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Efficacy of arthroscopy in the treatment of lateral epicondylitis: a systematic review with meta-analysis

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Abstract: Lateral epicondylitis, popularly known as tennis elbow, has a high incidence in athletes, around 50%, with a high prevalence in beginners learning the one-handed backhand. It is a clinical orthopaedic condition with a major impact on public health due to its high frequency in manual workers, 10.5% of whom may have lateral elbow pain and 2.4% of whom have a confirmed diagnosis. The aim of this study is to compare the effectiveness of arthroscopic versus non-arthroscopic techniques (open and percutaneous). This is a systematic review with meta-analysis. There is no need for approval by the ethics committee or institutional scientific review board. The reference lists of the included and previously published articles were searched for more relevant studies that met the eligibility criteria. Based on the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines. Five articles were selected containing patients diagnosed with lateral epicondylitis who underwent surgical treatment by arthroscopy, open surgery and/or percutaneous surgery. A total of 544 patients were included, with a mean age of 46 years. Of

these, 347 were treated by arthroscopy, 81 by open surgery and 42 by percutaneous surgery. The results were analyzed using the DASH (Disabilities of the arm, shoulder and hand) score, which assesses dysfunctions of the arm, shoulder and hand. In addition, some studies analyzed the VAS (Visual Analogue Scale) index, patient satisfaction, complications and other clinical assessment scales.Arthroscopic, open and percutaneous surgeries proved to be effective methods for treating lateral epicondylitis.However, because arthroscopy is a method that allows a complete intra-articular evaluation and adequate release of the tendons without ligament involvement, it was associated with a better prognosis in terms of pain, limb mobility and consequent patient satisfaction when compared to open and percutaneous procedures.

Keywords: Lateral epicondylitis; Arthroscopy; Treatment.

Introduction: Lateral epicondylitis, popularly known as tennis elbow, has a high incidence in athletes, around 50%, with a high prevalence in beginners learning the one-handed backhand. It is a clinical orthopaedic condition with a major impact on public health due to its high frequency in manual workers, 10.5% of whom can present with lateral elbow pain and 2.4% of whom have a confirmed diagnosis. [1,2]

This condition affects 1 to 3% of the general population, mainly between the ages of 35 and 50. 1,2,3 In most cases it can be successfully treated conservatively, with relief within one year. 3 However, 4% to 11% of patients persist with complaints, leading to a surgical approach which results in “good” or “excellent” results in 80% to 90% of cases.4,5

The mechanism of trauma is often ergonomics, hence the high prevalence and higher incidence in heavy manual workers and workers who perform repetitive movements or fine motor skills3. However, degenerative factors can contribute to the development due to the inflammatory process characterized by angiofibroblastic hyperplasia, high cell counts, hyperplasia of blood vessels and degradation of collagen fibers, which can evolve into partial or total tendon ruptures and even fibrosis and calcification 4

In most studies, the etiology has been correlated with the initial location of the tendon lesions, originating in the extensor carpi radialis brevis (ECRB), as a result of inflammation, generating a significant pain process. This can be explained biomechanically when playing tennis, and most notably when performing a backhand, by placing much greater loads on the ECRB tendon than on the other epicondyle tendons. Since anatomically, the other extensors are muscular and this one is tendinous[5].

Another scientific hypothesis is that epicondylitis is a clinical manifestation of elbow instability, anatomically justified by the proximity between the extensor carpi radialis brevis and the collateral ligaments. This may justify the ligament laxity found in patients undergoing diagnostic arthroscopy for this pathology[5].

Historically, this pathology was thought to be a self-limiting disease, however, persistent pain is detected in most patients, even when treated for a year with conservative methods8 and subsequent local injections of corticosteroids have also shown unfavorable results, especially in those with a pain duration of more than 6 months8 .

Numerous forms of conservative treatment have been established, with immobilization, avoidance of manual work, physiotherapy, systemic or local anti-inflammatories and radiofrequency to relieve pain.12,13,14 However, patients who don't respond positively or those with a period of 6 months of complaints become candidates for surgical intervention.9

Numerous techniques have been proposed to free the origin of the common extensor.12 Firstly, it was performed by the open route, first described by Nirschl and Pettrone in 1979. 13Later, in 1982, Baumgard and Schwartz 14 were the first to describe percutaneous release, with the patient under local anesthesia, for the treatment of lateral epicondylitis.13,14

With the popularity of elbow arthroscopy, the use of arthroscopic methods has been explored for the treatment of this pathology in refractory cases.15 It was first described in 2000 by Blaker et al 16 in a small series of cases with 42 releases. Since then, numerous articles have established that this is a viable option for cases that are refractory and chronic to non-operative treatment.17,18 Therefore, the aim of this study is to compare the effectiveness of the arthroscopic technique versus non-arthroscopic techniques (open and percutaneous).

METHODOLOGY

Data search

Bibliographic survey through the electronic databases: Scielo, PubMed/MEDLINE and Cochrane Library without language restriction of publications until November 31, 2023, through a search strategy combining keywords and MeSH terms and the Boolean operator AND/OR. The health descriptors (DECS)/MESH TERMS selected were: Lateral epicondylitis OR Tennis elbow AND Arthroscopy AND Orthopaedic procedures.

Type of study

This is a systematic review with meta-analysis. There is no need for approval by the ethics committee or institutional scientific review board. The reference lists of the included and previously published articles were searched for more relevant studies that met the eligibility criteria. Based on the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines 6.

Eligibility criteria

The PICOS principle (Population, Intervention, Comparison, Outcomes and Study Design) was used.

1) Population: patients diagnosed with lateral epicondylitis

2) Intervention: arthroscopic, open or percutaneous surgical treatment.

3) Comparator: DASH score (Disabilities of the arm, shoulder and hand)

4) Outcome: arthroscopic treatment of lateral epicondylitis is associated with better prognosis when compared to other techniques.

Criteria for classifying studies

Excluded

(1) Studies with incomplete data for the proposed work (2) Non-randomized controlled trials, comparative studies, editorial articles, letters to the editor, cohort studies, review articles, meta-analyses, expert opinions, conference papers, or books; (3) Same publications by the same author or institution; (4) Articles that did not evaluate the patients' DASH (Disabilities of the arm, shoulder and hand) score; (5) Articles that did not analyze the arthroscopic technique in the treatment of lateral epicondylitis; (6) Articles analyzing techniques other than arthroscopy, open and percutaneous.

Statistical analysis

The methodological quality was guided by the inclusion and exclusion criteria of the studies, assessed with the Cochrane Collaboration tool for determining risk of bias in the Review Manager program, version 5.3 (The Nordic Cochrane Centre, The Cochrane Collaboration, Copenhagen, Denmark). 7

The systematic review protocol was registered in the International prospective register of systematic reviews (PROSPERO) under ID CRD42024504346.

RESULTS

The selection of studies began with 192 articles, and after excluding those published more than 15 years ago, 51 were selected. After evaluating the titles and abstracts that were not in line with the proposal of the study, 26 were left for full reading. Finally, 5 were selected for discussion, analysis and construction of the study (Figure 1).

Five articles were selected containing patients diagnosed with lateral epicondylitis who underwent arthroscopic, open and/or percutaneous surgical treatment. A total of 544 patients were included, with a mean age of 46 years. Of these, 347 were treated by arthroscopy, 81 by open surgery and 42 by percutaneous surgery. The results were analyzed using the DASH (Disabilities of the arm, shoulder and hand) score, which assesses dysfunctions of the arm, shoulder and hand. Some studies also analyzed the VAS (Visual Analogue Scale) index, patient satisfaction, complications and other clinical assessment scales.

Table 1 contains the selected studies and their outcomes.21,22,23,24,25

Table 2 shows the analysis of the pre- and post-operative DASH score results obtained using the arthroscopic technique and other techniques used in the treatment of lateral epicondylitis (table 2).21,22,23,24,25

Figure 2 contains an analysis of the results obtained using the arthroscopic technique and other techniques used in the treatment of lateral epicondylitis (figure 2).

Clark et al's study showed that the DASH score and PRTEE showed no significant differences between the two surgical modalities (open and arthroscopic), the VAS SCORE 12 months after surgery represented better results for those patients who underwent arthroscopy (30.6 +- 4.9 for open surgery and 26.9 +- 4.2 for arthroscopic). While for Solheim et al, at medium follow-up, the DASH score showed significantly better results in the arthroscopic group compared to the open group. The study also pointed out that serious complications such as chronic nerve damage, elbow stiffness or deep infections were not found in any of the patients 21,22.

Ertem et al. analyzed the efficacy of arthroscopic treatment alone, and found a significant improvement in the post-operative DASH score compared to that recorded before surgery. The MEPS (Mayo Elbow Performance Scores), an instrument that tests elbow limitations during daily physical activities, showed a substantial improvement from 48.5 +- 1.5 to 101.2 +- 22.9 after surgery.19

For Othman et al, arthroscopy showed more favorable results in the DASH score, in the post-operative VAS score (2 +- 1 for the arthroscopy group and 2.1 +- 1 for the percutaneous technique) and in the degree of satisfaction compared to percutaneous release. Szabo et al. evaluated the percutaneous, open and arthroscopic techniques. When taking into account the Andrews - Carson score, arthroscopic surgery showed better post-operative indices compared to the others:

195.4, 195.3 and 193 for arthroscopic, percutaneous and open, respectively. The post-operative VAS index also showed better results for the arthroscopic technique, with records of 1.0, 1.1 and 1.2 for the arthroscopic, percutaneous and open routes.24,25

DISCUSSION

Arthroscopic, open and percutaneous surgeries have proven to be effective methods for treating lateral epicondylitis. However, because arthroscopy is a method that allows complete intra-articular assessment and adequate tendon release without ligament involvement, it was associated with a better prognosis in terms of pain, limb mobility and consequent patient satisfaction when compared to open and percutaneous procedures 21,22,23.

In addition to the patient's choice and the orthopaedic surgeon's familiarity with each technique, there are three factors discussed that affect the choice of treatment such as (1) the ability to visualize the elbow joint; (2) the complication rate and (3) the duration of the surgical procedure..26 Supporters of the arthroscopic and open techniques refer to the theoretical benefit of intra-articular visualization, which makes it possible to identify other possible pathologies causing this lateral elbow pain, masked or coexisting with tendinosis of the ECRB, reducing the number of refractory cases26.

Arthroscopy allows visualization of the entire elbow joint and avoids splitting the overlying common extensor origin, which may or may not be associated with the pathological process, while the open surgical approach can be altered with a capsulotomy allowing partial visualization of the elbow joint28.

It is argued that arthroscopy of this limb has a high learning curve with possible serious complications such as peripheral nerve damage, while percutaneous and open techniques require less technical skill in the hands of most surgeons with a thorough knowledge of elbow anatomy.29 However, two studies show that the complication rate of arthroscopic treatment of lateral epicondylitis is lower than that of non-arthroscopic techniques.27,30

Studies present evidence to show a faster return to work with percutaneous and arthroscopic procedures versus open techniques with a decrease in grip strength to 90% on the non-compromised side, and an equivalent “success rate” for the three techniques, covering pain, multiple outcome measures, return to activities and function. 31,32

It was found that patients may have better functional results with open and arthroscopic releases as opposed to percutaneous releases. However, those who underwent arthroscopic and percutaneous releases may have less post-operative pain than those who underwent an open approach. They also found that complication rates were similar between the techniques, with the exception of superficial wound infections, which were more prevalent among those who opted for open release.The individuals reported equally high levels of satisfaction, regardless of the technique.12

The three techniques mentioned above for the treatment of lateral epicondylitis show excellent results. Since patients may report less pain with percutaneous and arthroscopic techniques, even if the risk of complications are similar between them, patients can be informed that the risk of infectious complications may be higher in open procedures.12

CONCLUSION

Both the arthroscopic method and the open and percutaneous approach showed excellent results and are effective for the treatment of lateral epicondylitis. The risk of complications between them is similar, but patients should be warned that open releases may have a higher level of infectious complications. However, arthroscopic treatment was associated with a better DASH score, better VAS scores and patient satisfaction.

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