

CALCIFYING TENDINOPATHY: A LOCAL OR A SYSTEMIC CONDITION?

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ABSTRACT

Objective: To evaluate the relationship between cases of calcifying tendinopathy of the shoulder and symptomatic metabolic diseases such as kidney stones, gallstones and gout. **Methods:** Calcifying tendinopathy of the shoulder was diagnosed in 63 patients between May 2007 and September 2011. All the patients were treated by the same orthopedic surgeon and were interviewed to gather the following data: age at diagnosis, sex, affected side, dominant side, body mass index (BMI), smoking status and previous histories of kidney stones, gallstones or gout. For statistical analysis, a control group of 63 patients with similar demographic characteristics was used. **Results:** Among the 63 patients with calcifying tendinopathy of the shoulder, 35 (56%) were male. The right side was affected in 38 patients

(60%) and the average age was 48.2 years. Thirty-one patients (49%) had histories involving some of the metabolic diseases investigated: 20 patients (32%) reported kidney stones, six (9.5%) gallstones, four (6.3%) gout and one (2%) concurrent diagnoses of kidney stones and gout. In the control group, eleven patients (17%) had histories involving some of the metabolic diseases investigated: six patients (9.5%) reported kidney stones, four (6.3%) gallstones and one (1.6%) gout. **Conclusions:** The high frequency of nephrolithiasis in patients with calcifying tendinopathy of the shoulder in our study suggests that there are common mechanisms in the pathophysiology of these disorders. Better understanding of these diseases may enable improvement of diagnostics and treatments.

Keywords – Tendinitis; Metabolic Diseases; Nephrolithiasis

INTRODUCTION

Calcifying tendinopathy is a common disorder of the shoulder, of unknown etiology, characterized by deposition of calcium crystals inside one or more tendons of the rotator cuff⁽¹⁾. It affects around 3% of adults and, of these, one third start to show symptoms within three years. In painful shoulders, it may be diagnosed in around 7% of the cases. It occurs especially in female patients between the fourth and sixth decades of life^(2,3).

These calcifications occur with greatest frequency in the supraspinatus tendon (51 to 90%), followed by cases in the tendons of the infraspinatus and teres minor. The subscapularis is the least affected tendon, in only 3% of the cases^(2,3).

Although the etiology is still not completely understood, it is known that deposition of calcium hydroxyapatite occurs in the affected tendon, with consequent spontaneous reabsorption and tendon healing⁽²⁾. Tissue hypoxia and localized pressure have already been reported as causal factors. Two different processes for formation of calcium deposits have been proposed: degenerative and reactive calcification⁽⁴⁾.

The degenerative hypothesis, which was proposed by Codman, correlates tissue hypovascularization with consequent fibrosis, necrosis and local calcification. The advocates of this theory generally do not take into consideration the typical age distribution of the patients affected, the course of the disease and the morphological characteristics of the calcification.

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Work received for publication: August 22, 2011; accepted for publication: November 10, 2011.

The authors declare that there was no conflict of interest in conducting this work

This article is available online in Portuguese and English at the websites: www.rbo.org.br and www.scielo.br/rbort

According to the hypothesis of reactive calcification, the evolution of calcifying tendinopathy can be divided into three phases: pre-calcification, calcification and post-calcification⁽⁴⁾.

Some authors have also correlated calcifying tendinopathy with a genetic predisposition, through higher levels of human leukocytic antigen A1 (HLA-A1) in the patients affected, in comparison with the healthy population. This result was not found by other authors^(4,5).

There are few reports in the literature on diseases related to calcifying tendinopathy. Harvie et al⁽⁷⁾ reported associations with certain hormonal alterations, such as diabetes mellitus, hypothyroidism and disorders of the menstrual cycle. However, there are no studies in the literature correlating calcifying tendinopathy with metabolic diseases such as renal lithiasis, gallstones and gout.

The aim of the present study was to determine the frequency of associations of symptomatic metabolic diseases with calcifying tendinopathy of the shoulder.

MATERIALS AND METHODS

Between May 2007 and September 2011, 63 patients with calcifying tendinopathy of the shoulder were diagnosed and treated at our clinic, by the same orthopedic surgeon. Cases of dystrophic calcification associated with rotator cuff injuries were excluded, as were various other cases that involved periarticular calcifications, such as fractures and dislocations.

All the 63 patients retrospectively agreed to participate in the study and were then asked about their previous history of symptomatic metabolic diseases, which included renal lithiasis, gallstones and gout. Data on age at the time of diagnosis, sex, side affected, dominant side, body mass index and smoking were also gathered.

For comparative analysis on the results, a control group formed by 63 patients from the general orthopedics outpatient clinic was used. These individuals presented confirmed diagnoses of some other orthopedic or traumatic disorder. Among these, patients with calcifying tendinopathy of the shoulder or diseases of calcifying nature in other regions, such as calcifying tendinopathy of the calcaneus and triceps, were excluded. In the same way as in the study group, all the patients in the control group agreed to participate in the study, and then data were gathered regarding their age, sex, body mass index, smoking habits and pre-

vious histories of renal lithiasis, gallstones and gout.

To make comparisons between the groups in relation to the variables, the Student t test, chi-square test and Fisher exact test were used. P-values < 0.005 were taken to indicate statistical significance. The data were organized in Excel spreadsheets and were analyzed using the Statistica software, version 8.0.

RESULTS

Calcifying tendinopathy group

Among the 63 patients who presented calcifying tendinopathy of the shoulder, 35 (56%) were male. The right side was affected in 38 patients (60%), the left side in 17 (27%) and bilaterality was recorded in eight cases (13%).

The mean age at the time when calcifying tendinopathy was diagnosed was 48.2 years. The body mass index (BMI) of this group was calculated as 27 kg/m².

Among the 63 patients, 31 (49%) presented previous histories of some of the metabolic diseases under investigation: 20 patients (32%) with histories of renal lithiasis, six (9.5%) with gallstones and four (6.3%) with gout. One patient (2%) presented concomitant diagnoses of renal lithiasis and gout. Eight patients (13%) reported that they were smokers.

Control group

The control group was formed by 63 patients with demographic characteristics similar to those of the calcifying tendinopathy group. In the control group, 32 (51%) were male. The mean age was 50.5 years. The mean BMI of this group was calculated as 26.1 kg/m².

Among these 63 patients, 11 (17%) presented previous histories of some of the metabolic diseases investigated: six patients (9.5%) with histories of renal lithiasis, four (6.3%) with gallstones and one (1.6%) with gout. Fourteen patients (22%) reported that they were smokers (Tables 1 and 2).

Table 1 – Results from Student's t test.

Variable	Group	Mean	SD	p
Age	Control	50.5	10.6	0.213
	Calcifying tendinopathy	48.2	9.8	
	Total	49.4	10.2	
BMI	Control	26.1	4.2	0.255
	Calcifying tendinopathy	27.0	5.0	
	Total	26.6	4.6	

Table 2 – Results from the chi-square test.

Variable	Group						p
	Control		Calcifying tendinopathy		Total		
	n	%	n	%	n	%	
Sex							0.592
Female	31	49.2	28	44.4	59	46.8	
Male	32	50.8	35	55.6	67	53.2	
Smoking							0.159
No	49	77.8	55	87.3	104	82.5	
Yes	14	22.2	8	12.7	22	17.5	
Gallstones							0.510
No	59	93.7	57	90.5	116	92.1	
Yes	4	6.3	6	9.5	10	7.9	
Gout							0.365*
No	62	98.4	59	93.7	121	96.0	
Yes	1	1.6	4	6.3	5	4.0	
Renal lithiasis							0.001
No	57	90.5	42	66.7	99	78.6	
Yes	6	9.5	21	33.3	27	21.4	
Total	63	100	63	100	126	100	

* Result from Fisher's exact test.

DISCUSSION

The etiology of calcifying tendinopathy remains unknown, as do its associations with other comorbidities. There are few reports in the literature on conditions correlated with calcifying tendinopathy. Harvie et al⁽⁷⁾ reported that calcifying tendinopathy was associated with hormonal abnormalities and/or autoimmune diseases such as hypothyroidism, diabetes *mellitus* and rheumatoid arthritis. However, there are no reports on association between calcifying tendinopathy and the disorder examined in this study.

The frequency of calcifying tendinopathy is significantly higher in manual workers, in the presence of diabetes (25%) and in patients with kidney failure, in whom the prevalence may reach 50%⁽⁸⁻¹⁰⁾.

According to Harvie et al⁽⁷⁾, from an analysis on 102 patients with calcifying tendinopathy of the shoulder, approximately 65% of the patients had already been diagnosed previously with some type of endocrine disease, while 19% were undergoing treatment for some type of autoimmune disease (hypothyroidism, rheumatoid arthritis or diabetes mellitus). Among the women, 68% had already undergone some type of treatment for menstrual disorders. All these rates were significantly higher than in the general population. Moreover, these authors reported that the cases of calcifying tendinopathy associated with endocrine

diseases were correlated with earlier development of tendinopathy, longer natural histories of evolution and greater resistance to conservative treatment.

According to the literature, nephrolithiasis is one of the commonest diseases of the urinary tract, with incidence of between 5 and 15% of the population and prevalence of 2 to 3% in the general population^(11,12). In our control group, we observed a prevalence of 9.5%, while in the group of patients with calcifying tendinopathy, the prevalence was 33%. These data were shown to be statistically significant, with p-value = 0.001.

The prevalence of cholelithiasis varies according to geographical location and the population group, but it has been estimated that it affects 10 to 25% of American adults^(13,14). In Brazil, studies have reported prevalences of 3.9 to 9.3%^(15,16). In our control group, we observed a prevalence of 6.3%, while in the group of patients with calcifying tendinopathy the prevalence was 9.5%, without statistical significance when compared (p > 0.005).

In a survey conducted in the United States between 1988 and 1994, it was estimated that around 2% of the men over the age of 30 years and of the women over the age of 50 years had a diagnosis of gout. Among Western men, it has been calculated that 1 to 2% have this disease⁽¹⁷⁾. In our control group, we observed that the prevalence of gout was 1.6%, while in the group of patients with calcifying tendinopathy, the prevalence was 6.3%, without statistical significance when compared (p > 0.005).

It is important to emphasize that most studies on the prevalence of renal lithiasis and gallstones have been based on ultrasound or necropsy findings, which include a large number of patients with these diseases but who were asymptomatic. In the present study, since we only asked the patients about their previous histories of symptomatic diseases, the number of individuals with renal lithiasis may even have been underestimated.

Most authors have generally agreed that females are more affected by calcifying tendinopathy of the shoulder^(1,2). However, among the patients in our study, males accounted for 56% of the cases, although this finding was not statistically significant (p > 0.005).

The other variables in this study (age, BMI and smoking) also did not show any statistical differences between the groups.

CONCLUSION

Although the etiology of calcifying tendinopathy remains unknown, we believe that reports on its associations with other comorbidities may help towards understanding the disease. We noted that there was a high and significant association between calcifying tendinopathy of the shoulder and renal lithiasis, given that we found renal lithiasis in 33% of the individuals with calcifying tendinopathy of the shoulder, while the prevalence of renal lithiasis

among the control group individuals was 9%. Thus, we believe that there may be mechanisms in common in the physiopathology of these disorders.

Our line of research should be continued to include an even larger number of patients and a more detailed study on the physiopathology of calcifying tendinopathy and renal lithiasis, in an attempt to create new perspectives for prevention, diagnosis and treatment of calcifying tendinopathy of the shoulder.

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