

Shoulder pain and metabolic syndrome

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To the Editor,

Shoulder pain is a very common complaint in clinical practice¹. One of the most common etiologies is periarthritis that encompasses involvement of tendons, joint capsule and bursas from this area¹.

It is well known that there is an association of shoulder periarthritis with diabetes mellitus (DM)² but lately this association has been widened to embrace the whole metabolic syndrome (MS)³. Viikari-Juntura *et al*⁴, in a review of 70 studies in shoulder pain found that it was consistently associated with DM and that there was evidence for association with overweight and obesity in three studies.

Damage to rotator cuff's microvascular supply is implicated in the etiopathogenesis of tendinopathies¹. Atherosclerosis affects the local vessels promoting impairment of blood supply and difficulties in the healing of microcracks. An area inside the supraspinatus tendon, the Codman's critical zone, is particularly hypovascularized and subject to repetitive trauma with arm elevation¹ and this could explain why the shoulders, more than any other joints, are susceptible to atherosclerotic consequences of MS. DM also favors shoulder periarthritis causing non-enzymatic glycation of periarticular collagenous structures and increased cross-linking of collagenous fibers².

The awareness that patients with shoulder pain may have an increased prevalence of MS and/or its components may help in its early detection and management.

To look further into this issue we studied 102 female patients (72 with shoulder periarthritis and 40 controls paired for age) after approval of Ethics in Research Committee. All patients had ultrasonography of the symptomatic shoulder showing the periarticular involvement. Uncontrolled hypothyroid patients, pregnant women, patients with history of major shoulder trauma and inflammatory rheumatic conditions were excluded.

All individuals were submitted to a questionnaire on demographic data, previous history of DM, hypertension, dyslipidemia, and cardiovascular disease. Height, weight, waist and hip circumferences were measured to calculate waist-to-hip ratio and body mass index (BMI). All participants had measurement of fasting glucose, Hb (hemoglobin) A1c, cholesterol, triglycerides, LDL and HDL cholesterol. Periarthritis patients answered the SF-12 questionnaire on quality of life⁵ and the PSS (Pennsylvania Shoulder Score) questionnaire about pain, function and satisfaction of the patient concerning the pathology of the shoulder⁶. MS was diagnosed when 3 or more criteria from the First Brazilian Guideline for the Diagnosis and Treatment of Metabolic Syndrome were present⁷.

We found that women with shoulder periarthritis had more history of hypertension, dyslipidemia, cardiovascular morbidity, higher LDL cholesterol and Hb A1c levels. A trend towards higher BMI and total cholesterol was observed. We also found that a higher number of patients fulfilled criteria for MS in the shoulder disease group (Table I).

The OR of MS presence was 2.63 (95%CI=1.1-6.1) and the OR for cardiovascular morbidity was 3.35 (95%CI=1.4-7.8) in periarthritis patients in relation to controls.

No differences could be found in shoulder periarthritis patients with and without MS concerning quality of life by SF-12 (physical domain with $p=0.25$; mental domain with $p=0.13$) and PSS grading ($p=0.79$ for pain; $p=0.46$ for function and $p=0.22$ for patient's satisfaction).

The consequences of the associations verified in the present study over cardiovascular system are very patent as the OR of having a cardiovascular disease was three times higher in patients with shoulder problems than controls. It is also important to note that patients with shoulder problems with and without MS have the same consequences of the joint disease regarding pain and function. Therefore, shoulder periarthritis patients must be screened for MS despite the degree of their symptoms.

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TABLE I. COMPARISON OF ATHEROSCLEROTIC RISK FACTORS IN SHOULDER PERIARTHRITIS PATIENTS WITH CONTROLS

	Shoulder Periarthritis patients n=72	Controls n=40	P
History of diabetes mellitus(#)	9/72 (12,5%)	2/40 (5%)	0.32 (*)
History of dyslipidemia	32/72 (44.4%)	8/40 (20%)	0.01 (**)
History of cardiovascular morbidity (myocardial infarction/angina)	38/72 (52.7%)	10/40 (25%)	0.004 (*)
History of hypertension	44/72 (61.1%)	15/40 (37.5%)	0.03 (**)
Cerebral vascular accident	1/72 (1.38%)	1/40 (2,5%)	1.00(*)
Body mass index (Kg/m ²)	19.1-40.5 Mean=29.1± 4.8	17.5 a-42.4 Mean=27.4±5.2	0.07 (§)
Waist diameter (cm)	62-118.0 Mean=67.8±13.3	60-123.0 Mean=91.3± 12.4	0.16 (§)
Relation hip/waist	0.72-1.95 Mean=0.8 ±0.07	0.74-1.18 Mean= 0.8±0.09	0.75 (§)
Total cholesterol (mg/dL)	122-261 Mean=183.6±34.29	86.0-319 Mean=198.0±40.0	0.07 (§)
HDL cholesterol (mg/dL)	33-83 Median=53(IQR= 45.5-59.0)	31.0-132.0 Median=52(IQR=40.6-61.7)	0.68 (§§)
LDL cholesterol (mg/dL)	51.2-168 Mean=115±31.3	36.8-139.4 Mean=100.5±26.4	0.03 (§)
Triglycerides (mg/dL)	62-335 Median=139.5(IQR=98.5-191.5)	47-312 Median=112(IQR=85.7-196.5)	0.34 (§§)
Hemoglobin A1c(%)	4.72-8.57 Median=5.4(IQR= 5.2-5.9)	4.9-7.41 Median= 5.3(IQR=5.1-5.7)	0.02 (§§)
Fasting glycemia (mg/dL)	68-141 Median=91.5 (IQR= 89.0-99.0)	62.0-148.0 Median=93.0(IQR de 87.0-99.0)	0.84 (§§)
Metabolic Syndrome	31/62 (50%)	11/40 (27.5%)	0.02 (**)

(#) all patients had type 2 diabetes mellitus;

(*) Fisher test; (**) Chi squared test; (§) unpaired t test; (§§) Mann Whitney test.

We concluded that shoulder periarthritis can be considered a red flag for metabolic syndrome in women. Awareness of such association may allow a precocious diagnosis of MS and early institution of measures to avoid its consequences.

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