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Original Article

Elastofibroma dorsi prevalance in patients with primary complaint of dorsalgia

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ABSTRACT

Background: The aim of this study is to evaluate the prevalence of elastofibroma dorsi (EFD) in computed tomography (CT) imaging of the thorax in patients with dorsalgia.

Materials and Methods: Patients who are greater than or equal to 50 years old and presented to our institution with chief complaint of dorsalgia and received a thoracic CT were identified and recorded in a database together with demographic information. Control group was chosen from consecutive trauma patients in the same age group and presented to emergency room and received thoracic CT as standard of care.

Results: Out of 83 patients with common complaint dorsalgia, 9 (9/83, 10.8%) patients had no lesions and EFD was observed in 74 of the patients (74/83, 89.2%). 140 EFD including 106 (106/140, 75.7%) with a subscapular localization and 34 (34/140, 24.3%) with an infrascapular extension were identified. The maximum diameter average was 4.1 cm (range = 1-11.5 cm). Unilateral lesion was detected in 8 (8/74, 10.8%) and bilateral lesions was observed in 66 (66/74, 89.2%) of the patients. Detection of EFD in patients with isolated dorsalgia complaints was significantly higher than patients with multiple complaints (78.4% vs 21.6%, p = 0.009).

Conclusions: Middle aged and elderly patients with isolated dorsalgia show an unusually high EFD prevalence. Clinical suspicion and diagnostic work-up can help those cases for timely diagnosis and treatment.

Keywords: Elastofibroma dorsi, thorax CT, dorsalgia, prevalence.

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Introduction

Elastofibroma dorsi (EFD) is a rare soft tissue tumor described by Jarvi and Saxen in 1961 and is frequently observed in middle-aged and older women [1,2]. It is a benign connective tissue tumor characterized by the proliferation of fibrous and adipose tissue. EFD is typically localized in the scapulothoracic region between the thoracic wall, serratus anterior, and latissimus dorsi muscles. Although EFD may be asymptomatic, it may also cause pain, clunking, scapular snapping, palpable stiffness, and may become visible after reaching certain size, causing cosmetic complaints [3-5]. The etiology of EFD is poorly understood but microtraumas caused by friction between the chest wall and the lower pole of the scapula resulting in proliferation of fibroelastic tissue may be the primary mechanism of EFD [6,7]. The presence of EFD in up to 81% of subjects in autopsy studies may point to aging process as an etiology [8]. Genetic factors may also play a role [9]. EFD is diagnosed with physical examination and imaging findings. Magnetic resonance imaging, which has high soft-tissue sensitivity and specificity, is preferred in the diagnosis of EFD [4]. Lipoma, neurofibroma, dermoid tumors, and malignant fibrosis histiocytoma should be considered in the differential diagnosis [3,10]. Surgical treatment is considered in complaints of increasing pain, edema, scapular snapping, and when the lesion size exceeds 5 cm [6].

The symptomatology of EFD can overlap with other causes of dorsalgia which are mostly clinical diagnoses. Since the degree of musculoskeletal degeneration and the severity of back related symptoms are poorly correlated [11,12] and usually conservatively managed, there may be a patient subgroup with overlooked EFD and get suboptimal results from conservative management. Surgical treatment has been associated with good symptomatic outcomes in EFD in well selected cases [13,14].

The aim of this study is to evaluate prevalence and features of EFD in patients who receive radiological work-up due to dorsalgia.

Material and Methods

Patients aged greater than or equal to 50 years who received imaging studies as a part of their clinical work up between January 2017 and January 2019 and had "back pain" or "dorsalgia" as a recorded complaint in hospital electronic medical records system were identified and recorded in a database. Patient data on age, gender, and presence of dorsalgia and additional complaints were gathered. A control group was formed from trauma patients presenting to emergency room during the study period, with consecutive cases in the same age group. Approval from the Institutional Review Board of Istanbul Medeniyet University Göztepe Prof. Dr. Süleyman Yalçın City Hospital (Decision number: 2019/0138) was obtained and in keeping with the policies for a retrospective review, informed consent was not required.

Typically localized, semilunar shaped, soft tissue lesions with muscle density were considered as EFD. EFDs were evaluated according to lesion localization (subscapular/infrascapular) and lesion side (unilateral/bilateral, right/left) and size.

The CT images of the patients with/without contrast were retrospectively re-evaluated by a senior radiologist for presence of EFD. GE Optima CT660 (GE Medical Systems) CT scanner was used for all the multislice chest CT imaging with a 128x0.5 mm slice collimation and a tube voltage of 120 kV, 1.5 pitch, 80 mAs. The reconstruction slice thickness was 2.5 mm, and the general reconstruction planes consisted of axial, sagittal, and coronal views. Axial images were used to provide measurements.

Statistical Analyses

Descriptive statistics are summarized as counts and percentages for categorical variables; mean and standard deviations and median (minimum and maximum) for others. The differences between two groups in terms of categorical variables were compared by using Chi-Square test. Differences between groups for normally and non-normally distributed continuous variables were evaluated by Student's t test or Mann Whitney U test, respectively. Degree of association between continuous variables were calculated by Pearson's correlation coefficient. P value less than 0.05 was considered significant.

A post-hoc power analysis was conducted to test the difference between independent groups (dorsalgia and control group) and considering EFD incidence using a total sample size of 166 participants with groups of n = 83 each and alpha of 0.05. The result shows that power was calculated at 1.0 for incidence of EFD.

Results

83 patients (44 male, 39 female) with dorsalgia were identified and included in the study. The mean age was 62.7 ± 8.9 (50-82) years. 22 patients had other complaints (chest pain, cough, epigastric pain, sternal pain, dysphagia, history of smoking, history of known malignancy, known lung nodule, fever) accompanying dorsalgia.

EFD was detected in 74 of 83 patients in our study (89.1%). Gender distribution in EFD patients was comparable (38 male (51.4%), 36 female (48.6%) (F/M: 1.05)) and mean age was 63 ± 9.1 (50-82) (mean male age 65.7 ± 8.8 and mean female age 60.1 ± 8.6, p = 0.953). 49 patients (66.2%) were under 65 years old, 25 patients (25/74, 33.8%) were 65 years and older (Figures 1,2).

66 patients (89.2%) had bilateral lesions, 8 patients had unilateral EFD (5 right, 3 left). No significant difference was found between genders in the distribution of unilateral-bilateral lesions (p = 0.712). The mean age of patients with bilateral and unilateral lesions were also comparable (63.1 ± 9.1 (50-82) vs 62 ± 7.6 (53-74), p = 0.477) (Table 1).

140 EFDs were detected in 74 patients. 106 EFDs had subscapular localization and the rest (n = 34) had infrascapular extension as well. In 9 of 66 patients with bilateral EFD, lesions had differences in localization, while the rest (n = 57) were symmetrical (bilateral subscapular in 45 patients, bilateral infrascapular in 12 patients). 71 of the 140 lesions in the study group were located on the right and 69 on the left. Localizations of right and left sided EFDs were equivalent (16 vs 18 for left and right sided lesions with infrascapular extension, respectively, p = 0.460).

The average longest diameter 4.1 ± 2 cm (1-11.5). Males and females had comparable lesion sizes (40.7 ± 21.4 mm vs 52.4 ± 21.7 mm, p = 0.428). Right and left sided lesions were of similar size (43.6 ± 21mm vs 41.3 ± 18.8mm, p = 0.305). Bilateral EFDs were significantly greater than the unilateral lesions (48.1 ± 21.8 mm (10-115 mm) vs 23.9 ± 5.8mm (15-83 mm) (p = 0.009)) (Table 1). No correlation was found between age and maximum diameter, diameter with right-sided lesions, and diameter with left-sided lesions (p = 0.180 r = 0.137; p = 0.078 r = 0.211; p = 0.249 r = 0.083, respectively).

No lesions were detected in 9 patients. Detection of EFD in patients with isolated dorsalgia complaints was significantly higher than patients with other complaints in addition to dorsalgia (p = 0.009).

Control group had 83 patients with comparable sex distribution (49 male, 34 female) but was significantly older with a mean age of 70.2 years (± 11.6) (p < 0.01). 12 patients were identified as having EFD (significantly lower incidence, p < 0.0001) with comparable laterality (9 bilateral, 3 unilateral). The maximum diameters were also comparable (42.1 ± 17.6 mm for right, 49.5 ± 27.9 mm for left). 8 EFDs were subscapular and 13 EFDs had infrascapular extension.

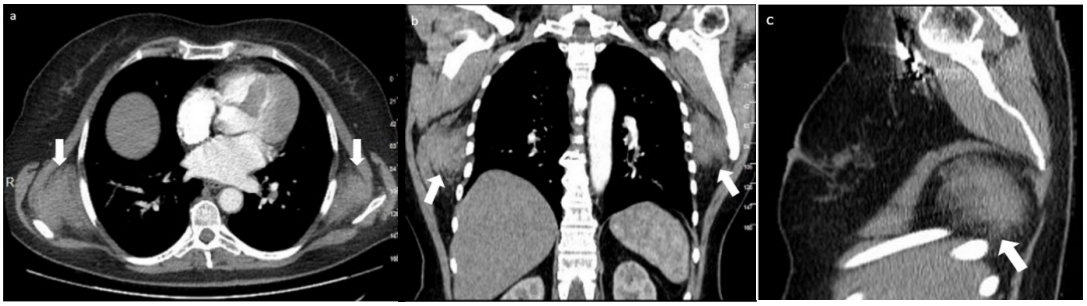

Figure 1. A soft tissue lesion compatible with subscapular elastofibroma dorsi showing a slight extension to the infrascapular area in axial **(a)**, coronal **(b),** and sagittal **(c)** thorax CT sections of a 66-year-old female patient with dorsalgia.

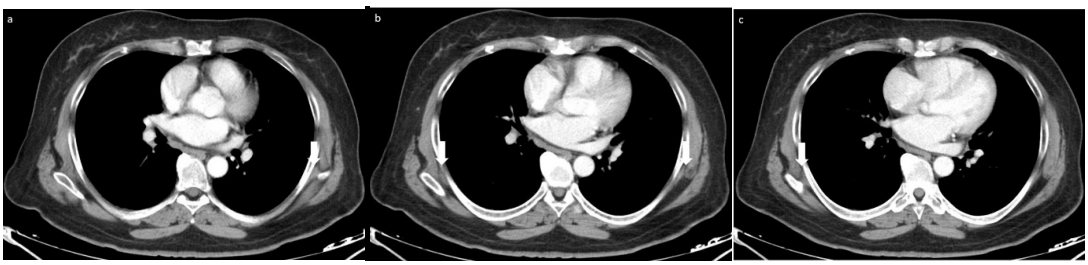

Figure 2. Consecutive axial CT images of bilateral small EFDs of a 50-year-old female patient with dorsalgia.

Table 1. Distribution of patient EFD characteristics according to laterality.

	Unilateral (n=8)	Bilateral (n=66)	p
Age (year ±SD) (min-max)	62±7.6 (53-74)	63.1±9.1 (50-82)	0.477
Sex (F/M)	3/5	33/33	0.712
Localization (subscapular/infrascapular)	7/1	99/33	0.679
Diameter (mm±SD)	23.9±5.8 (15-83)	48.1±21.8 (10-115)	0.009

Discussion

EFD is relatively rare and under-diagnosed mass due to its slow growth and variable symptomatology [7, 15-17]. Brandser et al reported 2% prevalence in CT imaging of 258 asymptomatic patients over age of 60 [18]. In a more recent study, the prevalence of patients over 18 years of age was 2.73% in the group of asymptomatic patients who underwent CT for another reason; and they showed that the prevalence increased significantly in patients over 65 years old [19]. An autopsy study done on 235 cases, the prevalence of EFD was 16% in patients over 55 years of age with male dominance [16].

In this study, the patient population consisted of adults over the age of 50 with dorsalgia and prevalence of EFD is much higher than articles reporting on asymptomatic populations [18,19]. While dorsalgia may be a common symptom that can be due to a wide variety of causes, the possibility of EFD should be kept in mind, especially if dorsalgia is an isolated symptom at the start of the work up. Study group showed dramatically increased prevalence of EFD when compared to the control group, despite the latter having more advanced mean age.

Many authors believe that the diagnosis of EFD can be made clinically and radiologically [20] and biopsy is generally not necessary for exclusion of malignancy. Minarro et al compared ultrasonography, CT and MRI for the diagnosis of EFD. CT was found to have a better correlation than MRI for evaluation of EFD size [21] but other clinical/radiological features are deemed to be more important. EFD is a tumor with a slow growth course; however, in cases with rapid growth, high contrast enhancement, and atypical localization, lipoma, hemangioma, and soft tissue tumors should be included in the differential diagnosis [3,10]. Therefore, in cases of dorsalgia with high probability of a soft tissue problem, MRI rather than CT may be more preferable, decreasing the radiation exposure. For palpable lesions or follow up of an accessible lesion, ultrasonography can be the study of choice [21].

Many studies report conflicting results regarding laterality in EFD involvement [10,19,22-24]. Also EFD is usually presented as a male predominant disease [13,16,19,21,25]. Our study population (≥ 50 y/o, with dorsalgia), contrary to the most of the reports showed predominantly bilateral involvement and equivalent gender distribution. This may be due to the fact that most of the studies are done on either asymptomatic populations or populations with multiple complaints [13,16,19].

Surgical excision of small and asymptomatic EFDs is not recommended. Although EFD is often an asymptomatic lesion [26,27] at the beginning, it can slowly reach to large sizes over time and may present with back pain and shoulder pain, edema, stiffness leading to cosmetic problems, and clunking of the scapula [4,7,28]. Significant regression of pain and functional improvement has been noted with complete resection in the literature [13,14,29]. The possibility of EFD should be kept in mind in the clinical work-up of dorsalgia in middle-aged and older population as surgical treatment may be indicated.

While relatively small sample size and retrospective nature of the study are the main limitations, we were able to present a target patient population with relatively high EFD prevalence in CT images. None of the patients included in this study have histopathological verification of EFD via either surgical excision or biopsies. While some patients prefer surgical excision instead of follow up and symptom management, diagnostic accuracy of radiological imaging in EFD seems to be reasonably high for conservative approach.

In conclusion, in this study the high prevalence of EFD (89.2%) in patients with dorsalgia indicates the need for careful evaluation of the scapulothoracic region in terms of EFD by radiologists and clinicians, especially in middle-aged and elderly patients with isolated dorsalgia, aiding timely diagnosis/treatment and eliminating the need for any additional further examination. Patients with isolated dorsalgia not improving on or do not want to follow up with medical treatment might benefit from re-evaluation of previous imaging or usage of MRI to assess this surgically correctable problem.

Declaration of conflicting interests

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Ethics approval

Approval from the Institutional Review Board of Istanbul Medeniyet University Göztepe Prof. Dr. Süleyman Yalçın City Hospital (Decision number: 2019/0138) was obtained.

Authors' contributions

ZNT; design, concept, planning, data collection, data analysis, manuscript writing, supervision, editing, ZB;

manuscript writing, data collection, supervision, editing, OA; design, planning, conduct, data collection, data analysis, editing, FC; design, materials, data analysis, conduct, manuscript writing, EK; design, concept, planning, conduct, supervision, editing.

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