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Does 18F-fluorodeoxyglucose PET/CT have a role in the management of pulmonary and extra pulmonary sarcoidosis?

Tho the Editors:

Sirs,

Sarcoidosis is a systemic, chronic inflammatory disease of unknown aetiology and it is characterised by the presence of a non-caseating granuloma in the affected organs [1]. 18F-fluorodeoxyglucose positron emission tomography / computed tomography (FDG-PET/CT) has been reported in sarcoidosis as an imaging modality able to provide useful information to evaluate disease status and treatment response, although its precise role in the management of this granulomatous inflammatory disease has not yet been defined [2-7]. One hypothesis is that FDG-PET/CT is able to offer an accurate evaluation of early response to the treatment in sarcoidosis due to the fact that it identifies the presence and activity of macrophages and lymphocytes [8]. In fact it seems that FDG uptake in the sarcoidosis granuloma is sustained by the presence of the lymphocytes-infiltration. [9]. Therefore the possibility of monitoring the cellular activity of the granuloma could allow an "on-line" evaluation of the treatment effectiveness. Here, we report a further contribution of the concomitant use of FDG-PET/CT and of the pulmonary function tests (PFT) in the management of a patient with histologically proven pulmonary sarcoidosis and extra pulmonary organ involvement.

A 39-year-old male, non-smoker, was referred to our clinical department complaining of low-grade fever, diffused joint pain, fatigue, dry cough and dyspnoea. Symptoms had started 3 months previously and the patient underwent two successive, different antibiotic treatments without any improvement. On presentation at our department, blood routine testing was normal. Hepatitis-A, B, C, HIV tests, skin test of delayed sensitivity to purified protein derivative of M. Tuberculosis were negative. Screening for viruses (Epstein Bar virus), bacteria (Mycoplasma Chlamydia, Nocardia), and the evaluation of the presence of acid-fast bacilli in sputum were also negative. Pulmonary Function Tests (PFT, expressed as % predicted) revealed a restrictive pattern. The residual volume (RV) was 45%, forced vital capacity (FVC) 80%, total lung capacity (TLC) 72%, and diffusion capacity of the lung for carbon monoxide (DLCO) 95%. The chest x-ray showed diffused bilateral lung infiltrates with a reticulo-nodular pattern predominant at the left upper lobe (chest radiographic stages II-III using the Scadding criteria) [10]. The chest and abdomen computed tomography (CT) scan showed bilateral pulmonary thickenings and a diffused micro-nodular pattern in the right lower lobe. A non-homogeneous vascular pattern of the spleen was evident. Several mediastinic and retroperitoneal lymph nodes with a maximum diameter of 2 cm were present. Subsequently an FDG-PET/CT was performed. This study showed the presence of multiple pathological tracer uptakes in the lungs (left and right upper lobe) liver, spleen, bone and lymph nodes above and below the diaphragm (figure 1A). Based on PET findings the patient underwent a surgical biopsy of axillary lymph nodes and an abdominal laparoscopy (with multiple liver, omentum, peritoneum, and lymph nodes biopsy samples). The histological results showed the presence of several typical granulomatous processes, and the diagnosis was systemic sarcoidosis.

Therefore, the patient was treated with oral prednisone (0,5 mg/kg/lean body weight/day) in association with inhaled budosenide (400 mcg twice daily) for 3 months. Nevertheless, fatigue, diffused joint pain, and dyspnoea persisted, and the PFT and the chest x-ray were stable [11, 12]. Consequently, the prednisone was associated with methotrexate, 10 mg every week, for a further 3

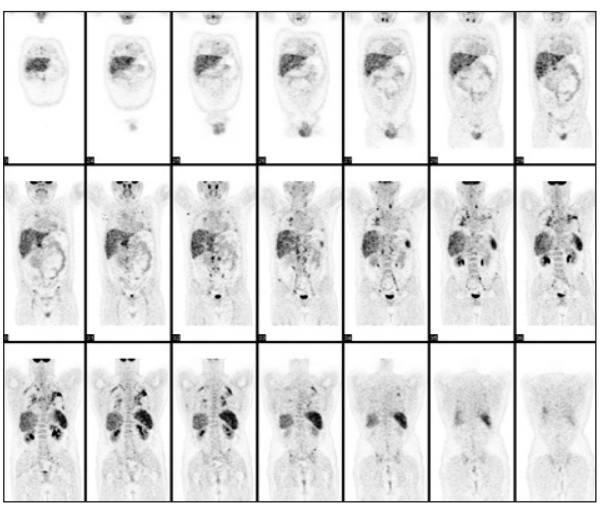

Figure 1A. - Pre treatment PET scan, coronal views: multiple pathological tracer uptakes are evident at the level of the lungs (left and right upper lobe) liver, spleen, bone and lymph nodes above and below the diaphragm.

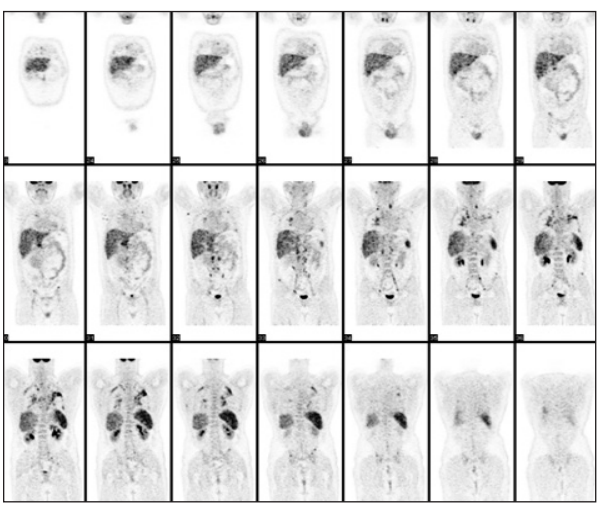

Figure 1B. - Post treatment PET scan, coronal views: non pathological uptakes of the tracer are evident.

months. After this period the patient showed a significant clinical improvement and the PET study indicated a complete disease response (figure 1B). On the contrary, at the same time, the PFT did not show any improvement (RV 43%; FVC 79%; TLC 71% DLCO 68%). This treatment was continued for a further six months and at the end of this period the PFT resulted normal (VR 76%; FVC 96%; TLC 98%; DLCO 101%).

As already suggested by Mana J *et al*. [6], and more recently by Nunes *et al*. [7], PET scans may play a potential role in identifying pulmonary sarcoid activity and extrapulmonary sites (e.g. lymph nodes, bone, cardiac, or neural sites). Therefore it is possible that in the future this imaging modality – although not strictly necessary for the diagnosis – could be added to other more traditional ones in the assessment of evolution of disease, especially when a decision on more intensive treatment have to be made. In addition, more accurate and controlled studies are needed in order to clearly define the precise role of this new technology in the clinical assessment of sarcoidosis.

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