Original Research

Annals of Paediatric Rheumatology

Prevalence of Juvenile Fibromyalgia Among Children with Type1 Diabetes Mellitus in Ismailia-Egypt

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Received: *Nov 17, 2012*
Accepted: *Dec 16, 2012*
Ann Paediatr Rheum 2012; 1:222-226
DOI: 10.5455/apr. 121620121425

Abstract

Objective: To evaluate the prevalence of Juvenile Fibromyalgia in pediatric patients with Type 1 Diabetes Mellitus.

Methods: A case-control study of 62 children with Type 1 Diabetes Mellitus and 62 controls at Suez Canal University Hospital, Ismailia, were included in the study from April 2011 to January 2012. Sixty-two children with a well-established diagnosis of Type 1 Diabetes Mellitus were recruited for the study. All subjects, patients and normal controls were evaluated by clinical assessment that included predefined tender points upon digital palpation.

Results: Fibromyalgia was diagnosed in eight Diabetes Mellitus patients (13%) and in only one (2%) healthy control (P=0.008*). Type 1 Diabetes Mellitus patients with Juvenile Fibromyalgia had significantly a higher mean number of tender points than those without Fibromyalgia (6.38±1.5 vs. 3.21±1.4, respectively) (P<0.05). Means of pain severity, sleep impairment and fatigue were higher in the JFM group than in DM without FM. Patients with chronic pain, neck pain, dorsal pain and low back pain were significantly higher in number in the DM with JFM group.

Conclusion: There is an increased prevalence of Juvenile Fibromyalgia among children with Type 1 Diabetes Mellitus; therefore, Juvenile Fibromyalgia can be added to the list of complications associated with Diabetes Mellitus.

Key words: *Prevalence, juvenile fibromyalgia, type 1 diabetes mellitus, egypt*

Introduction

Juvenile Fibromyalgia (JFM) is an idiopathic chronic pain syndrome defined by widespread non-articular musculoskeletal pain and generalized tender points. The syndrome is associated with a constellation of symptoms, including fatigue, non-refreshing sleep, irritable bowel, and more [1]. Fibromyalgia (FM) is most common in midlife, but may be seen at any age. Girls are affected relatively more often [2]. Using dolorimetry at specific tender point sites, boys exhibited less tenderness than girls did; subjects who had FM had a lower tenderness threshold compared with the subjects who did not have FM. These data demonstrating effects on tenderness associated with gender in children confirm results previously found in adults [3].

Clark and colleagues [4], reported that the prevalence of JFM in school children in Mexico reached 1.2%, which is fourfold lower than the previous study that evaluated the prevalence of JFM in

a group of 338 Israeli children, aged 9 to 15 years where 6.2% were found to have JFM [5].

Yunus & Masi [6] found that, as in adult patients who have FM, associated non-musculoskeletal symptoms were common in pediatric FM, including fatigue, poor sleep, anxiety, stress, headaches, and paresthesias. Physical examination revealed multiple tender points at characteristic soft tissue sites and no objective evidence of arthritis. The etiology and pathogenesis of FM is not entirely understood, although much progress has been achieved in its understanding. The current concept views FM as the result of central nervous system malfunction, resulting in amplification of pain transmission and interpretation. Several factors have been suggested to predispose the development of FM in children, including psychological factors, sleep disturbance, sexual abuse, familial, and genetic factors [7].

Diabetes mellitus (DM) is a disease characterized by complex metabolic disturbances including chronic hyperglycemia and protein-lipid metabolism abnormalities. Many musculoskeletal abnormalities have been reported in DM like diabetic osteoarthropathy, diabetic hand syndrome, Dupuytren's contracture, shoulder periarthritis and hyperostosis [8]. Most pediatric patients with diabetes have type 1 diabetes mellitus (T1DM) and a lifetime dependence on exogenous insulin [9].

Many studies estimated the prevalence of fibromyalgia syndrome in adult patients with diabetes mellitus. Fibromyalgia was diagnosed in 17% with DM and in only 2% of healthy control [10]. Other researchers found that 18% of patients with T2DM had fibromyalgia [11]. Nevertheless, no association between JFM and T1DM in children could be found in an extensive literature survey. The aim of the present study is to evaluate the prevalence of JFM in pediatric patients with T1DM.

Patients and Methods

Patients

Sixty-two children with T1DM were recruited to the study through simple random sampling; patients attending the Diabetes Clinic at the Pediatric Endocrinology Clinic, Suez Canal University Hospital, Ismailia, were included in the study from April 2011 to January 2012. A control group of 62 healthy children matched for age and sex were randomly recruited from the pediatric clinic on a voluntary basis.

All patients with chronic systemic diseases other than T1DM and psychological and behavioral disorders were excluded. In addition, patients on medications interfering with FMS symptoms such as analgesics, antidepressant medications and anticonvulsive drugs were also excluded.

Methods

The diagnosis of JFM was based upon criteria developed by Yunus and Masi [6].The 4 major criteria involving generalized musculoskeletal aching in at least 3 sites for at least 3 months, 5 of 18 tender points, the absence of another underlying condition, and normal laboratory test results (complete blood count, urinalysis, C-Reactive protein, Antinuclear antibodies and Rheumatoid Factor); 3 of 10 minor somatic complaints must also be present. Tender point examinations were done according to 'the Manual Tender Point Survey 'instructions. Thumb pad of the dominant hand was pressed to the survey side only once for 4 seconds until the nail bed gets white, which usually occurs at the 4 kg force. Definite tenderness of any of the points was considered present if some involuntary verbal or facial expression of pain occurred. Thumb palpation and pressure were also done at three control sites (Forehead, left thumb and right forearm) and patients were not told whether it was the tender or control points [12].

A single researcher evaluated patients, took the history and performed physical examinations.

Mean annual HbA1c was estimated for all children with T1DM. We interviewed patients with DM and the control group for symptoms related to FMS and about modulating factors for their pain according to Yunus and Masi [6]. Pain severity, sleep impairment and degree of fatigue were further assessed using a visual analogue scale (where 0 = 'no symptom suffering' and 10 = 'suffering as severe as imaginable').

Statistical analysis: Student's t-test and Fisher's exact testing using SPSS 19 were performed for statistical analysis. P value <0.05 was considered as significant.

Results

We have studied 62 children with T1DM and 62 healthy controls. Fifty Eight percent (n = 36) of children with T1DM and 51.6% (n =32) of controls were females (P = 0.084). Mean

age was 12.47 ± 2.7 years in T1DM group and 11.91 ± 2.83 years in control group (P=0.074). Mean disease duration was 4.42 ± 2.75. Fibromyalgia was diagnosed in 8 DM patients (13%) (1 male and 7 females) and in only one (2%) healthy control (P=0.008*).

In patients with T1DM, there was no significant difference for age, weight, height, DM duration between T1DM patients with JFM and T1DM patients without FM (Table 1). T1DM patients with JFM had significantly higher mean of number of tender points than those without FM (6.38±1.5 vs. 3.21±1.4, respectively) (P<0.05) (Table 1).

The number of patients with chronic pain, neck pain, dorsal pain and low back pain was significantly higher in patients with T1DM and JFM. The prevalence of poor sleep, fatigue, and headaches was significantly higher among patients with both JFM and T1DM, while complaining of chronic anxiety and IBS did not differ between the two diabetic groups (Table 2). Numbness was found to be higher in patients with diabetes and without FM. Numbness was localized in both lower limbs in all patients with T1DM without FM. Pain and other symptoms was always low or absent in the control group.

The severity of pain reported by patients in the FM group was 8.44 ± 1.57. The severity of sleep impairment was 6.65 ± 3.4 and for fatigue was 7.2 ± 3.2. In T1DM without FM the severity of pain reported was 3.2 ±1.95, Sleep impairment was 2.14 ±0.9 and for fatigue 3.67 ±1.2.

Discussion

Juvenile fibromyalgia (JFM) is a condition of chronic widespread musculoskeletal pain, associated with significant impairment in physical functioning [13]. There is no single etiologic factor, though physical and emotional trauma may trigger its appearance. Although it is considered as a disorder of pain perception involving neurohormonal dysregulation, it has been associated with various rheumatic and infectious diseases [14]. Its prevalence varies from 1.2 to 6.2% among different populations [4, 5]. Diabetes mellitus is a metabolic disease and its complex metabolic disturbances cause a variety of alterations in the musculoskeletal system. No studies have been performed looking at the prevalence of JFM in T1DM.

In our study, we detected an increased prevalence of JFM in T1DM patients (13%) when compared to healthy controls (2%). Our study was the first to investigate the frequency of JFM in T1DM in Ismailia -Egypt. These results were similar to those found in adults; Tishler and his colleagues detected FM in 17% of DM adult patients [10]. Another recent study estimated a prevalence of FM of 18% in DM [11].

Our results showed that girls are affected more than boys (7 out of 8 cases, 87.5%); these results are similar to those

Table 1. Comparison of clinical profile between T1DM children with fibromyalgia and those without.

	Fibromyalgia		P value
	Present (n=8)	Absent (n=54)	
Age	12.35 ± 2.1	12.58± 1.98	0.998
DM duration (year)	4.2±1.94	4.37±2.92	0.343
Height (cm)	144.52±7.2	142.94±9.1	0.242
Weight (kg)	39.24±5.12	37.53±6.34	0.357
BMI	21.88 ± 4.5	19.21 ± 4.73	0.078
HbA1c	7.69 ± 1.47	8.01 ± 1.85	0.186
Mean of number of tender points	6.38±1.5	3.21±1.4	0.002*
Severity of pain	8.44 ± 1.57	3.2 ±1.95	0.0042*
Degree of sleep impairment	6.65 ± 3.4	2.14 ±0.9	0.035*
Degree of fatigue	7.2 ± 3.2	3.67 ±1.2	0.008*

T1DM, Type 1 Diabetes Mellitus; DM, Diabetes Mellitus; BMI, Body Mass Index; cm, Centimeter; kg, Kilogram. Comparisons were performed by Student t-test and fisher's exact tests; *, P < 0.05 is statistically significant.

Table 2. Symptoms of Fibromyalgia among study groups.

Symptoms	Diabetic with fibromyalgia (Total number=8)		Diabetic without fibromyalgia (Total number=54)		Control (Total number=62)	
	Number	Percent	Number	Percent	Number	Percent
Chronic diffuse pain	6	75%	7	12.9%	1	1.6%
Cervical pain	3	37.5%	3	3.7%	1	1.6%
Thoracic pain	2	25%	5	9.2%	0	0%
Lumber pain	1	12.5%	2	3.7%	0	0%
Chronic anxiety	2	25%	10	18.5%	1	1.6%
Fatigue	3	37.5%	4	7.4%	1	1.6%
Poor Sleep	7	87.5%	9	16.7%	1	1.6%
Chronic Headache	5	62.5%	3	5.6%	1	1.6%
Irritable bowel	1	12.5%	6	11.1%	0	0%
Subjective soft tissue swelling	0	0%	0	0%	0	0%
Numbness	3	37.5%	24	44.4 %	0	0%
Pain modulation by physical activity	2	25%	8	14.8%	0	0%
Pain modulation by weather factors	0	0%	0	0%	0	0%
Pain modulation by anxiety or stress	1	12.5%	0	0%	0	0%

found in adult studies [15].

As in adult patients with FM, Yunus & Masi [6] found that associated nonmusculoskeletal symptoms were common in JFM, including fatigue, poor sleep, anxiety, stress, headaches, and paresthesias. In patients referred to a pediatric rheumatology clinic, JFM was characterized by diffuse pain and sleep disturbance [16]. This was similar to our results, showing that 87.5 % of patients with JFM and DM had poor sleep compared to only 16.7% with DM, suggesting that this symptom is relate to FM not to DM.

The mean number of tender points summed over all visits was fewer than the criterion of 11 established for adults at a single visit. This is also proved in the criteria of diagnosis, which require only five tender points [17]. In our study the mean of tender points was really lower than the adult level but it was significantly higher than those who have DM without FM (p=0.002).

Gedalia and colleagues [18], reported on their experience with pediatric FM that diffuse aching was found in 81%, headaches in 69%, and sleep disturbances in 90%. Less common were stiffness in 29%, and fatigue in 20%. These results are also in accordance with our findings. Percentages of these symptoms were found to be lower in diabetic without JFM leading to the conclusion that they are associated with JFM and not DM.

As there are no studies between JFM and DM, we will compare the rest of our results with those performed on adults. We could not find any correlation between hyperglycemia (elevated mean annual HbA1c) and the presence of FM, and this was in accordance with the results of Yanmaz and coworkers [11] who found that there was no significant difference regarding mean levels of fasting blood sugar and Hb1Ac levels between DM patients with FM and DM patients without FM.

All the researches that studied DM and FM had attributed the increased prevalence of FM to the psychiatric effect deriving from a chronic and often crippling disease such as diabetes. This is supported by the detection of a similarly high prevalence of FM in many other pathologic conditions with

completely different pathogenesis, such as rheumatic, Iron deficiency anemia and thalassemia minor [10, 15].

In conclusion, we have found an increased prevalence of JFM among patients with DM in our studied population but further observations from other centers are needed to validate the association of JFM in DM.

Competing interests: There is no conflict of interest of the authors.

Funding: None.

Provenance and peer review: Not commissioned; externally peer reviewed.

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DOI: 10.5455/apr. 121620121425