Functional assesment of symptomatic snapping scapula after scapulothoracic arthroscopy: a prospective study protocol

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I. INTRODUCTION

The role of the scapulo-thoracic joint is crucial for proper upper limb motion and any conditions that produce alterations of the scapular gliding on the posterior thoracic cage have detrimental effects on shoulder girdle function [1]. In this regard, the snapping scapula syndrome represent a typical phenomenon, usually under-recognized that seldom becomes painful [2]. It was first described by Boinet in 1867 as a characteristic crepitus between the scapula and the chest wall due to the anomalous tissue at this level [3,4]. Several theories have been proposed to explain the pathoanatomy of this syndrome [5]. Codman emphasized the role of the scapular bursitis as consequence of decreased musculature function or scapular tilting [6], while Bateman highlighted the importance of repetitive microtrauma as a source of traction osteophytes or bone spurs at muscle insertion [7]; moreover, both these conditions are worsened by scapular dyskinesis [5] The first approach in the management of snapping scapula is conservative, aimed to balance muscles dysfunction and restore postural control [8,9]. Initially the patient have to change his activities and rest the joint to calm the cycle of bursitis and scarring, thus a course of non-steroidal anti-inflammatory medications is indicated to decrease inflammation. Muscular stretching and strengthening and postural training are the most beneficial treatments. Restoring scapular strength establishes static proximal stability to provide a stable base of support. Because the scapula is responsible for static stability of the shoulder girdle, endurance training of these muscles is the key for scapular stability. Strengthening of the subscapularis and serratus anterior are crucial since a weak serratus anterior muscle causes forward tilting of the scapula inducing crepitus [10]. Nevertheless, in case of persistent pain and shoulder dysfunction after 3 to 6 months of conservative treatment, surgery should be considered [8]. Although both, open and arthroscopic procedures have been proposed to remove the scar tissue and any bone spurs, arthroscopy is advantageous for its lesser invasiveness, lesser scar formation, lower risk of infection and faster rehabilitation [10-13]. Up to date, few studies have described the results of arthroscopic decompression in patients with snapping scapula [10,12-16].

II. PURPOSE OF THE STUDY

In this paper we describe our retrospective/prospective protocol of research (retrospective for the data collected and prospective for the last follow-up evaluation) used to evaluate the clinical and radiographic outcomes of this procedure in a population of patients with symptomatic snapping scapula.

III. PATIENTS AND METHODS

Study design

All patients enrolled gave their informed consent to be included in the study, which was performed in accordance with the Ethical Standards of the 1964 Helsinki Declaration as revised in 2000. Overall subjects have had an unsuccessful conservative treatment for a minimum of 6-month period that consisted of rest and nonsteroidal anti-inflammatory medications, followed by appropriate physical therapy program. Scapula-thoracic arthroscopy was proposed after a failure of the aforementioned non-surgical therapies. Preoperative imaging evaluation was performed with X-ray (Grashey view and outlet view)

and CT scan to search for bony alterations, such as spurs or exostoses.

Study population and enrollment

We estimate to enroll 14 subjects underwent scapulothoracic arthroscopy between January 2006 and May 2012 at the Unit of Shoulder and Elbow Surgery of D. Cervesi Hospital. Postoperative evaluation were performed at 3 and 6 months and the last follow-up at a mean of 24 months. Preoperative, intraoperative and postoperative clinical and radiographic data will be collected at assessed.

Outcome measures

Preoperative and postoperative clinical outcomes will be evaluated with the Western Ontario Rotator Cuff index (WORC) [17], the scale of Constant-Murley (CS) [18], and the Simple Shoulder Test (SST) [19]. WORC is a self reported 21 items questionnaires score including 5 domains: physical symptoms, 6 items; sports and recreation, 4 items; work, 4 items; lifestyle, 4 items; and emotions, 3 items. Each item is scored on a 100-mm visual analogue scale with a total score ranging from 0 to 100, with a higher score indicating a reduced HR-QOL; since it is easier to report scores as percentage of normal score (the aggregate score is subtracted from 2100 and divided by 21) it can vary from 0 % (the lowest functional status level) to 100 % (the highest functional status level). The CS includes a subjective questionnaire for pain, the ability to perform daily living activity (DLA), an objective evaluation of active range of motion (ROM) and strength. Pain was scored on a 15 points scale (0 severe pain, 15 no pain), while DLA was scored on a 20 points scale, with lower scores associated with greater impairment on DLA. ROM was measured using a standard goniometer between the upper arm and the upper part of the thorax. Shoulder strength will assessed using the Lafayette handheld dynamometer (Lafayette Instruments, Lafayette, Ind, USA), that has a microprocessor with a resolution of 0.4 lb (0.2 kg) in the range 0-50 pounds (0-22.6 kg), 0.03% accuracy with two calibration points: 0.25 and 50 lbs (0.11 and 22.6 kg). Data were recorded and analyzed using SPSS v.10 software (SPSS Inc, Chicago, IL, USA). We assigned 1 point for each 0.5 kg of strength registered.

The SST consists of 12 questions with dichotomous response options. For each question, the patient indicates whether he or she is able to do the activity or not. The scores are summarized into a total score, which ranges from 0 (worst) to 12 (best) for shoulder functioning.

Inclusion criteria

Age and gender: male and female $\geq$ 18 years

Infomed consent of the patients to be enrolled in the study

Preoperative diagnosis and surgical procedure: preoperative evaluation with MRI of the affected shoulder

Exclusion criteria

Cognitive limitations that precluded a valid consent to be included in the study

Unwilling to be enrolled

Lost to follow-up

Statistical analysis

Statistical analysis will be performed using the Wicoxon signed-rank test for paired data to assess the difference between pre and postoperative clinical scores. Correlations between patient's features (age, gender, height, weight), follow-up and clinical scores will be sought using non-parametric Spearman's test and Kruskall-Wallis test. Bravais-Pearson correlation coefficient will be used to search the difference between the two independent observations.

Risks and adverse events

No risks are expected with the routinary diagnostic exams performed in the the two groups. Eventual adverse events occurred during the study will be properly recorded and reported.

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