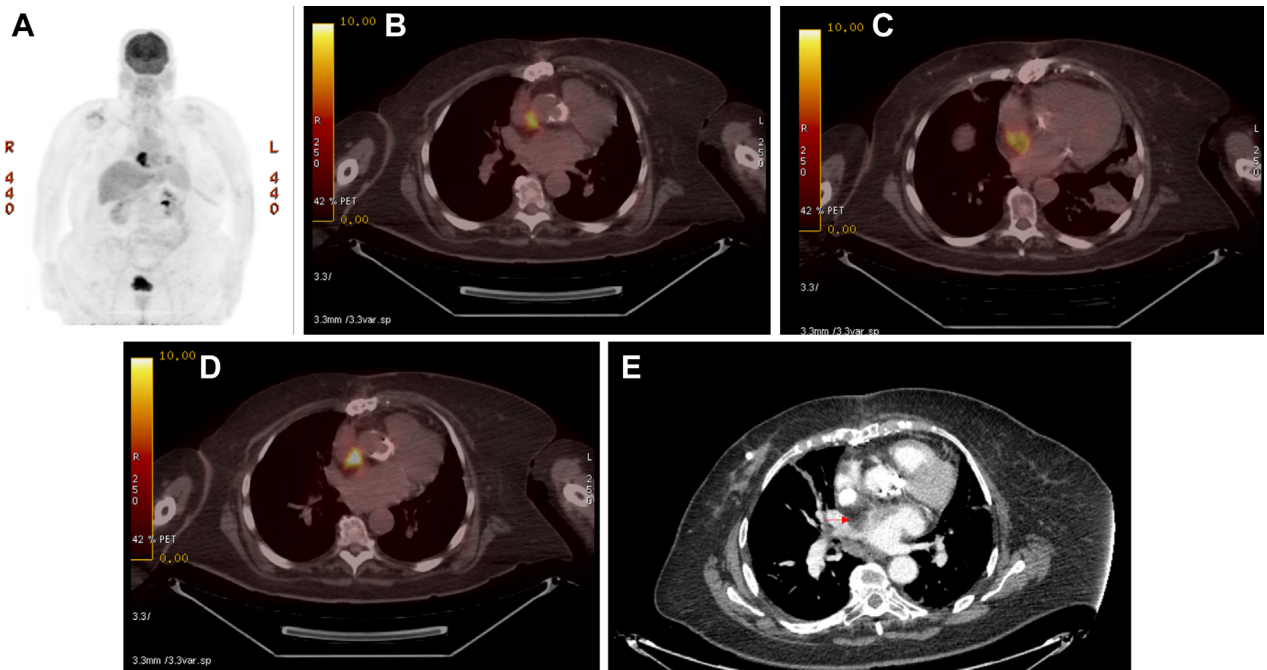
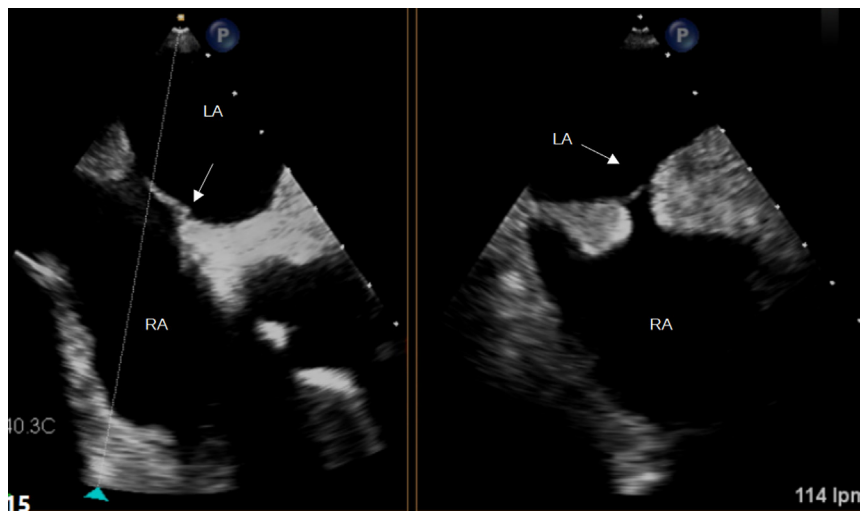
FIGURE 1 Transesophageal Echocardiogram Showing Thickening Interatrial Septum

FIGURE 2 18-Fluorodeoxyglucose Positron Emission Tomography-Computed Tomography Images



(A) Maximum-intensity projection of positron emission tomography images. (B-D) Axial slice. Images show a focus of fluorodeoxyglucose uptake in the interatrial septum, near the aortic wall with a standard uptake value. (E) Chest computed tomography scan. The arrow pointed at a thickened interatrial septum, with low-attenuation suggestive of fatty composition. L = left; R = right.

FIGURE 3 Transesophageal Echocardiogram



Static images obtained in the midtransesophageal position in the (left) anterior-posterior and (right) superior-inferior plane. Thickened interatrial septum, infiltrated by heterogeneous echorefringent content (fat) and typically sparing the fossa ovalis (arrows), adopts an "hourglass" or "dumbbell" shape. LA = left atrium; RA = right atrium.

pathologic conditions that may resemble the uptake pattern typically observed in IE. Thus, in a series that included 11 patients with LHS examined with ¹⁸F PET-CT, 9 (82%) of these patients showed focal increased FDG uptake corresponding to the region of LHS on cross-sectional imaging, with a mean standard uptake value of the atrial septa of 5.⁴ As reported in our case, the increased uptake of ¹⁸F PET-CT in LHS could be misdiagnosed as an uncontrolled infection (abscess).

The ET, a multidisciplinary group focused on the management of patients with IE, is highly recommended in IE European Society of Cardiology Guidelines.⁵ In this patient, a multidisciplinary approach was critical to accomplishing the right diagnosis. As we said before, the presence of LHS on ¹⁸F PET-CT can lead to uptake that is indistinguishable from infectious inflammatory uptake. In our patient, the ET gathered to assess the multimodality images we had. TEE images depicted a hyperechoic, homogeneous image without Doppler flow. Therefore, it was possible to conclude that it was not an abscess but, rather, fatty tissue. In this way, the existence of an ET with experts in cardiology images allowed an adequate interpretation of the imaging tests, thus avoiding unnecessary surgical intervention.

Currently, the increase in the incidence of obesity and diabetes, the aging of the population, and the increasing use of PET-CT for the diagnosis of endo-

carditis may make ¹⁸F uptake in ¹⁸F PET-CT increasingly common.

FOLLOW-UP

After 2 years of follow-up, the evolution of the patient has been satisfactory, with no new episodes of IE.

CONCLUSIONS

LHS is an infrequent entity with no pathologic significance, but it must be included in the differential diagnosis of IE in pathologic perivalvular uptake on ¹⁸F PET-CT. The accurate interpretation of image studies is key in the management of these patients to avoid unnecessary diagnostic and therapeutic procedures.

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The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS ¹⁸F PET-CT, infective endocarditis, lipomatous hypertrophy of the interatrial septum

APPENDIX For a supplemental video, please see the online version of this paper.