Surgical Management for Resistant Lateral Epicondylitis

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Abstract:

Objective: To study the role of Modified Nirschl Procedure in treatment of resistant lateral epicondylitis**.**

Background: 5-10 % of cases of lateral epicodylitis are resistant to conservative treatment and need surgical intervention. The purpose of this study was to evaluate the clinical outcomes of Modified Nirschl techniques for treatment of tennis elbow.

Methods: A Prospective case series study was designed between February 2019 and January 2020 included 20 patients from outpatient clinic of Benha university hospital suffering from resistant lateral epicondylitis. Detailed medical history, clinical examination and PRTEE score applied to all patients pre and post-operatively.

Results: There were 8 female and 12 male patients in the study. The mean duration of symptoms before surgery was 14.3 months. The average duration of follow up was 28 months. We found that the Modified Nirschl Procedure has encouraging results in management of lateral epicondylitis in (95%) of cases with a mean of 4 weeks period to return to normal activities and 15.3 weeks to resume heavy activities without pain. The total PRTEE score improved from a mean of 67 points to a mean of 6 points postoperatively.

Conclusion: The Modified Nirschl Procedure shares nearly equal results with other procedures, although the patients return to their activities later than the other methods. Also this method has an advantage of good visualization of the whole degenerated tissues ensuring perfect debridement. Therefore, we suggest this option after failed conservative management of lateral epicondylitis.

Keywords: Lateral epicondylitis, modified Nirschl surgery, tennis elbow

Introduction:

Pain from the lateral aspect of the elbow was first described in 1873, and has since then been given different names such as tennis elbow, lateral epicondylitis, epicondylosis (1). The main complaints in lateral epicondylitis are pain and decreased grip strength causing significant disability in daily activities (3). It affects 1–3% of population in the age group of 40–60 years (4).

The primary causes of epicondylitis are the contractile overloads that chronically stress the tendon near its attachment on the lateral epicondyle of humerus in repetitive upper extremity activities such as heavy lifting, computer use, forceful forearm supination and pronation, and repetitive vibration (5). In 75% of cases, the dominant side is affected (6). The aetiology of TE is not known, but it is considered to be an overuse injury (7). This tissue response has been interpreted as inflammation and so called lateral epicondylitis. However, there are no signs of a prostaglandin mediated inflammation (8).

The overuse causes cumulative micro trauma that weakens the structural, vascular elements of the tendon and fatigue of the tenocytes till the ability to repair is overwhelmed (9). In the chronic stage there is a so called neurogenic inflammation with vasodilatation (10). Nirschl (1992) have described the microscopic appearance as a degenerative process with dense populations of fibroblasts, vascular hyperplasia (angiofibroblastic hyperplasia) and disorganised collagen without signs of inflammation (angiofibroblastic tendinosis) (11).

Macroscopic appearance of the ECRB-tendon is dull, grey, friable and oedematous (12). Therefore, the name epicondylitis does not seem correct so it is called angiofibroblastic tendinosis (13). Tendinosis have shown sensory and sympathetic nerves in the deep side of the tendon (14). Immunoreactivity for the neurotransmitters as substance P, glutamate and calcitonin gene-related peptide (CGRP), has been also demonstrated in (ERCB) (15). Other tendinopathies (Achilles and patellar tendon) have shown a local catecholamine production inside non-neural cells ,and so playing a role in the regulation of blood flow, local changes in the tissue and pain (16). Acetylcholine has been found to be produced by non-neural cells in tendons of patients suffering from patellar and Achilles tendinopathies (17). It is not known if such a local catecholamine and/or acetylcholine production is present in TE (18).

Conservative treatments include NSAIDs, steroid injection, functional brace and manipulative treatment (19). Most patients respond to non-operative treatment (20); however, surgical treatment is necessary in 4%–11% of patients (20). Various operative

techniques have been described including open CEO release, percutaneous release and arthroscopic release. The main role of all procedures is debridement of the pathological ECRB tendon tissue, and decortication of the lateral epicondyle (21). The best surgical treatment is not known. The limitations of open ECRB release include late return to work and sporting , a risk of posterolateral instability of the elbow due to lateral ligament complex injuries, and the formation of neuroma after surgery (22). Percutaneous extensor tenotomy can include the risk of recurrence. With regard to arthroscopic ECRB release, it is difficult to suture the ruptured ECRB to avoid the risk of damage to the lateral collateral ligament (23).

Aim of the work: To study the role of Modified Nirschl Procedure in treatment of resistant lateral epicondylitis.

Patients and methods:

After approval of the Local Institutional Ethical Committee of Benha University Hospital and after taking a written consent from the patients, this prospective case series study was performed by selecting 20 patients from the outpatient clinic of Benha university hospital in the period between February 2019 and January 2020. The inclusion criteria were skeletally mature patients with resistant lateral epicondylitis unresponsive for all the available nonsurgical measures for at least 3 months. Exclusion criteria were, systemic disorders as (coagulation disorders, DM and rheumatoid arthritis), local defect as previous surgery, infection, previous fracture or local malignancy. Also, in skeletally immature patients, arthritis and neurological abnormalities, all candidates were subjected to detailed medical history taking, clinical examination and patient-related tennis elbow evaluation PRTEE score. Post-operatively, the patients were re-assed post-operatively by using the (PRTEE) scores and the last ones were used for analysis and we resumed follow up. Two types of statistics were done 1- Descriptive statistics in which quantitative data were expressed in mean, standard deviation of the mean ($x \pm SD$), and standard error (SE), 2- Qualitative data which were expressed in number (frequency), and percent (%).

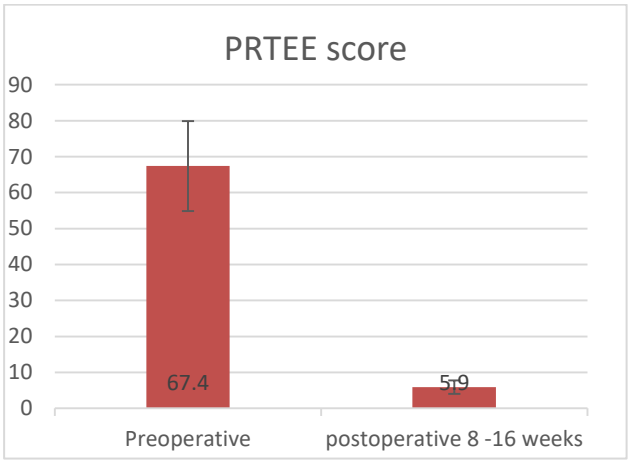
Finally, data were analyzed using SPSS 18 (Statistical Package for Social Science) to tabulate and statistically analyze collected data. V.16. Qualitative data presented as numbers. p (probability) value of >0.05 means insignificant differences. p – value < 0.05 considered statistically significant. p – value < 0.01 considered highly significant.

Results:

Twenty patients (14 males and 6 females) were included in this study. The mean age at the time of surgery was 37.3 years (ranged from 20 to 60 years). The average duration of preoperative symptoms was 14.3 months. All patients returned to usual activities within an average time period of 15.3 weeks (ranged from 12-20 weeks) table (1). All patients had previous conservative treatment with no success to relieve their symptoms. The mean duration of post-operative follow up was 28 weeks (16 to 40 weeks). All patients reported improvement of symptoms post-operatively in different degrees. The mean PRTEE score of pain improved from a pre-operative mean of 67 to 6 at 16 weeks post-operative as in Table(1),Figure(1).

Table (1): Pre and post-operative PRTEE score among studied patients .

	PRTEE score	Test of significant	P Value
Preoperative			
Mean	67.40	Paired t test	
±SD	±12.51		≤0.001
Range	45-89		HS
Median	67	23.20	
Postoperative 16 weeks	5.90		
Mean	±1.83		
±SD	3-9		
Range	6		
Median			



Figure(1)pre and post-operative PRTEE score among studied patients.

We have obtained PTREE scores during the final visit that these scores are independent from the following parameters: age, gender duration of symptoms. No major complications occurred after surgery. At the final visit, no patient required further surgery or injection after surgery.

Discussion:

Lateral epicondylitis was first described by Runge in 1873 as a constellation of pain with tenderness at the lateral epicondyle, with resisted wrist dorsiflexion, and with passive wrist flexion. Lateral epicondylitis are often treated in greater than 90% of patients with conservative measures such as rest, medication, immobilization, physical therapy, and local steroid injection. The rate of surgery for resistant cases varying from 0 to 22%. (24). Lateral epicondylitis has many surgical options for treatment including: open ECRB

release, percutaneous extensor tenotomy and arthroscopic ECRB. These procedures do not differ in the concept that the main site of pathological changes is the ECRB origin. These changes include macroscopic or microscopic tears, scar tissue, vascular granulation and fibroblastic invasion on light microscopy, so the role of surgery is debridement of the degenerated tissues leading to high degree of improvement and minimal rate of recurrence of symptoms, so this is the main factor of preference between different surgical techniques which are nearly equal in short term functional results (25). We depend in our study on the Modified Nirschl procedure. This technique involves release of the extensor aponeurosis, debridement of the ECRB tendon, drilling the lateral epicondyle and finally repair of the ECRL to the extensor aponeurosis (24).

Our study describes a typical group of patients with a mean age at the time of surgery of 37.3years (ranged from 20 to 60 years). A total of 20 patients (14 men and 6 women) were included with long-standing symptoms not responding to non-operative modalities of treatment with 14.3 months average duration of preoperative symptoms. The mean follow up period was 28 weeks (16-40 weeks) postoperatively. The results of this study are encouraging. Ninety five % of patients achieved an elbow that was completely free of pain at final follow-up. Nearly all patients returned to usual activities within an average time 5 weeks and return to full activities and work at period of 15.3 weeks (ranged from 12-20 weeks). The mean PRTEE score PRTEE improved from 67.4 pre-operatively to 5.9 points post-operatively. No major complications happened to any one of selected patients except two patients have wound infection and treated with alteration of the antibiotic (26). At the final visit, no patient required further surgery or injection. So this technique provides an effective simple procedure, with a small incision, minimal complications and lower rate of recurrence of symptoms than that of the percutaneous procedure because of improper debridement of ECRB in percutaneous release which needs good experience to be done perfectly as it is obvious in the results of a study done on a revision surgery evaluating 34 patients (35 elbows) who previously had percutaneous surgery for lateral epicondylitis without relief. In seven patients, the pathologic ECRB tissue was incompletely excised, and in 27 patients, the ECRB was not addressed at all (27). Our results are nearly equal to these of studies done using Modified Nirschl Procedure as the study done by Hohmann in 1933 with the same technique recording 97% improvement in symptoms with 85% of patients fully returned to work without pain (28). The disadvantage of the Modified Nirschl Technique is that the time needed to return to work is longer than that in other procedures.

This is obvious in a study done by Leppilahti et al. who compared the percutaneous technique with the open technique in 2004 in a group of 22 patients who underwent the open technique and 23 patients who were treated with percutaneous technique. Patients returned to work after 2 weeks in the percutaneous group versus 15 weeks in the open surgery group (29). The disadvantage of the percutaneous release is that it does not allow good visualization of the whole degenerated tissues leading to ECRB incomplete debridement so giving high rate of recurrence of symptoms.

Arthroscopic release for lateral epicondylitis has the advantage of complete intra-articular visualization, less invasive technique, early return to normal activities. A study done by Peart et al. on 54 patients underwent open release of the ECRB tendon and 33 patients operated arthroscopically. There was no significant difference in the functional results between the two groups. However, the patients in the arthroscopic group were able to return to work earlier. (30) The limitations of the Modified Nirschl procedure include late return to work and sporting activities, a risk of posterolateral instability of the elbow and risk formation of neuroma after surgery. Overall, it is believed that this procedure provides an effective treatment option. Its results are in the range of other procedures and the selection of the procedure by the surgeon returns to his experience and the available instruments until the three major procedures have nearly equal results. In addition, it is a relatively simple procedure, with low morbidity, were managed successfully with minimal incision technique under general anesthesia and giving good results for patients with lateral epicondylitis, which were resistant to long-term conservative treatments.

Conclusion:

The results obtained in our study supports that Modified Nirschl Procedure is an excellent surgical option between surgical procedures known for treatment of resistant lateral epicondylitis and has nearly equal results and longstanding improvement without regression of symptoms. Further studies are required to establish this finding.

References

1.Shiri, R; Viikari–juntura, E; and Varonen Hand Heliovaara (2006). prevalance and determinants of lateral and medialepicondylitis population study A.M J Epidemiology:146(11) :1065-1076.

2.Allander, E; (1974). Pre valence, incidence, and remission rates of some common rheumatic diseases or syndromes. Scand J Rheumatol;3(3):145–53.

3.Dorf, ER; Chhabra, AB; Golish, SR; and McGinty, JL; (2007). Effect of elbow position on grip strength in the evaluation of lateral epicondylitis. J Hand Surg Am.;32(6):882–6.

4.Gruchow, HW; and Pelletier, D; (1979).An epidemiologic study of tennis elbow Incidence, recurrence, and effectiveness of prevention strategies. Am J Sports Med.;7(4):234–8.

5.Kraushaar, BS; and Nirschl, RP; (1999).Tendinosis of the elbow (tennis elbow)Clinical features and findings of histological, immunohistochemical, and electron microscopy studies. J Bone Joint Surg Am.;81(2):259–78.

6.Nirschl, RP; and Ashman, ES*; (2004)."*Major HP. Lawn-tennis elbow. Br Med J. 1883;2(2):557 *Tennis elbow tendinosis (epicondylitis)Instr Course Lect. 53: 587–98.*.

7.Jozsa, L; Lehto, M; Kvist, M; Alint, JB; and Reffy, A; (1989). A Alteration in dry mass content of collagen fibers in degeneration tendinopathy and tendon rupture matrix (2)140:146

8.Nirsch, lR; (1990).Patterns of failed healing in tendon injury Sports-induced inflammation clin basic sci con;577-585

9.Jozsa, L; Lehto, M; Kvist, M; Balint, JB; and Reffy, A; (1989). A Alteration in dry mass content of collagen fibers in degeneration tendinopathy and tendon rupture matrix (2)169:172.

10.Nirschl, RP; *(October 1992). "Elbow tendinosis/tennis elbow". Clin Sports Med(4): 851–70.*

11.Regan, W; Coonrad, R; and Morrey BF; (1992) Microscopic histopathology of chronic refractory lateral epicondylitis, American Journal of Sports Medicine, 20: 746-749.

12.Nirschl, RP; (1992). Elbow tendinosis/tennis elbow.Clin Sports Med.;11(4):851–70.

13.Weinberg, BW; ,Cook, JL; Gisslen, K; and Alfredson, H; (2005).Lateral epicondylitis pathology page .123-129

14.Danielson, P; Alfredson, H; and Forsgren, S; (2006). Immunohistochemical and histochemical findings favoring the occurrence of autocrine/paracrine as well as nerve-related cholinergic effects in chronic painful patellar tendon tendinosis. Microsc Res Tech.;69:808–819. doi: 10.1002/jemt.20351.

15.Alfredson, H; and Ohberg, L; (2005). Neovascularisation in chronic painful patellar tendinosis—promising results after sclerosingneovessels outside the tendon challenge the need for surgery. Knee Sports TraumatolArthrosc.;13:74–80

16.Bjur, D ; Danielson, P; Alfredson, H; and Forsgren, S; (2008) .Presence of a non-neuronal cholinergic system and occurrence of up- and down-regulation in expression of M2 muscarinic acetylcholine receptors: new aspects of importance regarding Achilles tendon tendinosis (tendinopathy). Cell Tissue Res 331:385–400.

17.Danielson, P; Andersson, G; Alfredson, H; and Forsgren, S; (2007). Extensive expression of markers for acetylcholine synthesis and of M2 receptors in tenocytes in therapy-resistant chronic painful patellar tendon tendinosis—a pilot study. Life Sci.;80:2235–2238. doi: 10.1016/j.lfs.2007.01.005.

18.Jozsa, L; Lehto, M; Kvist, M; and Balint, JB; (1989).A Alteration in dry mass content of collagen fibers in degeneration tendinopathy and tendon rupture matrix (2)151:153.

19.Labelle, H; Guibert, R; Joncas, J; Newman, N; and Fallaha, M; (1992). Lack of scientific evidence for the treatment of lateral epicondylitis of the elbow. An

attempted meta-analysis. J Bone Joint Surg Br.;74(5):646–51.

20.Coonrad, RW; and Hooper, WR; (1973). Tennis elbow: its course, natural history, conservative and surgical management. J Bone Joint Surg Am.;55(6):1177–82.

21.Nirschl, R; (1989). Patterns of failed healing in tendon injury. In: Leadbetter W., Buckwalter, J, Gordon S (eds) Sports-induced Inflammation, American Academy of Orthopaedic Surgeons, Illinois, pp 577-585.

22.Inhyeo, R; Chaei,C; Gu, SB; and Wo, KB; (2005). Arthroscopic treatment of the refractory lateral epicondylitis and associated synovitis. J Shoulder Elbow Soc.;5(2):86–7.

23.Kim, SJ; Park, BM; and Oh, KS; (2007). Arthroscopic treatment of lateral epicondylitis. J Korean Orthop Sports Med.;6(2):105–9.

24.Marvin, Y ; Safran, MR; and Marc, K; . Surgical Treatment of Lateral Epicondylitis: A Systematic Review p 85-89.

25.Cochrane Rachelle Buchbinder and Renea, V; Johnston, RV; (November 2019). Reviews matching surgeries for tennis elbow Surgery for lateral elbow pain Issue 11 of 12, page201:205.

26.Stuart, H; Baumgard, MD; Donald, R; and Schwartz, MD; (1982). First Published July 1, .Percutaneous release of the epicondylar muscles for humeral epicondylitis .

27. Dunkow, PD; Jatti, M; and Muddu, BN; (2004). A comparison of open and percutaneous techniques in the surgical treatment of tennis elbow. *J Bone Joint Surg Br*.;86:701-704.

28. Hohmann, G; and Das, Wesen; (1933) .und behandlung des sogenannten tennis ellenbogens Munch Med Wschr; 80: 250-4.

29. Leppilahti, J; Raatikainen, T; Pienimäki, T; Hänninen, A; and Jalovaara, P; (2001) . Surgical treatment of resistant tennis elbow. A prospective, randomized study comparing decompression of the posterior interosseous nerve and lengthening of the tendon of the extensor carpi radialis brevis muscle. Arch Orthop Trauma Surg.;121(6):329–32.

30. Peart, RE; Strickler, SS; and Schweitzer, KM Jr; (2004).Lateral epicondylitis:a comparative study of open and arthroscopic lateral release. Am J Orthop (Belle Mead NJ);33(11):565–7.

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