Introduction

Elastofibroma dorsi is a benign tumour or a pseudotumour most commonly located in the subscapular region. It is more frequently found in adults and elderly women and it has been described in the literature as an unusual lesion. It is a non-encapsulated lesion made of elastic and connective fiber accumulation, associated to fibroblasts and adipocytes. It is commonly asymptomatic and when it manifests clinically, it does so in the form of a painful mass. Its radiological aspect has been documented with ultrasound, computed tomography (CT) and Magnetic Resonance Imaging (MRI). However, the number of articles documenting its characteristics with PET/CT is scarce. The aim of this study is to characterize, through a case series, the findings of Elastofibroma Dorsi in PET/CT and to stress that it is not an infrequent finding, and therefore its recognition is important in order to avoid misdiagnosis.

Materials and methods

This is a retrospective and descriptive study of a series of 29 cases of patients who underwent a PET/CT scan in our institution (Fundación Centro Diagnóstico Nuclear) between December 3rd, 2008 and January 5th, 2010. These patients were referred for staging or restaging of a malignant neoplasia and the presence of elastofibroma dorsi was found and reported as an incidental finding. During this period, 1,751 PET/CT were performed in a Positron Emission Tomograph PET/CT Discovery STE-16 (General Electric) after 45-60 min of the intravenous administration of 4.07 MBq/kg of 18F-deoxiglucose (FDG). The patients were studied with a min-
Table 1
Elastofibroma Dorsi on $^{18}$FDG-PET/CT scans of 1,751 Patients. General characteristics.

<table>
<thead>
<tr>
<th>EFD</th>
<th>Number of patients</th>
<th>Sex (%) M/F</th>
<th>Age</th>
<th>SUVmax</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Unilateral</td>
<td>11</td>
<td>27/73</td>
<td>65 ± 10</td>
<td>2.0 ± 0.3</td>
<td>0.63</td>
</tr>
<tr>
<td>Left Unilateral</td>
<td>1</td>
<td>F</td>
<td>65</td>
<td>1.7</td>
<td>0.06</td>
</tr>
<tr>
<td>Bilateral EFD</td>
<td>17</td>
<td>23/77</td>
<td>67 ± 12</td>
<td>2.2 ± 0.5</td>
<td>0.97</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>24/76</td>
<td>66 ± 11</td>
<td>2.1 ± 0.5</td>
<td>1.66</td>
</tr>
</tbody>
</table>

EFD: Elastofibrome Dorsi.

Results

Between December 3rd, 2008 and January 5th, 2010, 1,751 PET/TC were performed in our institution. Twenty nine cases of elastofibroma dorsi were recorded which is equivalent to a prevalence of 1.66%. They were 22 women (75.86%) and 7 men (24.14%) with ages ranging from 46 to 86 years old, with an average age of 66.3. In 17 patients, the elastofibroma dorsi was bilateral (58.62%) and in 12 patients it was unilateral (41.38%), 11 of which were in the subscapular right region and only one on the left side. The SUVmax ranged from 1.4 to 3.2, with an average value of 2.11. Table 1 summarizes the characteristics of our population.

In many cases, the lesion was visible at maximum intensity projections (MIP) which is the first image evaluated by our radiologists and nuclear physicians. In the frontal MIP projection, an oval image with moderate or low intensity uptake of FDG at the unilateral or bilateral pectoral level was identified. The lateral MIP projection showed that such lesions were placed at the posterior part of the chest, therefore belonging neither to mammary gland nor lung tissue (fig. 1).

In the axial plane of the PET study, again it was clear that those lesions were placed at the posterior part of the thorax and that they corresponded to oval images with low or moderate diffuse and mostly homogeneous uptake of the radiotracer. In the fusion with CT, its placement was in the subscapular region, behind the serratus anterior muscle and medial to the latissimus dorsi muscle. The CT showed a lesion with soft tissue density, similar to those of the adjacent muscular structures (fig. 2).

Discussion

Since its first description in 1961 by Jarve and Saxen, the elastofibroma dorsi has been largely described as a non frequent lesion. Nevertheless, Brandser et al2 reported a 2% prevalence in an asymptomatic elderly population studied with a chest CT. On the other hand, in a series of autopsies3 in people older than 55 years old, there was a prevalence of 24% in women and 11% in men. Our prevalence of 1.66% reaffirms the idea that the elastofibroma dorsi is a relatively frequent finding.

Regarding the bilateral nature of lesions, we have found contradictory results. Some papers have reported both regions being affected in only 10% of the cases.4 However, in other case series, the percentage is much higher, between 60 and 75% of the cases.5-7 Our results are similar to the latter, with a percentage of near 59%.

In our study, the affected region has almost always been (except Figure 1. Frontal (A) and lateral (B) MIP projection of a $^{18}$F-FDG PET study. Increased FDG accumulation (SUVmax = 2.1) on the right posterolateral chest in a patient with metastatic uterine cancer. C) Axial PET and fused PET/CT images demonstrate a right subscapular lesion which corresponds to a unilateral elastofibroma dorsi.
one case on the left side) on the right side in unilateral elastofibromas dorsi cases, in agreement with other publications. This might be related to the association of this lesion to manual work, as right-handed population is more prevalent. It is postulated that a process of degeneration of the elastic fibers intervenes due to repetitive micro-trauma by friction of the tissues found between the lower angle of the scapula and the chest wall. Nevertheless, its frequent bilateral nature indicates a multifactorial etiology.

Concerning metabolic activity of the elastofibroma dorsi, 4 isolated cases have been described, 3 bilateral and 1 right-sided. In these cases, an SUVmax varying from 1.52 to 2.8 has been documented. Our series of 29 cases of elastofibroma dorsi studied with PET/CT showed SUVmax between 1.4 and 3.2 with an average of 2.11.

Although it is not necessary to perform a PET study to diagnose such lesions, it is important to identify them in order to avoid misdiagnosis. CT or MRI alone is sufficient for its characterization. CT shows a mass with soft tissue density, with non-precise limits in the subscapular region. Its attenuation is similar to that of skeletal muscle, except for internal striations with fatty density due to the accumulation of adipose tissue. MRI shows an alternation of fibrous and adipose tissue, with the former isointense to the muscular tissue in T1 and T2 weighted sequences while the adipose tissue is hyperintense in T1.

Currently, the more frequent indication of PET/CT is the diagnostic evaluation of oncological patients. For this reason, and for the relatively frequent findings of elastofibromas in asymptomatic patients, it is of high importance to establish an accurate diagnosis and not to misinterpret these benign lesions with primary or secondary malignant neoplasia, leading the overstaging to unnecessary treatments.

Elastofibroma dorsi represents one more incidental finding of PET/CT. In daily medical practice, we report very frequently oncological or non oncological lesions not related with the indication of the study. As an example, we can mention the thyroiditis with diffusely increased FDG uptake, hot thyroid nodules, hypermetabolic focus suggestive of colonic polyps, trocanteritis or other inflammatory signs, as well as metachronic or synchronous neoplasias. The physicist must take into account all this range of diagnostic possibilities when reporting in order to provide clear and complete information.

**Conclusion**

The elastofibroma dorsi is a relatively frequent lesion present in 18FDG-PET/CT as an image with soft tissue density with mild or moderate diffuse metabolic activity located in the subscapular region. Their morphological and metabolic characteristics should be known to reach an accurate diagnosis of this benign lesion and to avoid misdiagnosis which hinders the treatment of oncological patients studied with PET/CT.

**Conflict of interests**

Authors declare that they don’t have any conflict of interests.

**References**