Characterization of Elastofibroma Dorsi with $^{18}$FDG PET/CT: a retrospective study


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A B S T R A C T

Elastofibroma dorsi has been described in the literature as an unusual tumor or pseudotumor. However, autopsies and imaging studies have revealed that it is a non-negligible finding.

Purpose: The aim of this study has been to illustrate and become familiar with this type of lesion in order to prevent misdiagnosis.

Materials and methods: From 3 December 2008 to 5 January 2010, 1,751 patients were evaluated with $^{18}$FDG-PET/CT. Of these, 29 cases of elastofibroma dorsi were recorded as an incidental finding. A retrospective and descriptive analysis was performed on this study series.

Results: The study showed a prevalence of 1.66%. Out of the 29 findings, 22 (75.86%) were females and 7 (24.14%) males. Seventeen (58.62%) cases were bilateral, 12 (41.38%) unilateral and the SUVmax ranged from 1.4 to 3.2. These lesions were reported as soft tissue density images with mild or moderate diffuse metabolic activity.

Conclusion: The elastofibroma dorsi is a relatively common finding in PET/CT that should be known in order to avoid making wrong diagnoses.

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Resumen de elastofibroma dorsi con $^{18}$FDG-PET/CT: un estudio retrospectivo

El elastofibroma dorsi ha sido descrito en la literatura como un tumor o pseudotumor poco frecuente. Sin embargo, autopsias y estudios de imagen han revelado que se trata de un hallazgo no despreciable.

Material y métodos: Del 3 de diciembre de 2008 al 5 de enero de 2010, se evaluaron 1,751 pacientes mediante $^{18}$FDG-PET/TC, de los cuales 29 casos de elastofibroma dorsi fueron reportados como hallazgo incidental.

Resultados: Este estudio mostró una prevalencia del 1,66%. De los 29 casos, 22 (75,86%) fueron mujeres y 7 (24,14%) hombres. Diecisiete (58,62%) casos resultaron bilaterales, 12 (41,38%) unilaterales y el SUVmax osciló entre 1,4 y 3,2. Dichas lesiones fueron descritas como imágenes con densidad de partes blandas con leve o moderada actividad metabólica difusa.

Conclusión: El elastofibroma dorsi es un hallazgo relativamente frecuente en PET/TC. Sus características deberían ser conocidas a fin de evitar diagnósticos erróneos.

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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 $^{18}$F-deoxyglucose (FDG). The patients were studied with a min-
Table 1
Elastofibroma Dorsi on 18F-FDG-PET/CT scans of 1,751 Patients. General characteristics.

<table>
<thead>
<tr>
<th>EFD</th>
<th>Number of patients</th>
<th>Sex (%)</th>
<th>Age</th>
<th>SUVmax</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Unilateral EFD</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 EFD</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: Elastofibroma 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,1 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 2. Axial and coronal ¹⁸F-FDG PET/CT images of a bilateral elastofibroma dorsi. PET images (A) show moderate FDG uptake (SUVmax = 3.2) in both subscapular regions which correlate in CT (B) with soft tissue density lesions. C) Fused PET/CT images.

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 over staging 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 ¹⁸F-FDG-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


