

Functional Outcome of Minimal Incision Surgery for Tennis Elbow

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ABSTRACT

INTRODUCTION: Lateral epicondylitis (Tennis elbow) is one of the most common lesions of the arm. Various surgical techniques have been described for the treatment of resistant lateral epicondylitis with variable clinical benefits. The purpose of this study was to analyze the clinical outcomes of surgical treatment for tennis elbow by minimal incision technique.

METHOD: A retrospective study was carried out in the department of Orthopaedics and Trauma surgery at Bir Hospital from September 2014 to August 2017. Study was undertaken in 21 patients to analyze the outcomes by open surgery under local anesthesia.

RESULT: Most of the patients in this study were female who were involved in repetitive hand work. The post-operative outcome was good to excellent in most patients.

CONCLUSION: This procedure is associated with a high rate of patient satisfaction in a resistant tennis elbow.

KEY WORDS: Epicondylitis, Local Anesthesia, Surgical Technique, Tennis Elbow.

INTRODUCTION

Lateral epicondylitis (tennis elbow) was first described in 1873 by Runge.¹ Patient shows pain at the lateral aspect of elbow, decreased grip strength, tenderness at the lateral epicondyle.² It occurs most commonly between the ages 40 and 60 and usually affects the dominant arm. Its prevalence is said to be from 1% to 3% and seems more common in women.³ In 75% of cases, the dominant side is affected, suggesting that work-related forceful and repetitive wrist extension may have a role in the pathogenesis.⁴ Despite many proposed theories, the pathogenesis of this condition is still unclear. More than 90% of patients improve with non-operative management.⁵ Surgical treatment is necessary in 4%-11% of patients when symptoms

persist.^{6,7} Non-operative treatment necessitates a long abstinence from work and subsequent immobilization in an uncomfortable bracing and arm sling pouch. Repetitive use of local injection of steroid has physical and psychological impact on patients. Surgical treatment results in early mobilization and early return to work which has psychological, social, and economic advantages over non-operative treatment. The most commonly used procedure was initially described by Nirschl and Pettrone in 1979, which involves excision of diseased tissue at the origin of the extensor carpi radialis brevis (ECRB).⁷ However, 13 other techniques with approximately 300 modifications have been described in the literature.^{8,9,10} In recent years, several studies were reported about the outcomes of surgical release of ECRB for the treatment of lateral epicondylitis by minimal incision technique. This study was undertaken to analyze the clinical results with this procedure.

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METHOD

In this retrospective study, 21 patients who attended outpatient department of Bir Hospital with resistant lateral epicondylitis were assigned to the study from September 2014 to August 2017. The diagnosis of tennis elbow was made clinically. Local tenderness over the lateral epicondyle, pain in the extensor muscles induced by gripping or resisted extension movements of the wrist were clinically assessed for the diagnosis.¹¹ Resistant tennis elbow was considered when symptoms not disappeared with the conservative methods for at least six months.¹² Informed consent was obtained from all the patients. The inclusion criteria were all the patients not responded to nonsurgical treatment modalities including use of nonsteroidal anti-inflammatory drugs (NSAIDs), physical therapy, support with elbow brace and corticosteroid injections. The mean local steroid injection given to the patients was 1.3 (range from 1 to 3 injections). Patients were excluded if they had local infections, generalized polyarthritis, ipsilateral shoulder dysfunction, radial tunnel syndrome, carpal tunnel syndrome, and had a corticosteroid injection within the previous six weeks.

Surgical Technique

All operations were performed by the single surgeon under local anesthesia without using pneumatic tourniquet. Patient was kept in supine position with arm on an arm board. Under all aseptic precautions draping was done. Injection 1% xylocaine was infiltrated as a local anesthetic agent along the proposed skin incision. Approximately 3 cm long skin incision was given centering the lateral epicondyle. The deep fascia was identified, incised and retracted. During dissection, a local anesthetic agent was infiltrated whenever patient experienced pain. ECRB tendon was reached from extensor carpi radialis longus (ECRL) and extensor digitorum communis (EDC) interval and then the origin of the ECRB was identified. To confirm ECRB tendon, patient was asked to extend middle finger to observe ECRB tendon movement. The tendon was debrided and decorticated from the epicondyle at the origin of extensor musculature with bone nibbler. Hemostasis was achieved by the use of bipolar cautery throughout the procedure. Wound was irrigated with normal saline and closed in layers. Dressing and a compression bandage was applied.

Rehabilitation

The patients were discharged on the same day of the operation. Arm sling pouch was applied and patient was encouraged for early active range of motion of forearm and eventual return to full activity as tolerated.

Assessment and statistical analysis

Patient information was recorded in the questionnaire that included age, sex, dominant hand, involved hand and occupation (engaged in repetitive hand work, and engaged in non repetitive hand work). After the suture removal, patients were followed up at 1 month, 3 month and every 6 months at least for 1 year for evaluation of the clinical results in terms of pain, activity level, and patient satisfaction. At the final follow-up, the patients were classified according to Grundberg and Dobson.¹³

Table 1: Grundberg and Dobson rating

Rating	Pain	Activity and patient satisfaction
Excellent	No pain	Returned to work or activity; Patient satisfied
Good	Pain only with heavy use	Returned to work or activity; Patient satisfied
Poor	Pain unchanged	Patient dissatisfied

RESULT

This study included 21 patients (Table 2) who had undergone surgical release of ECRB by minimal incision technique. All patients had previous conservative treatment with no success to relieve their symptoms. The mean intraoperative bleeding was 30cc and mean surgical time was 40 minutes. The minimum follow-up was 14 months (range 14-22 months). There were no postoperative wound complications. All patients returned to work within an average time period of 4 weeks (ranged from 2-6 weeks). The patients were evaluated for pain, activity, and patient satisfaction during the last examination shown in Table 3. All patients were satisfied with the incision scar.

Table 2: Distribution of age, gender, dominant hand, involved hand and occupation

Age	40 (Mean)	35-62 (Range)
Sex	8 (Male)	13 (Female)
Occupation	14 (Repetitive hand work)	7 (Non repetitive hand work)
Dominant hand	21 (Right)	0 (Left)
Involved hand	16 (Right)	5 (Left)

Table 3: Grundberg and Dobson rating result

Rating	Pain	Activity and patient satisfaction	Number of patient
Excellent	No pain	Returned to work or activity Patient satisfied	18
Good	Pain only with heavy use	Returned to work or activity Patient satisfied	3
Poor	Pain unchanged	Patient dissatisfied	0

DISCUSSION

Tennis elbow involves an overuse type injury of the extensor tendons, especially in the ECRB. Histological studies of surgical specimens have confirmed that the pathology consists of vascular infiltration and degeneration of the common tendon origin.^{14,15} The patients should be examined carefully to exclude other pathologies like entrapment of the anterior branch of radial nerve and lateral ligament complex injury. Initially patients are treated with nonoperative measures including activities modification, analgesics, physical therapy and local corticosteroids with variable clinical benefit.¹⁶ When conservative treatment is unsuccessful, surgery is recommended. Surgical treatment options include excision of the damaged portion of ECRB from the epicondyle, divisions of the branches of the radial nerve,^{7,17} excision of lateral epicondylar ridge, z-lengthening of the tendon, arthroscopy and open and percutaneous tenotomy. Open ECRB release, percutaneous extensor tenotomy and arthroscopic ECRB release are currently the most preferred procedures with a success rate of 80-97%.^{18,19} Release of the common extensor origin is a highly satisfactory procedure for the treatment of lateral epicondylitis unresponsive to conservative treatment: the reported rates of good results have ranged from 54% to 99%.²⁰

In this study, ECRB was released from its lateral epicondyle under local anesthesia. The results of this study showed excellent in 18 (85.71%) patients whereas good in 3 (14.29%) patients in total of 21 patients. All the patients were satisfied with the treatment and returned to the work after procedure. However, 3 out of 21 had pain while doing heavy forearm activities which constitute 14.2%. There was free of pain in

95.8% elbows after a similar surgery performed in general anesthesia.²¹ While in another study conducted in 125 elbows to observe any differences in the outcome of release of the common extensor origin and release of the common extensor origin and drilling of the lateral epicondyle for recalcitrant tennis elbow, reported 75% of the patients had excellent or good results and 73% of them were satisfied with the results of surgery in both procedures.²² The study performed by adopting the technique proposed by Nirschl, 97% of patients reported improvement in symptoms and 85% of patients fully returned to work without pain.^{17,23} Likewise, in the comparative study, report showed that 81% of the case in the open group had excellent or good result as compared to 90% of excellent or good results in the percutaneous group in early follow up with the similar functional outcome at the end of the study.²⁴ In other study good and excellent result were claimed in 96.66% elbows, by releasing the extensor origin using percutaneous method whereas in the similar study the results were excellent in 86.95% and good in 26.08% patients.^{13,25}

CONCLUSION

Surgical treatment by minimal incision technique is a good treatment option after failed conservative management of tennis elbow with high patient satisfaction and no postoperative complications.

REFERENCES

1. Runge F. Zurgene und behandlung des schreibekampfes. Berl.Klin.Runge F. Zurgene und behandlung des schreibekampfes. Berl Klin Wochenschr 1873;10:245-248.
2. Dorf ER, Chhabra AB, Golish SR, et al. Effect of elbow position on grip strength in the evaluation of lateral epicondylitis. J Hand Surge 2007;32:882-886.
3. Thurston AJ. Conservative and surgical treatment of tennis elbow: A study of outcome. Aust NZ J Surg 1998;68:568-572.
4. Major HP. Lawn-tennis elbow. Br Med J 1883;2:557.
5. Coonrad RW, Hooper WR. Tennis elbow : Its course, natural history, conservative and surgical management. J Bone Joint Surg 1973;55-A:1177-1182.
6. Boyd HB, Mcleod AC. Tennis Elbow. J Bone Joint Surg Am 1973;55(6):1183-1187.
7. Nirschl RP, Pettrone FA. Tennis elbow. The surgical treatment of lateral epicondylitis. J Bone Joint Surg Am 1979;(61):832-829.

8. Calfee RP, Patel A, DaSilva MF, et al. Management of lateral epicondylitis: current concepts. *J Am Acad Orthop Surg* 2008;16(1):19-29.
9. Karkhanis S, Frost A, Maffulli N. Operative management of tennis elbow: A quantitative review. *Br Med Bull* 2008;88(1):171-188.
10. Van Hofwegen C, Baker CL, III, Baker CL, Jr. Epicondylitis in the athlete's elbow. *Clin Sports Med* 2010;29(4):577-597.
11. Gruchow HW, Pelletier D. An epidemiologic study of tennis elbow : Incidence, recurrence and effectiveness of prevention strategies. *Am J Sports Med* 1979;7:234-238.
12. Kaleli T, Ozturk C, Temiz A, Tirelioglu O. Surgical treatment of tennis elbow: Percutaneous release of the common extensor origin. *Acta Orthop Belg* 2004;70:131-133.
13. Grundberg AB, Dobson JF. Percutaneous release of the common extensor origin for tennis elbow. *Clin Orthop Relat Res* 2000;376:137-140.
14. Regan W, Wold LE, Coonrad R. Microscopic histopathology of chronic refractory lateral epicondylitis. *Am J Sports Med* 1992;20:746-749.
15. Crowther MAA, Bannister GC, Huma H, Rooker GD. A prospective, randomised study to compare extracorporeal shock-wave therapy and injection of steroid for the treatment of tennis elbow. *J Bone Joint Surg* 2002;84-B:678-679.
16. Price R, Sinclair H, Heinrich I, Gibson T. Local injection treatment of tennis elbow: hydrocortisone, triamcinolone and lignocaine compared. *Br J Rheumatol* 1991;30:39-44.
17. Hohmann LGH. Das Wesen und die Behandlung des sogenannten Tennisellenbogens. *Münch Med Wochenschr* 1933;80:250-252.
18. Lo MY, Safran MR. Surgical treatment of lateral epicondylitis: A systematic review. *Clin Orthop Relat Res* 2007;463:98-106.
19. Szabo SJ, Savoie FH, 3rd, Field LD, Ramsey JR, Hosemann CD. Tendinosis of the extensor carpi radialis brevis: An evaluation of three methods of operative treatment. *J Shoulder Elbow Surg* 2006;15(6):721-727.
20. Nollen A. Ergebnisse der operativen Behandlung der Epikondylitis lateralis humeri. *Orthopäde* 1981;10:328-329.
21. Amroodi MN, Mahmuudi A, Salariyeh M, Amiri A. Surgical Treatment of Tennis Elbow; Minimal Incision Technique. *Arch Bone Jt Surg* 2016;4(4):366-370.
22. Das D, Maffulli N. Surgical management of tennis elbow. *J Sports Med Phys Fitness* 2002;42:190-197.
23. Nirschl RP. Muscle and tendon trauma: Tennis elbow. In: Morrey BF, editor. *The elbow and its disorders*. Philadelphia: WB Saunders;1985;481-496.
24. Gyawali B, Bhatta T, Dawadi T, Shrestha S, RC D, Pradhan N. Functional Outcome of Open Surgical Release Versus Percutaneous Release of Tennis Elbow. *Med J Shred Birendra Hops* 2016;14(1):16-19.
25. Sahu RL, Guptha P. Percutaneous tennis elbow release under local anesthesia: A prospective study. *J Med Sci Tech* 2013;2(1):4-7.