Interesting images

Diagnosis of infection in a patient with implantable device with $^{18}$F-FDG PET-CT

Diagnóstico de infección en un paciente con dispositivo implantable con $^{18}$F-FDG PET-CT

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A R T I C L E   I N F O

Article history:
Received 25 June 2014
Accepted 12 August 2014

We report the case of a 19-year-old woman with a bicameral implantable cardioverter defibrillator. Six months later, she complained of local discomfort, swelling and pain in the sternotomy scar, without erythema, drainage or fever. She was referred to the Nuclear Medicine Department for evaluation of an inflammatory-infectious process.

An $^{18}$F-FDG PET-CT was performed, showing intense uptake in the generator pocket, along the path of the subcutaneous electrode and the deepest portion of extracardiac electrode. No pathological intracardiac uptake in the electrode and valves were observed. Since the metal may cause artefacts in the PET due to overcorrection, we compared the corrected and the uncorrected images, observing persistence of the uptake with similar intensity to those displayed in the corrected PET image; compatible with active inflammatory-infectious disease in the bag and the electrodes, discarding endovascular and valvular infection.

The generator and the two electrodes were explanted and a new device was implanted. Cultures of the explanted electrodes and the bag’s tissue showed growth of Staphylococcus epidermidis and Propionibacterium acnes, confirming local infection of the removed material, consistent with the findings of PET-CT.

Cardiac devices infections are becoming increasingly common, with an incidence of 1–7%.

In over 70% of the cases the causing organisms are Staphylococcus epidermidis in later forms (as in the presented case) and S. aureus in earlier stages.

Clinical manifestations can be local and/or systemic. These symptoms guide the diagnosis if they appear right after surgery, but it is more complex in later stages. Moreover, infection may be limited to the bag and/or subcutaneous cable track (local device infection), but it may also affects the intravascular track or even the valves, causing infective endocarditis (cardiac device-related endocarditis). Distinguishing them is frequently difficult. The final diagnosis is based on microorganism isolation. A correct diagnosis prevents secondary complications and costs due to unnecessary surgeries and hospital admissions.

$^{18}$F-FDG PET-CT is now increasingly used for the diagnosis of infection of implantable devices. Their possible indications are to confirm or discard the infection, to estimate its extension and detect associated complications. So that, PET-CT may have an impact on the therapeutic management (Fig. 1).

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http://dx.doi.org/10.1016/j.remn.2014.08.002
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Fig. 1. $^{18}$F-FDG PET-CT with iodinated contrast. (A) MIP. (B, C, D and E) Coronal and axial images (fused PET-CT, corrected and uncorrected PET). (B) and (C) $^{18}$F-FDG uptake with SUV$_{max}$ up to 6.8 in the generator pocket (arrowhead) and along the path of the subcutaneous electrode with SUV$_{max}$ up to 7.8 (arrow). (D) $^{18}$F-FDG uptake in both electrodes, subcutaneous (arrow) and deep clavicular region with SUV$_{max}$ up to 5.7 (arrowhead). Persistence of deposits in uncorrected PET to the corrected PET images, which rules out overcorrection artefacts and therefore suggests active inflammatory-infectious disease in the bag, the subcutaneous track of the electrode and in the deep subcutaneous electrode path. (E) Slight $^{18}$F-FDG uptake in the intracardiac part of the electrode (right ventricle) (arrow) showed in the corrected PET did not show in the uncorrected images, which means it is considered artefact overcorrection, discarding endovascular inflammatory-infectious diseases.

References

