Orijinal Araştırma / Original Investigation
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Frequency of Metabolic syndrome in Patients with Shoulder Pain

Omuz Ağrısı Olan Hastalarda Metabolik Sendrom Sıklığı

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ÖZET

AMAÇ: Omuz ağrısı yaygın bir sakatlık nedenidir. Literatürde Metabolik Sendromu (MetS) omuz ağrısı ve omuz patolojileri ile ilişkilendiren az sayıda çalışma bulunmaktadır. Bu çalışma omuz ağrısı olan hastalarda metabolik sendrom sıklığını ve omuz ağrısının şiddeti ve özellikleri açısından iki grup arasında fark olup olmadığını belirlemeyi amaçlamaktadır

GEREÇ VE YÖNTEM: Bu prospektif kesitsel çalışmada, hedef popülasyon omuz ağrısı şikâyeti ile polikliniğe başvuran 18 yaş ve üzeri deneklerden oluşturuldu. Tüm hastaların detaylı omuz muayeneleri yapıldı ve omuz hareket açıklığı ölçüldü. Bel-kalça oranı ve vücut kitle indeksi hesaplandı. Kan basınçları ölçüldü. Açlık kan şekeri ve lipit düzeyleri kaydedildi. Mevcut ağrı için Görsel Analog Skala uygulandı.

BULGULAR: 114 hastanın 47'sine MetS tanısı konuldu. MetS hastalarında en sık görülen omuz sorunları; sırasıyla 16 (%34,0), 10 (%21,3) ve 7 (%14,9)'sinde donuk omuz, supraspinatus tendiniti ve rotator manşet kaslarında parsiyel yırtıktı. MetS'li hastalarda iç ve dış rotasyon ve pasif abduksiyon hareketlerinde EHA kısıtlılığı istatistiksel olarak anlamlı derecede yüksek bulundu. MetS hastalarında VAS skorları daha yüksekti. Aktif hareket ve istirahatte VAS skorları arasındaki fark istatistiksel olarak anlamlıyken, gece ağrısında VAS skoru farkı istatistiksel olarak anlamlı değildi.

SONUÇ: Omuz ağrısı ile MetS arasında açık bir ilişki olduğu sonucuna vardık. Bu tür bir ilişkinin bilinmesi, MetS'in erken teşhisine ve sonuçlarından kaçınmak için erken önlemler alınmasına izin verebilir.

Anahtar Kelimeler: Omuz, Ağrı, Metabolik Sendrom, Beden Kitle İndeksi, Hipertansiyon

ABSTRACT

OBJECTIVE: Shoulder pain is a common cause of disability. There are few studies in the literature linking Metabolic Syndrome (MetS) with shoulder pain and shoulder pathologies. This study aims to determine the frequency of metabolic syndrome in patients with shoulder pain; and whether there was a difference between the two groups in terms of severity and characteristics of shoulder pain.

MATERIALS AND METHODS: In this prospective cross-sectional study, the target population consisted of subjects aged 18 years or older applying to the outpatient clinic with shoulder pain. Detailed shoulder examinations were performed and shoulder range of motion was measured in all patients. Waist-to-hip ratio and body mass index were calculated. Blood pressures were measured. Fasting blood glucose and lipids levels were recorded. A Visual Analogue Scale for current pain was applied.

RESULTS: MetS was diagnosed in 47 of 114 patients. The most common shoulder problems of patients with MetS; were frozen shoulder, Supraspinatus Tendinitis, and partial tear of rotator cuff muscles in 16 (34.0%), 10 (21.3%), and 7 (14.9%) of the patients, respectively. ROM limitation was found to be statistically significantly higher in patients with MetS in internal and external rotation and passive abduction movements. VAS scores were higher in patients with Mets. While the difference in VAS scores with active movement and at rest was statistically significant, the difference in VAS scores in night pain was not statistically significant.

CONCLUSION: We concluded that there is a clear relationship between shoulder pain and MetS. Awareness of such association may allow early diagnosis of MS and early institution of measures to avoid its results.

Keywords: shoulder, pain, metabolic syndrome, body mass index, hypertension

INTRODUCTION

Shoulder pain is a common cause of disability that causes severe limitations in work life, and daily activities. Its prevalence is 7-34% in the population and it is seen at least once in every person in a lifetime (1,2). It has been shown that it has an incidence of 12-25 / 1000 years in referrals to

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family physicians (3,4). Age and overuse of the shoulder joint are the main determinants for shoulder pain and disorders (1). Shoulder pain etiology varies according to age. Soft tissue lesions are the most common in the elderly, including rotator cuff tendinitis or rupture, subacromial impingement, frozen shoulder and acromioclavicular joint osteoarthritis.

Metabolic syndrome (MetS), an increasing health problem in industrialized countries, is a group of risk factors for cardiovascular disease, including central obesity, dyslipidemia, and insulin resistance (5,6). The prevalence of MetS in the US population is approximately 35 %.7 Components of MetS (Dyslipidemia, type 2 Diabetes Mellitus, Obesity, hypertension) are associated with chronic low-grade systemic inflammation (8). Low-grade systemic inflammation is characterized by a mild increase in acute phase proteins, an increase in active inflammatory cytokines in tissues, and acute inflammation associated with low neutrophil counts (8-10). Diabetes Mellitus(DM) which is one of the components of MetS, is associated with various pathologies such as calcific tendinitis (11) and frozen shoulder (12,13), adhesive capsulitis, and rotator cuff syndrome (14,15). Besides, various studies have shown that hyperlipidemia and obesity predispose to rotator cuff syndrome (16-20). There are few studies in the literature linking MetS with shoulder pain and shoulder pathologies (21,22).

This study aims to determine the frequency of metabolic syndrome in patients with shoulder pain; and whether there was a difference between the two groups in terms of severity and characteristics of shoulder pain.

MATERIAL & METHODS

Following institutional review board approval, this prospective study was conducted on consecutive patients with shoulder pain who applied to our third-degree medical faculty hospital outpatient clinics. Approval for this study was granted by the local ethics committee. The inclusion criteria were as follows; patients aged between 18-and 80 years old, patients with shoulder pain for six weeks or more, patients with no history of shoulder dislocation or fracture or trauma and shoulder surgery, patients with no systemic or inflammatory disease, neurological disease, and pregnancy. Exclusion criteria were as follows; cervical disc hernia, rheumatologic disease, shoulder fracture, or dislocation history. The patients who met the criteria were informed about the study, and their consent were obtained. After implementation of these criteria, 114 patients were enrolled in the study.

Detailed shoulder examinations of all patients were performed by an experienced physician (ŞN). A shoulder range of motion (ROM) and visual analog scale (VAS) was used to evaluate the shoulder joint. If necessary, an additional radiological examination was performed on patients to support the diagnosis.

Socio-demographic data such as age, gender, shoulder pain symptom duration, comorbid diseases such as diabetes mellitus, hypertension, dyslipidemia, and cardiovascular disease, the drugs used, and smoking history were obtained. Height, weight, waist circumference, and blood pressure of the patients were examined and then body mass index (BMI) was calculated. Fasting blood glucose, high-density lipoprotein (HDL), triglyceride (TG), total cholesterol, and low-density lipoprotein (LDL) were recorded as biochemical variables. All of the laboratory measurements were done in our tertiary medical faculty hospital. The diagnosis of MetS was made according to the results of both clinical and biochemical examinations.

Blood Pressure Measurement

30 minutes before blood pressure measurement, the patient was informed about not smoking or drinking coffee. The patients were rested for at least 5 minutes before the measurement. A single measurement was performed properly while sitting in a chair.

Waist Circumference Measurement

It was measured with an abdominal tape measure at the first border of the iliac crest with the waist area naked and recorded in centimeters. The measurement was made at the end of exhalation while the patient was breathing comfortably. Waist circumference is divided into three categories according to their measurement values; <94.0 cm, 94.0-101.9 cm, ≥ 102.0 cm in men and <80.0 cm, 80.0-87.9 cm and ≥ 88.0 cm in women (23).

Statistical analysis

Computer-assisted “IBM SPSS Statistics” (SPSS Inc. Released 2007. SPSS for Windows, Version 16.0. Chicago, SPSS Inc.) program was used in the statistical analysis of the data obtained. In the analysis of nominal and ordinal data, descriptive statistics, ratios, and averages were calculated

first. Pearson Chi-Square test was used to compare nominal data between groups. Considering the normality of distributions, student t-test or Mann Whitney U test was used to evaluate the difference between the two groups. If $p < 0.05$, the results were considered significant.

RESULTS

The demographic data of the patients included in the study are shown in Table 1. MetS was diagnosed in 47 of 114 patients included in the study. The most common shoulder problems of patients with MetS; were frozen shoulder, Supraspinatus Tendinitis, and partial tear of rotator cuff muscles in 16(34.0%), 10(21.3%), and 7(14.9%) of the patients, respectively (Table 2). The comparison of shoulder ROM according to the groups is given in Table 3. ROM limitation was found to be statistically significantly higher in patients with MetS in internal and external rotation and passive abduction movements. VAS scores were higher in patients with Mets. While the difference in VAS scores with active movement and at rest was statistically significant, the difference in VAS scores in night pain was not statistically significant (Table 4).

Table 1. *Demographic data of the patients*

	Metabolic Syndrome		P
	Yes	No	
Sex (Male)	38.3%	40.3%	0.830
Age (year) (mean±SD)	58.2±10.2	58.9±11.5	0.714
BMI (kg/m^2) (mean±SD)	31.7±4.6	29.5±4.4	0.012
Waist Circumference (mean±SD)	105.0±12.3	99.1±12.0	0.017
Dominant Upper Limb (Right)	95.7%	98.5%	0.364

±SD: minus, plus standard deviation, BMI: body mass index

Table 2. *Shoulder pathology frequencies according to patient groups*

Diagnosis		Metabolic Syndrome		Total
		Yes	No	
Supraspinatus Tendinitis	N	10	23	33
	%	21,3%	34,3%	28,9%
Biceps Tendinitis	N	4	10	14
	%	8,5%	14,9%	12,3%
Supraspinatus & Biceps Tendinitis	N	6	9	15
	%	12,8%	13,4%	13,2%
Rotator Cuff Partial Rupture	N	7	5	12
	%	14,9%	7,5%	10,5%
Rotator Cuff Total Rupture	N	4	4	8
	%	8,5%	6,0%	7,0%
Frozen Shoulder	N	16	16	32
	%	34,0%	23,9%	28,1%
Total	N	47	67	114
	%	100,0%	100,0%	100,0%

Table 3. *Shoulder ROM according to patient groups*

Metabolic Syndrome		Flex (P)	Flex (A)	Ext (P)	Ext (A)	Abd (P)	Abd (A)	Add (P)	Add (A)	ER (P)	ER (A)	IR (P)	IR (A)
Yes	**N**	47	47	47	47	47	47	47	47	47	47	47	47
	Median	160	165	45	45	160	160	45	45	80	80	80	70
	25th	120	120	40	40	150	145	40	40	70	70	60	55
	75th	170	170	45	45	170	170	45	45	90	90	80	80
No	**N**	67	67	67	67	67	67	67	67	67	67	67	67
	Median	170	170	45	45	170	160	45	45	90	90	80	80
	25th	140	150	40	40	160	160	40	40	80	80	80	70
	75th	170	170	45	45	170	170	45	45	90	90	80	80
P Value		,172	,129	,354	,328	,016*	,102	,463	,425	,024*	,046*	,021*	,000*

*(P): Passive (A): Active Flex: Flexion Ext: Extension Abd: Abduction Add: Adduction ER: External Rotation IR: Internal Rotation 25th-75th percentiles *statistically significant*

Table 4. *VAS scores of the patients according to groups*

	Metabolic Syndrome		P
	Yes	No	
VAS Active Motion	70 (70-80)	70(60-80)	0.260
VAS Rest	60(50-70)	60(50-70)	0.188
VAS Night Pain	70(70-80)	70(70-80)	0.786

Data were expressed as median (25th-75th percentiles)

DISCUSSION

Apart from traumatic and degenerative causes, it has been reported in the literature that shoulder pain is associated with various metabolic diseases (DM, etc.) and MetS (14, 21). As a result of this cross-sectional study, we found that the frequency of MetS in patients presenting with shoulder pain was substantially higher. Also, patients with MetS had significantly more pain and limitation of movement than those without MetS.

Shoulder pain is a problem that seriously affects the quality of life. Both its diagnosis and treatment challenge physicians. Many reasons can cause shoulder pain. Metabolic problems cause both shoulder pain to develop more frequently and to be more resistant to treatment (11, 16, 21). Viikari-Junturaet al. (19), In their review of 14 studies on shoulder pain, they found that shoulder pain was consistently associated with metabolic diseases such as DM. Overweight or obesity was associated with the incidence of shoulder symptoms in three studies and with clinically defined shoulder disorders in one case-control study. As it is known, MetS affect many organs and systems. The musculoskeletal system is one of the systems it affects. In terms of joint involvement, its relationship with osteoarthritis has been clearly shown (24-26). Except for the association of MetS with osteoarthritis, there is not enough data in terms of joint pathologies in the literature. Therefore, in this cross-sectional study, the association between MetS and shoulder pain was examined and a strong relationship was found.

An increase in adipokine production (leptin; adiponectin; plasminogen activator inhibitor; tumor necrosis factor-a; angiotensinogen; interleukins 6, 8, 10 and 18) has been reported in obesity, which is a component of MetS. These molecules trigger oxidative stress, inflammation, thrombosis, and endothelial dysfunction, leading to periarthritis and rotator cuff damage around the shoulder (27). In our study, we think that the significantly higher pain and limitation of movement in patients with Mets were caused by these inflammatory events.

Contieri et al. detected MetS in 31 (50%) of 62 patients, similar to our study, in patients with shoulder periarthritis (22). Rechardt et al. found MetS in 847 (30%) of 2817 male patients with shoulder pain and 1037 (31%) of 3333 female patients (21). Previous studies have shown a relationship between hyperlipidemia and hyperglycemia and shoulder pain (14-18). Suspecting MetS in patients presenting with shoulder pain in clinical practice is beneficial for physicians. In this way, the differential diagnosis of shoulder pain and its treatment planning can be done more effectively. Secondly, it will enable the diagnosis of MetS in a patient presenting with shoulder pain and in this way, necessary measures will be taken against other problems that may be caused by MetS in the future.

Contieri et al. found no significant difference between those with and without MetS according to SF-12 and Pennsylvania Shoulder Score (22). Shah KM et al. found a significant decrease in the Shoulder Pain and Disability Index and shoulder joint ROM in patients with DM compared to the control group (28). In a study conducted by Kim JM et al. on the supraspinatus tendinopathy of hyperlipidemia, they found that patients with hyperlipidemia had higher pain scores and lower range of motion than the control group after 8 weeks of the treatment (29). Despite different results in the literature, we found that VAS scores were higher and lower shoulder ROM values in patients with MetS. Therefore, we think that the compliance and response of these patients to treatment may be more troublesome.

CONCLUSION

Few studies are investigating the relationship between MetS and shoulder pain. Therefore, according to the results of this study, there is a clear relationship between shoulder pain and MetS. More detailed studies need to support the relationship between MetS and shoulder pain. The high frequency of MetS in patients with shoulder pain has shown that MetS should be kept in mind in patients presenting with shoulder pain. Thus, with early diagnosis, it can be predicted that the shoulder pathology can regress or recurrence can be prevented with MetS treatment.

Etik: Bu çalışmanın etik kurulu alınmıştır.

Ethics committee approval had been taken.

Yazar katkı durumu; Çalışmanın konsepti; SS, NŞ, AYK, dizaynı; SS, NŞ, AYK, Literatür taraması; SS, NŞ, AYK, verilerin toplanması ve işlenmesi; SS, NŞ, AYK, istatistik; SS, NŞ, AYK, yazım aşaması; SS, NŞ, AYK,

Author contribution status; The concept of the study; SS, NŞ, AYK, design; SS, NŞ, AYK, literature review; SS, NŞ, AYK, collecting and processing data; SS, NŞ, AYK, statistics; SS, NŞ, AYK, writing phase; SS, NŞ, AYK,

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