ASSESSMENT OF ARTHROSCOPIC ELBOW SYNOVECTOMY OUTCOMES IN PATIENTS WITH RHEUMATOID ARTHRITIS

Alberto Naoki Miyazaki¹, Marcelo Fregoneze², Pedro Doneux Santos³, Luciana Andrade da Silva⁴, Rodrigo Tormin Ortiz⁵, Eduardo César Moreira Mariz Pinto⁶, Sergio Luis Checchia¹

ABSTRACT

Objective: To review functional outcomes of arthroscopic elbow synovectomy in patients with rheumatoid arthritis.

Methods: Between May 1999 and December 2005, 15 patients were submitted to elbow synovectomy using an arthroscopic approach. Three cases were bilateral, totaling 18 elbows. There were two male and 13 female patients. The mean age was 44 years and five months. The mean time of previous diagnosis was six years and eight months. All patients reported preoperative pain, and on seven elbows, instability was present. The mean preoperative values for joint motion were: flexion, 118°; extension, -24°; supine, 80°; and; prone, 71°. Result: The mean postoperative follow-up time was 39 months. The mean postoperative joint motion was 133° for flexion, -20° for extension, 84° supine, and 78° prone. On nine elbows (50%) an improved postoperative range of motion was reported, reaching functional levels. Twelve cases (66.6%) showed pain resolution or improvement to a level not interfering on the activities of daily life. According to Bruce’s assessment method, the results were as follows: seven excellent, three good, two fair and six poor results, with an average of 85.5 points. Synovitis recurrence was found in six cases (33.3%), and evolution to osteoarthrosis was found in four (22.2%).

Conclusion: Arthroscopic elbow synovectomy in patients with rheumatoid arthritis leads to pain improvement in 66.6% of the cases; however, it does not cause a significant range of motion improvement.

Keywords – Arthritis, Rheumatoid; Elbow; Arthroscopy

INTRODUCTION

Rheumatoid arthritis (RA) is an inflammatory, systemic, and chronic disease affecting connective tissue. Its etiology is unknown and it affects about 0.3% to 1% of the world population. The main feature of RA is symmetric joint involvement and a gradually increasing inflammatory process(1). In RA patients with five years of disease, the elbow joint is involved in around 20% to 50% of cases(1,2).

Initially, conservative treatment consists of measures to assess pain and preserve joint range of motion. Disease progression leads to the worsening of symptoms and joint instability(3), with pain and restriction of the elbow, which end up compromising the function of the upper limb(4).

Surgical synovectomy is indicated in cases of failed conservative treatment. It leads to good results as to the relief of symptoms when it is performed via open access, but pain in the postoperative period and the risk of wound dehiscence and infection delay the initiation of rehabilitation(5).
Elbow arthroscopy is a relatively new procedure and has several indications, among them, synovectomy in patients with RA \(^{(6)}\). Arthroscopic synovectomy is less invasive and allows for immediate rehabilitation; however, it presents significant risk of neurovascular injury \(^{(5,7)}\). Several authors have shown satisfactory results with arthroscopic synovectomy for both pain relief and functional improvement, especially in the early stages of the disease \(^{(2,5,8)}\).

The objective of this paper is to show the functional results of arthroscopic synovectomy of the elbow in patients with RA.

**METHODS**

We evaluated patients diagnosed with RA operated by the Shoulder and Elbow Group of the Department of Orthopedics and Traumatology, School of Medical Sciences, Santa Casa de São Paulo, “Fernandinho Simonson Pavilion”, with elbow impairment, who underwent arthroscopic synovectomy.

From May 1999 to December 2005, 15 patients underwent treatment, three of them with bilateral involvement, totaling 18 elbows.

Thirteen patients were female and two were male. The average age was 44 years and five months, ranging from 16 to 64 years. The dominant upper limb was affected in nine cases (50%). Two patients (11%) had monoarthritis of the elbow, without the involvement of other joints (Table 1).

The average time of a prior diagnosis of the disease was six years and eight months, ranging from zero to 23 years; in three cases the disease was diagnosed only after surgery, which was indicated by nonspecific monoarticular synovitis. Thirteen patients (72%) used antirheumatic drugs. The disease was active in all cases. All patients complained of pain preoperatively. There was elbow instability in seven (39%) and the joint was stable in 11 (61%) patients (Table 1).

The average flexion in the preoperative period was 118°, ranging from 40° to 140°. The average extension was -24°, ranging from 0° to -45°. Supination ranged from 15° to 90°, with an average of 80°, and the average pronation was 71°, ranging from 10° to 90° (Tables 1 and 2).

Patients had preoperative anteroposterior and profile radiographs taken (Figures 1 and 2) and underwent physical examination, for classification of elbow impairment in rheumatoid arthritis according to the Mayo criteria \(^{(9)}\). (Chart 1), five (27%) were considered as grade I, three as grade II (16%), eight as grade III (44%) and two as grade IV (11%) (Table 1).

All patients underwent arthroscopy of the elbow in the prone position. In all it was possible to perform synovectomy and in one case synovectomy was associ-

**Table 1 – Patients data.**

| NAME | G | AGE (years) | DOM | S | TDSE (months) | MONO | MED | CLAS | INS | PRE.MOB. | PROC | POST.MOB. | BRUCE | SAT | REC | FU | TEA |
|------|---|------------|-----|---|--------------|------|-----|------|-----|----------|------|----------|--------|----|-----|----|----|
|      | G | AGE (years) | DOM | S | TDSE (months) | MONO | MED | CLAS | INS | PRE.MOB. | PROC | POST.MOB. | BRUCE | SAT | REC | FU | TEA |
|      | G | AGE (years) | DOM | S | TDSE (months) | MONO | MED | CLAS | INS | PRE.MOB. | PROC | POST.MOB. | BRUCE | SAT | REC | FU | TEA |
|      | G | AGE (years) | DOM | S | TDSE (months) | MONO | MED | CLAS | INS | PRE.MOB. | PROC | POST.MOB. | BRUCE | SAT | REC | FU | TEA |
|      | G | AGE (years) | DOM | S | TDSE (months) | MONO | MED | CLAS | INS | PRE.MOB. | PROC | POST.MOB. | BRUCE | SAT | REC | FU | TEA |
|      | G | AGE (years) | DOM | S | TDSE (months) | MONO | MED | CLAS | INS | PRE.MOB. | PROC | POST.MOB. | BRUCE | SAT | REC | FU | TEA |
|      | G | AGE (years) | DOM | S | TDSE (months) | MONO | MED | CLAS | INS | PRE.MOB. | PROC | POST.MOB. | BRUCE | SAT | REC | FU | TEA |
|      | G | AGE (years) | DOM | S | TDSE (months) | MONO | MED | CLAS | INS | PRE.MOB. | PROC | POST.MOB. | BRUCE | SAT | REC | FU | TEA |

**Source:** DOT-FCMSCSP Archives

**Legend:** G = Gender, M = Male, F = Female, DOM = Dominance, S = Side, R = Right, L = Left, TDSE = Time with disease, DIAG SUR = diagnosed after surgery, MONO = monoarticular involvement, MED = antirheumatic medication, CLAS = classification, INS = instability, PRE.MOB. = preoperative mobility, FL = flexion, EX = extension, SU = supination, PR = pronation, PROC = associated procedure, RAD.HEAD = resection of the radial head, POST.MOB. = postoperative mobility, SAT = satisfaction, REC = recurrence, F-U = follow-up, TEA = indicated total elbow arthroplasty

Rev Bras Ortop. 2009;44(6):491-5
ASSESMENT OF ARTHROSCOPIC ELBOW SYNOVECTOMY OUTCOMES IN PATIENTS WITH RHEUMATOID ARTHRITIS

Table 1 – Mayo classification of elbow involvement in rheumatoid arthritis.

| Grade | Description |
|-------|-------------|
| I     | No radiographic changes besides osteoporosis. Presence of synovitis. |
| II    | Mild joint space narrowing. Preserved joint architecture. Persistent synovitis. |
| III   | Moderate to severe changes in the elbow architecture. Thinning of the olecranon or resorption of the trochlea or head. Variable synovitis may be quiescent. |
| IV    | Widespread joint destruction, with resorption of the articular surface. Minimal synovitis. Presence of instability. |

Modified from Morrey et al., 1992.

Regarding the results, patients were evaluated for the degree of joint mobility and submitted to a questionnaire by the criteria of the American Medical Association (AMA) modified by Bruce et al.\(^{(10)}\) (Chart 2).

**RESULTS**

The postoperative follow-up averaged 39.1 months, ranging from 14 to 91 months (Table 1).

As for joint mobility in the postoperative period, the average flexion was 133°, ranging from 90° to 150°.

| PreOP | PostOP | Difference |
|-------|--------|------------|
| Flexion | 118° | 133° | > 15° |
| Extension | -24° | -20° | > 4° |
| Supination | 80° | 84° | > 4° |
| Pronation | 71° | 78° | > 4° |

Source: DOT-FCMSCSP Archives

Extension ranged from 0° to -60°, with an average of -20°. Supination averaged 84°, ranging from 40° to 90°. The final average pronation was 78°, ranging from 30° to 90°. Flexion increased 15°, extension 4°, supination 4°, and pronation 7° in relation to the preoperative joint mobility (Table 2).

In nine elbows (50%), the postoperative range of motion improved to the functional range, that is, with at least 130° of flexion and -30° of extension (Figure 3), as described by Morrey et al.\(^{(11)}\). The two cases (11%) that had limitation of supination and pronation below the functional angle of 50° in each movement, cases 6 and 7, improved in the postoperative period (Table 1).

There was resolution or improvement of pain after surgery in 12 cases (66.6%) to the point that pain no
longer interfered with the activities of daily living.

With regard to the ability of performing activities of daily living in the postoperative period, ten elbows (55.5%) had normal function and two (11.1%) had independent activities of daily living with less than two limitations at work (Table 2). These patients represent 66.6% of the total.

According to Bruce’s evaluation criteria, the mean value found was 85.5 points. The results were considered excellent in seven patients (38%), good in three (16%), fair in two (11%) and poor in six (33%) (Table 1).

**DISCUSSION**

Performing elbow synovectomy in patients with RA is indicated in cases of synovitis that is not controlled by medication, is associated with persistent pain, stiffness, and loss of function\(^{(12)}\).

The results of open elbow synovectomy in patients with RA have been described by several authors, with improvements in pain and range of motion, but the procedure is not without complications such as infection, wound dehiscence, and fracture of the olecranon\(^{(4,13-16)}\).

Arthroscopic synovectomy has been described as a less invasive alternative with a faster postoperative recovery, but it is technically more difficult, with a greater possibility of neurovascular complications\(^{(6,7,12)}\). We did not observe these complications in our study.

Horiuchi et al.\(^{(1)}\) believe that arthroscopic synovectomy of the elbow in RA has as its main objective not a gain in the range of motion, but pain relief and, secondarily, to improve the activities of daily living. Several authors have also reported that there is no substantial improvement of joint mobility in the postoperative period\(^{(2,5,12)}\), which coincided with our observations. There was some improvement in joint mobility in all directions of movement. The main improvement occurred in flexion, with an average increase of 15° (Table 2).

With regard to pain relief, 12 elbows (66.6%) evolved with no pain or mild pain that did not interfere with daily activities. Lee and Morrey\(^{(2)}\) found similar results, with 64.2% of patients without pain or mild pain after arthroscopic synovectomy. Horiuchi et al.\(^{(1)}\) had 76% of patients in similar circumstances. Tanaka et al.\(^{(5)}\) compared RA patients undergoing arthroscopic or open synovectomy of the elbow; 48% of patients who underwent arthroscopic surgery and 70% of patients who underwent open surgery had no pain or mild pain; however, this difference was not statistically significant.

Resection of the radial head has been described by authors who perform the surgery via the open approach\(^{(4,14,16)}\). But Copeland and Taylor\(^{(15)}\) show that it is possible to achieve good results with only...
Arthroscopic synovectomy of the elbow, without resection of the radial head, because it acts as a stabilizer of the elbow and wrist. Therefore, it is desirable to preserve it in the rheumatoid elbow; resection is contraindicated in patients with instability(3). In our study, the radial head was resected in only one patient (case 6), who had limited joint mobility and pain especially with regard to supination and pronation. In the postoperative evaluation, this case showed improvement of these movements.

According to Kauffman et al.(3), the degree of elbow involvement in the preoperative period is described as an important prognostic factor; they showed that even in cases with significant impairment of the joint, synovectomy and capsular release can result in pain relief and improvements in the range of motion. We have observed that patients with the worst results were those with higher preoperative classification (Mayo) grades (Table 1).

The bad results were attributed to recurrence of synovitis in six cases (33%) and progression of osteoarthritis in four (22%).

In three patients (16%) (cases 1, 8, and 10), the development of arthritis of the elbow led to total arthroplasty. In three other cases (16%) (patients 5, 7, and 13), total arthroplasty was indicated, but it has not yet been performed (Table 1).

The exception was a patient with juvenile rheumatoid arthritis diagnosed at the first surgery (case 4), that even with the degree of involvement of the elbow classified as grade I, evolved with recurrence of symptoms, requiring another arthroscopic synovectomy after 14 months. This second procedure also failed, which led to the patient undergoing an interposition arthroplasty and resection of the radial head after 18 months (Table 1).

Of the three patients who underwent bilateral surgery, in two cases (cases 2 and 3) the degree of involvement was low (Mayo grade I) and evolved without complications and with patient satisfaction. In the patient with elbows with different degrees of involvement (case 1), the side with the more advanced grade underwent total arthroplasty because of symptoms persisting after synovectomy (Figures 1, 2, and 3).

The rate of reoperation was 22%: in one patient (case 4), another synovectomy was performed by arthroscopy and later, an interposition arthroplasty; three other patients underwent total arthroplasty (cases 1, 8, and 10). Of these, cases 1 and 8, initially classified as grade IV, did not progress well, as had been expected as a possibility, and underwent total arthroplasty. Our reoperation rate is similar to that seen by Mäenpää et al.(17) who performed 103 open elbow synovectomies and reoperated 22 patients (21%), with eight repetitions of synovectomy and 14 total arthroplasties.

With respect to the index of satisfaction of our patients, 12 (66.6%) are happy with the results of the procedures they underwent.

CONCLUSION
Arthroscopic synovectomy of the elbow in patients with rheumatoid arthritis provided pain relief in 66.6% of the operated elbows; however, it did not lead to improvement in joint mobility.

REFERENCES
1. Horiuchi K, Momohara S, Tomatsu T, Inoue K, Toyama Y. Arthroscopic synovectomy of the elbow in rheumatoid arthritis. J Bone Joint Surg Am. 2002;84(3):342-7.
2. Lee BF, Morrey BF. Arthroscopic synovectomy of the elbow for rheumatoid arthritis. J Bone Joint Surg Br.1997;79(5):770-2.
3. Kauffman JL, Chen AL, Stuchin SA, Di Cesare PE. Surgical management of the rheumatoid elbow. J Am Acad Orthop Surg. 2003;11(2):100-8.
4. Brunfield RH Jr, Resnick CT. Synovectomy of the elbow in rheumatoid arthritis. J Bone Joint Surg Am.1985;67(1):16-20.
5. Tanaka N, Sakashashi H, Hirose K, Ishima T, Ishii S. Arthroscopic and open synovectomy of the elbow in rheumatoid arthritis. J Bone Joint Surg Am.1993;75(3):521-5.
6. O’Driscoll SW, Morrey BF. Arthroscopy of the elbow. J Bone Joint Surg Am.1992;74(1):84-94.
7. O’Driscoll SW. Elbow arthritis: treatment options. J Am Acad Orthop Surg. 1999;7(2):106-16.
8. Nemoto K, Arino H, Yoshihara Y, Fujikawa K. Arthroscopic synovectomy for the rheumatoid elbow: a short-term outcome. J Shoulder Elbow Surg. 2004;13(6):352-5.
9. Morrey BF, Adams RA. Semiconstrained arthroplasty for treatment of rheumatoid arthritis of the elbow. J Bone Joint Surg Am.1992;74(4):479-90.
10. Bruce HE, Harvey JP Jr, Wilson JC Jr. Monteggia fractures. J Bone Joint Surg Am.1974;56(8):2563-76.
11. Morrey BF, Askew LJ, Chao EY. A biomechanical study of normal functional elbow motion. J Bone Joint Surg Am.1981;63(6):872-7.
12. Steinmann SP, King GJ, Savoie FH 3rd. Arthroscopic treatment of the rheumatic elbow. J Bone Joint Surg Am.2002;84(3):342-7.
13. Inglis AE, Ranawat CS, Strau LR. Synovectomy and débridement of the elbow in rheumatoid arthritis. J Bone Joint Surg Am.1982;64(7):1074-8.
14. Porter BB, Richardson C, Vainio K. Rheumatoid arthritis of the elbow: the results of synovectomy. J Bone Joint Surg Am.1971;53(4):652-62.
15. Copeland SA, Taylor JG. Synovectomy of the elbow in rheumatoid arthritis. J Bone Joint Surg Am.1974;56(3):427-37.
16. Eichenhatl M, Hass A, Kessler I. Synovectomy of the elbow in rheumatoid arthritis. J Bone Joint Surg Am.1982;64(7):1074-8.
17. Mäenpää HM, Kuusela PP, Kaarela K, Kaulanen HJ, Lehtinen JT, Bell EA. Reoperation rate after elbow synovectomy in rheumatoid arthritis. J Shoulder Elbow Surg. 2003;12(5):480-3.