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Rotator cuff surgery in persons with spinal cord injury: relevance of a multidisciplinary approach

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Background: This article is a prospective review of patients with spinal cord injury who underwent multidisciplinary consultation from January 2005 to September 2013 for pain in one or both shoulders.
Methods: We performed clinical, functional, and lesion evaluations of 38 patients with paraplegia and quadriplegia presenting with rotator cuff pathologies.
Results: Surgery was indicated and performed on 38 shoulders in 28 patients. The lesion assessment during surgery showed injuries that were more severe than one would have thought based on imaging data. The mean pain intensity rating in the operative and nonoperative groups was 0 and 1.6, respectively, at rest and 2 and 4.9, respectively, during paroxysmal peaks. On average, for patients who had surgery, the Functional Independence Measure score decreased by 2.3. The mean satisfaction index in operated patients was 8.5 of 10.
Conclusions: When the surgical indication was based on a multidisciplinary decision, no negative results were reported that could have challenged the validity of this decision. Pain relief was the primary benefit reported after surgery. The functional status was modified because of the technical aids needed to prevent shoulder overuse. There are several arguments in favor of rotator cuff surgery for wheelchair-bound patients with spinal cord injury. Because of their functional impairments, wheelchair-bound patients will continue to overburden their shoulders after rotator cuff surgery. A multidisciplinary approach emerges as the solution to inform and educate patients to limit the risk of recurrence.
Level of evidence: Level IV, Case Series, Treatment Study.

Keywords: Rotator cuff; shoulder; surgery; pain; spinal cord injury; paraplegia

The internal ethics committee within our neurologic center approved the ethical validity of the study. In France, prospective studies of patients undergoing common care management (ie, as per protocol) do not need specific approval from the regional institutional review board. We asked the patients to give their permission to use their clinical data in accordance with the French Data Protection Agency - Commission Nationale de l'Informatique et des Libertés (CNIL).

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Rotator cuff injuries and shoulder pain are both quite common in persons with spinal cord injury (SCI) and have a negative impact on their autonomy in activities of daily living and quality of life even in the early stages of SCI.[9] These injuries are often bilateral and related to the long-term use of wheelchairs (eg, repetitive movements during transfers[12] and propulsion and arm movements above shoulder level[3]), as well as orthotic-assisted walking.[5,11,13,18]

Many authors report that the prevalence of shoulder pain is greater in patients with paraplegia and increases regularly between 5 years (30% to 50%) and 20 years (70%) after SCI.[7,17] Conversely, in patients with quadriplegia, maximum shoulder pain occurs early on in the acute phase (0 to 5 years after SCI) and is found in 78% of patients within the first 6 months after SCI.

In 75% of patients with painful shoulders, the term ''weight-bearing shoulder'' can hide real shoulder pathologies, from simple tendinitis to more severe degenerative lesions,[4,15] alone or combined (ie, rotator cuff tear, arthritis of the glenohumeral joint, subacromial bursitis, biceps tendinopathy, or avascular necrosis of the humeral head).[4,6] Data from the literature underline a real discrepancy between the reality of these injuries and the clinical picture, which is often less discriminating in patients with SCI than in healthy populations. In fact, usually because of delays in consultations being performed and a proper diagnosis being obtained, we observe a rapid degeneration of these injuries in this SCI population, with 63% of patients with paraplegia having rotator cuff injuries versus 15% of healthy control subjects matched for gender and age.[1]

Rotator cuff surgery, which is commonly indicated in non-neurologic patients, is still not largely proposed to patients with SCI because teams are afraid of postoperative dependence.[8,16]

In January 2005, a multidisciplinary medical and surgical consultation was implemented in our SCI rehabilitation center, specializing in physical medicine and rehabilitation for neurologic impairments related to SCI lesions. This prospective, non-controlled study was designed to (1) refine the clinical, functional, and lesion profile of patients with SCI who underwent consultations for shoulder pain; (2) study and compare the clinical and functional progression of patients who underwent (or did not undergo) rotator cuff surgery; and (3) detail recommendations for shoulder management in persons with SCI.

Methods

All adults with SCI who underwent a multidisciplinary consultation between January 2005 and September 30, 2013, for unilateral or bilateral shoulder pain and/or shoulder-related functional impairments were seen in a prospective manner. Exclusion criteria were patients who had unstable psychiatric pathology and/or were deemed unable to answer questions pertaining to the study.

Each patient had a complete medical evaluation to collect anamnestic, clinical, and lesion data. Anamnestic data comprised the following: age at consultation, age at SCI, neurologic profile, American Spinal Injury Association Impairment Scale (ASIA), and preoperative functional status by use of the Functional Independence Measure (FIM) assessing physical impairments (13 items) and cognitive impairments (5 items). Each item on the FIM scale is scored from 1 to 7 (where 1 indicates complete dependence and 7 indicates complete independence). The scale ranges from 18 to 126. The FIM scale is mainly used to track changes in a person's ability to carry out an activity in an independent manner.

Clinical data comprised the following: nature of the complaint (pain, functional impairment, and/or joint range-of-motion [ROM] limitation); results of the joint examination (passive and active joint limitations, decentered glenohumeral joint, and/or joint instability); results of the musculotendinous examination (subacromial conflict, tendon pathology, and rotator cuff tear evaluation tests); and circumstances surrounding pain aggravation or its onset (transfers, propulsion, movements above shoulder level to reach objects, and/or other situations).

Lesion data comprised imaging data (plain radiographs and/or ultrasound data when there was evidence of subacromial impingement syndrome and/or computed tomography [CT] arthrography or magnetic resonance imaging [MRI] for rotator cuff injuries).

Some patients underwent specific physical therapy (8 sessions on average) associating functional rehabilitation, therapeutic education, and recommendations for limiting stress on their injured shoulders.

Surgical management was guided by the intensity of the pain and its functional impact, as well as the importance of injuries as evidenced on imaging. The surgeon chose the surgical technique during arthroscopic or open surgery after determining the severity of the lesions and defined the medical/surgical treatment strategy based on 8 principles (Fig. 1). The patient, under general anesthesia, was placed in a semi-sitting position. Arthroscopic rotator cuff repair first consisted of scapulohumeral arthroscopy, followed by subacromial bursoscopy to precisely assess the lesions.

For supraspinatus, infraspinatus, and subscapularis tendon repairs, the surgeon reattached the torn tendon with one or several anchors (single-row repair for partial tears and double-row repair for total rotator cuff tears).

Arthroscopic tenodesis was the first-line treatment for repair of the long head of the biceps. For acromial spurs causing lesions to the shoulder and reducing the subacromial space, the technique consisted of recalibrating the coracoacromial arch by conservative anterior acromioplasty with removal of the acromioclavicular ligament with or without acromioclavicular arthroplasty. A subacromial tendon bursectomy was sometimes performed to complete the procedure to remove any bony prominences and irregular tendon edges with or without tenosynovectomy of the biceps sheath.

Open rotator cuff surgery consisted of making an incision above the shoulder to detach the anterior deltoid and then proceeding with cutting the medial deltoid heads along their fibers before rotator cuff repair was performed by transosseous reattachment.

All patients were seen in a prospective manner after the operation or at some time after their last multidisciplinary consultation if they did not undergo surgery.