Pain intensity and functional limitation are not related with medical image findings in patients with shoulder pain*

A intensidade da dor e a limitação funcional não estão relacionadas com os achados em imagens de pacientes com dor no ombro

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ABSTRACT

BACKGROUND AND OBJECTIVES: Shoulder pain limits patients' ability to perform daily life activities, as well as to carry out professional activities. This study aimed at evaluating the relationship between pain intensity, incapacity and medical image findings of patients with shoulder pain.

METHODS: This was an observational analytical study with 54 patients with possible shoulder injury. Participants have answered an incapacity questionnaire, a pain intensity scale and then were submitted to image exams. Incapacity, pain intensity and image diagnosis were correlated, in addition to comparing pain intensity and level of incapacity among participants with and without medical image abnormalities.

RESULTS:Mean pain intensity was 7.4±2.52. There has been a high degree of incapacity (mean of 57.2%). Image findings have shown abnormalities in 59.3% of reports. There has been no correlation between image findings and pain intensity, as well as there has also been no correlation between image findings and incapacity. There has been high correlation between pain intensity and incapacity (Rho=0.67; p<0.001). Pain intensity and incapacity were not different between participants with and without some type of abnormality at image exams.

CONCLUSION:Patients with shoulder complaints may have limitations to perform daily activities and pain, even with negative image findings.

Keywords: Deficit evaluation, Medical exams, Physical evaluation, Radiography, Shoulder pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O quadro doloroso do ombro limita o paciente de realizar suas tarefas diárias, assim como de realizar atividades dentro da sua jornada de trabalho. O objetivo deste estudo foi avaliar a relação entre a intensidade da dor, a incapacidade e os achados no exame de imagem de pacientes com dor no ombro.

MÉTODOS: Foi realizado um estudo observacional analítico em 54 pacientes com possível lesão de ombro. Os participantes responderamum questionário de incapacidade, uma escala de intensidade de dor e em seguida foram submetidos ao exame de imagem. Foi realizada a análise de correlação entre a incapacidade, a intensidade de dor e o diagnóstico por imagem, além da comparação da intensidade da dor e do nível de incapacidade entre os participantes com e sem anormalidade no exame de imagem.

RESULTADOS: A intensidade de dor média encontrada foi de 7,4±2,52. Houve alto grau de incapacidade (média de 57,2%). Nos exames de imagem analisados foram encontradas anormalidades em 59,3% dos laudos. Não houve correlação entre os achados na imagem e a intensidade de dor, assim como não houve correlação entre os achados na imagem e a incapacidade. Observou-se alta correlação entre intensidade de dor e o nível de incapacidade (Rho=0,67; p<0,001). A intensidade de dor e incapacidade não foram diferentes entre os participantes com ou sem algum tipo de anormalidade nos exames de imagem.

CONCLUSÃO: Pacientes com queixas na região do ombro podem apresentar limitações nas atividades de vida diária e presença de dor, mesmo sem achados no exame de imagem.

Descritores: Avaliação da deficiência, Dor de ombro, Exame físico, Exames médicos, Radiografia.

INTRODUCION

Complaints of upper extremity pain and incapacity are common reports in orthopedics. It is estimated that approximately 20% of general population have upper extremity chronic pain[1], among them shoulder impairment. The prevalence of shoulder pain is between 7 and 14% of general population[2]. Most frequent shoulder diagnoses are:

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rotator cuff tendinopathy, impingement syndrome, acromioclavicular joint disorder and adhesive capsulitis[3].

With the introduction of ultrasound using high resolution transducers, X-rays digitalization, modern computerized tomography and magnetic resonance imaging, the diagnostic capacity of the shoulder and other musculoskeletal system areas exams was widely expanded. Nevertheless, correlation among image findings, pain and alterations at physical evaluation is controversial[4].

Physical shoulder evaluation has similar incapacity patterns regardless of clinical diagnosis. Decreased movement amplitude for shoulder elevation is a frequent finding in some conditions such as: impingement syndrome, rotator cuff tendinopathy, bursitis and adhesive capsulitis. In general, limited shoulder elevation is associated to limitations of daily life activities. A study[5] has found more than 70% of the sample with problems to sleep comfortably on the affected shoulder, wash the back at the shoulder opposite to the affected one, raise 3.6kg and throw a ball over the head.

Shoulder pain limits common daily activities such as carrying out professional tasks. Considering this association, this study aimed at evaluating the relationship between pain intensity and incapacity, and image findings of patients with shoulder pain.

METHODS

This was a transversal, observational and analytical study with 54 patients with possible shoulder injury, carried out in the imaging clinic Dr. Niazi Dias Rubez. Participants were approached at the time of the imaging exam, regardless of being X-ray or ultrasound. Inclusion criteria were having a request for shoulder imaging exam, aged above 18 years, regardless of gender. Exclusion criteria were non-collaborative patients, with some cognitive deficit or with previous shoulder surgery.

Participants agreeing to participate were asked to answer an incapacity questionnaire and a pain intensity scale. Data were collected while patients were waiting for the imaging exam. After filling the incapacity questionnaire and the pain scale, patients were submitted to regular exam.

Upper extremity incapacity was measured with the short version of the self-applicable Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire. This questionnaire was originally developed in English and was called DASH Questionnaire. DASH was developed by Hudak, Amadio and Bombardier[6] with the aim of measuring physical incapacity and upper limbs (UULL) symptoms in a heterogeneous population. Orfale et al.[7] have translated and adapted DASH for Brazilian Portuguese. Variables were analyzed by modules proposed by DASH.

DASH questionnaire short version has 19 questions (scored one to five). QuickDash scores were calculated as follows: [(sum of answers / n) - 1] x 25, being n the complete number of answers. Score obtained quantifies the degree of UULL physical incapacity. The higher the result, the higher the incapacity. Score is considered excellent (>20 points), good (20 to 39 points), regular (40 to 60 points) and poor (>60 points). Psychometric properties of the Brazilian questionnaire short version were evaluated by Puga et al.[8] and its use is recommended for patients with shoulder pain.

Pain intensity was evaluated by the pain numerical scale. Pain numerical scale has scores from zero (no pain) to 10 (worst imaginable pain). Patients were oriented to identify the number best representing their pain intensity in previous week.

Imaging exams were X-rays and ultrasound. Radiographs were performed by a single technician in the positions: corrected anteroposterior (AP) and scapula profile in a digital device (SHIMADZU MEDICAL). Such incidences were chosen for clearly depicting structures involving such joint. According to Turtelli[9], the corrected AP incidence is performed in anteroposterior, with 30º rotation of patients to the side of the examined shoulder. This is made to correct glenoid anteversion and humerus retroversion tangent to joint in AP. The scapula profile or Y incidence, tunnel or outlet incidence, was performed with the patient straight with the shoulder to be examined posteriorly rotated in 10º, enough to dissociate the contralateral shoulder. Central radius focused on the achromium inclined 20º caudally.

Ultrasound exam was performed by a single experienced physician who was not previously notified or the use of reports, in positions: elbow flexion at 90º to evaluate tendon of the long head of biceps, external rotation to evaluate subscapular tendon, external rotation with arm extension (asking patients to put the back of the hand on their back) to evaluate supraspinal tendon, abduction with the hand on waist to evaluate infraspinal tendon, internal rotation with horizontal abduction (hand on opposite shoulder) to evaluate the acromioclavicular joint. Bursae were observed in neutral position, as well as in abduction and aduction.

As from imaging exams reports analysis, participants were classified in three groups: group 1 with preserved anatomical structure (normal), group 2 with impingement syndrome signs (bursitis, tendinopathy) or group 3 with degeneration signs.

Statistical analysis

Data distribution was analyzed by the Shapiro-Wilk test. Correlation between incapacity and pain intensity and imaging diagnosis was analyzed by the Pearson or Spearman correlation coefficient, according to data distribution nature. Correlation above 0.90 was considered as very high, (0.70-0.89) high, (0.50-0.69) moderate, (0.30-0.49) low, and below 0.29 as discrete[10]. Sample was divided according to imaging exam results, being one group classified as normal exam and the other with signs of impingement and /or degenerative signs. Groups were compared by Mann-Whit-

ney T and U tests, according to data distribution nature. Significance level was 0.05 for all statistical tests. Statistical analysis was carried out with the Statistical Package for Social Sciences (SPSS – version 17).

All participants have signed the Free and Informed Consent Term (FICT). This study was carried out in compliance with resolution 466/12 of the National Health Council and with the Declaration of Helsinki of 1975.

This study was approved under number CAAE 14939213.2.0000.5258/2013.

RESULTS

Mean pain intensity was 7.4±2.52. Most frequent pain intensity (13 patients) was the highest score (score 10) and the second most frequent score was 5, corresponding to 8 patients. There has been high degree of incapacity (mean of 57.2%) measured by the QuickDASH questionnaire. Most answers were scored as moderate or severe difficulty. Pain intensity, incapacity and imaging exam reports characteristics are shown in table 1.

Table 1. Pain intensity, incapacity and imaging exam report characteristics of patients with possible shoulder injury (n=54)

Characteristics	Values
Incapacity (QuickDash) (mean±SD)	57.2±22.2
Pain intensity (mean±SD)	7.4±2.5
Diagnosis	
Normal absolute value (%)	22 (40.7)
Subacromial impingement signs absolute value (%)	28 (51.9)
Degeneration signs absolute value (%)	4 (7.4)

Abnormalities were found in 32 (59.3%) of reports of analyzed imaging exams. In 25 reports some type of tendinopathy was found and in 7 subjects image was compatible with bursitis, the two latter characterizing impingement syndrome, which supposedly is the major complain, tendinopathy and/or bursitis. Distribution of diagnoses found in imaging exams is shown in table 2.

Correlation analysis has shown no correlation between imaging findings and pain intensity (Rho=0.19; p=0.89). There has also been no correlation between imaging findings and incapacity (Rho=0.07; p=0.61). The only statistically significant correlation classified as high correlation was observed between pain intensity and incapacity level (Rho=0.67; p<0.001) (Figure 1).

Pain intensity and incapacity results were not significantly different among participants having or not some type of alteration at imaging exams. Figures 2 and 3 show the comparison between pain intensity mean and incapacity mean, respectively, in groups with normal and abnormal images.

Table 2. Distribution of diagnoses found in imaging exames of patients with possible shoulder injury (n=54)

Results of X-rays and ultrasounds	
Report	Values
Supraspinal tendinopathy without rupture	5
Supraspinal tendinopathy with partial rupture	12
Supraspinal tendinopathy with complete rupture	3
Rotating cuff tendinopathy	2
Long head of biceps tendinopaty	1
Subacromial/subdeltoid bursitis	7
Long head of biceps rupture	1
Supra tendon mildly thickened with calcification	2
Irregularities of umeral tubercle contours	1
Acromioclavicular inflammatory process	1
Signs of acromioclavicular osteoarthritis	1
Acromial spur	3
Subscapular calcification	2
Lipoma	1
Normality	22

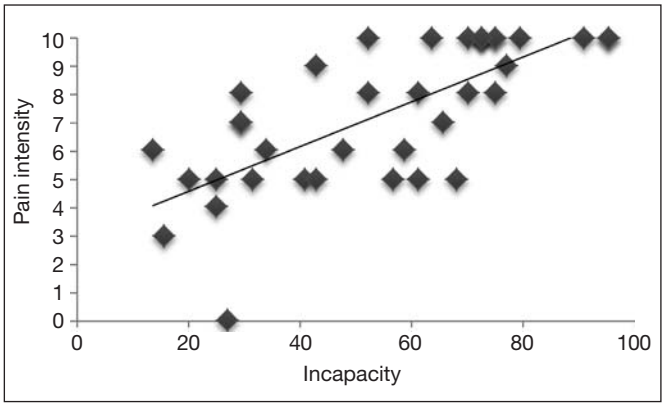

Figure 1. Correlation between pain intensity and incapacity in patients with possible shoulder injury (n=54)

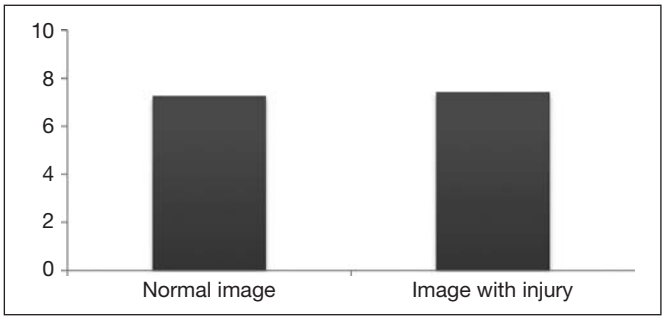

Figure 2. Comparison of pain intensity in groups with normal image and image with injury in patients with possible shoulder injury (n=54)

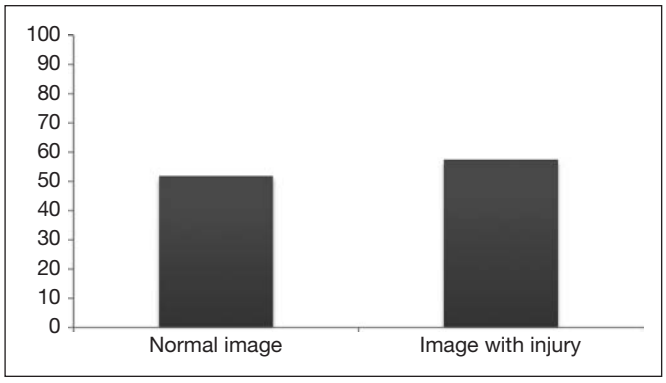

Figure 3. Comparison of incapacity in groups with normal image and image with injury in patients with possible shoulder injury (n=54)

DISCUSSION

Patients with shoulder complaints who were referred to imaging exams and were evaluated in this study had high pain intensity, high level of incapacity and different imaging exam findings. Pain intensity was highly correlated to incapacity level. Although several patients had imaging exam findings, anatomical injury was not related to pain intensity or to incapacity level.

Rotator cuff injuries may be related to the aging process since it is more likely to find MRI abnormalities in the asymptomatic elderly population as compared to youngsters with painful shoulder without such injuries[11]. According to Zorzetto et al.[12] approximately 60% of shoulder alterations are related to rotator cuff injuries. However, only 10% of rotator cuff injuries may have morphological changes which may be tendon retraction, muscle atrophy and infiltrations[13].

The comparison of pain intensity and incapacity level among patients with and without imaging injuries has shown no difference in such characteristics between groups. A previous study using MRI in patients with shoulder injuries has shown that although tendinopathy and bursitis findings were frequent, their contribution to symptoms was low. Analyzing the function, the same authors have found results similar to those presented here and have observed that daily life activities were not affected even in cases of complete or incomplete rotator cuff rupture[11].

Hodges and Tucker[14] have reviewed the influence of pain in the performance of activities with movement and have described that painful stimulation leads to changes in muscle behavior, in movement patterns, in addition to decreasing movement speed and other repercussions in central and peripheral nervous systems. So, the presence of pain should better explain incapacities of patients as compared to imaging findings.

Literature reports confirm our findings and point to the fact that tissue injury not always reflects the functional condition to perform dynamic tasks. That is, the severity of structural degeneration of joints and soft tissues is not directly related to the level of functional alteration in most patients with musculoskeletal injuries. One should also stress that complementary exams, in many cases, are not relevant and "false positive" radiological findings are increasingly common[15].

Finding association between symptoms and images is a challenging and critical task for clinical decision-making. There are reports of high prevalence of rotator cuff injuries in asymptomatic populations[16-18]. So, the misuse of images without clinical data may greatly decrease treatment effectiveness and lead professionals to make inadequate therapeutic choices[11].

Due to discrepancies between presence of pain and incapacity and imaging exams findings, in the last decades, outcomes such as health-related quality of life, functional capacity, pain scales and patients satisfaction have been used as evaluation tools. For allowing the analysis of health status and disease manifestations in the life of individuals according to their own perspective, such evaluations complement clinical and objective data, such as movement amplitude, muscle strength and complementary exams[19].

It is known that imaging exams results depend on examiner's skills to perform the technique and lack of report accuracy may cooperate for some differences in results found in our study. The relationship between pain intensity and incapacity, which was the major finding of this study, may suffer interference of other factors, such as age, gender, occupation, physical activity level, movement pattern. Further studies should control such factors to more accurately analyze the relationship found here. In addition, studies with MRI and a larger number of participants should also be carried out to confirm the findings of this study.

CONCLUSION

Patients with shoulder complaints may have limitations for daily life activities and the presence of pain, even without imaging findings. Pain intensity and incapacity level are not related to imaging findings.

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