RADIAL TUNNEL RELEASE AND TENNIS ELBOW : DISAPPOINTING RESULTS ?

L. DE SMET, T. VAN RAEBROECKX, H. VAN RANSBEECK

In a retrospective study, 19 patients with 20 decompressions of the posterior interosseous nerve for radial tunnel syndrome were reviewed. The results were evaluated using Roles and Maudsley's criteria ; they were found to be consistent with those previously reported : i.e. 75% favorable outcomes. Despite this finding only 8 patients (40%) stated they were satisfied. The main reason was residual pain. Shorter delay between the onset of symptoms and surgical treatment as well as simultaneous release of the lateral epicondylar muscles was found to influence positively patient satisfaction. These findings suggest that the scoring system used in the present study and also in previous studies is inappropriate. They also cast some doubt on the role of compression of the posterior interosseous nerve in the pathogenesis of chronic lateral elbow pain.

Keywords : elbow ; radial tunnel ; tennis elbow ; neurocompression.
Mots-clés : coude ; épicondylalgie ; tunnel radial ; compression neurologique.

INTRODUCTION

Lateral elbow pain is a common condition. Numerous causes have been suggested for this condition, also known as lateral epicondylitis or tennis elbow. It is considered an occupational disease (overuse, repetitive strain, microtrauma, etc.) affecting the attachments of the wrist and finger extensors at the lateral side of the elbow.

Compression (entrapment) of the deep (motor) branch of the radial nerve, i.e. the posterior interosseous nerve (p.i.n.) in the radial tunnel has also been suggested as a possible cause for lateral elbow pain. Despite the favorable results published by numerous authors following release of the nerve (2-13), much controversy exists about the reality of this syndrome. Unpredictable results have been recently reported by Atroshi *et al.* (1). We retrospectively evaluated 22 surgically treated elbows in 21 patients with the diagnosis of radial tunnel entrapment.

PATIENTS AND METHODS

Twenty-one patients with 22 involved elbows with a diagnosis of compression of the posterior interosseous nerve were operated. There were 10 men and 11 women, the average age was 40.4 years (range 19 to 53 years). The right side was involved in 12, the left in 8, and there was one bilateral case. Four patients were not working or had an occupation with light manual work, 5 had a moderate and 12, a heavy manual occupation. The average duration of symptoms was 10.6 months (range 1 month up to more than 3 years). Pain localized in the elbow, forearm or wrist (table I) was present in all patients, and 8 had nocturnal pain. Weakness was noted in 16 patients ; 7 complained of disturbed sensibility. An electrophysiological examination was performed in 9 patients ; it showed decreased nerve conduction in 7 of them ; the other 2 had normal conduction velocities of the radial nerve.

The diagnosis was suggested in patients with persistant lateral elbow pain resistant to conservative treatment, and with tenderness over the radial tunnel and relief of symptoms by infiltration with cortisone/lidocaine in the radial tunnel. Radiographs were done in all cases ; none demonstrated abnormalities.

Conservative therapy (rest, infiltration, brace) was prescribed in 17 patients. Release of the extensor tendons had been previously performed without success in 5 patients. Cast immobilization was applied 5 times. A combined extensor tendon release and p.i.n. decom-

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pression was performed in 14 elbows ; in 4, isolated p.i.n. decompression was done ; one patient had a revision of a previous lateral epicondylar tendon release combined with a p.i.n. decompression.

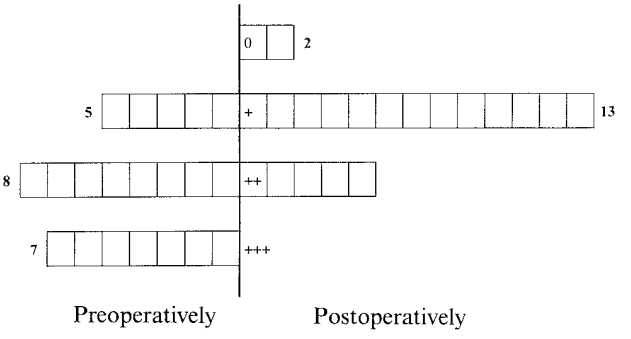
All operations were done by the senior author (LDS) on an outpatient basis under Beer's block and with 4.5 × magnification. The radial tunnel was approached anterolaterally, starting distal to the elbow crease and extending longitudinally along the medial border of the brachioradialis muscle. All potentially compressing structures overlying the posterior interosseous nerve were transsected ; in particular the fibrous edge of the supinator muscle which seemed to compress the nerve in all cases was sectioned. Only the skin was closed. A compressive dressing was applied and immediate mobilization was started.

Nineteen patients with 20 operated elbows were reviewed by an independent observer (TVR). The records of all patients were reviewed, and the patients were assessed by questionnaire and pain visual analogue scale (VAS). The criteria of Roles and Maudsley (11) were used for overall evaluation : excellent — no pain, full movement, full activity ; good : occasional discomfort, full movement and activity ; poor : unchanged discomfort after prolonged activity ; pain-limiting activities.

RESULTS

A decrease in symptoms was observed in 11 elbows, all symptoms disappeared in 4 ; 4 were unchanged and one patient was worse (tables I, II). This corresponds to 75% good and excellent results. The postoperative symptoms are described in table I. Elbow and forearm pain decreased from a VAS of 6.7 preoperatively to a VAS of 3.6 postoperatively ($p < 0.001$ paired test) (fig. 1). Patient satisfaction with the result, evaluated on a VAS, was high (≥ 8) for 8 elbows, but insufficient

Table II. — Pain in elbow or forearm



(< 8) for 11 elbows (one not evaluated). The mean VAS was 5.16 (range 0 - 10). Comparing the satisfied versus the dissatisfied patients for different parameters, we found the duration of preoperative complaints was shorter in the satisfied group (t-test, $p = 0.02$) (fig. 2). Simultaneous release of the epicondylar insertion of the wrist extensors gave a significantly better outcome (Chi-square, $p = 0.04$). Otherwise no significant differences could be found. There is an inverse significant correlation between the duration of symptoms and patient satisfaction ($p = 0.02$) ($r = -0.52$) (Spearman Rank) (fig. 2). The residual pain determines the satisfaction ($p = 0.004$) ($r = -0.62$) (Spearman Rank) (fig. 3).

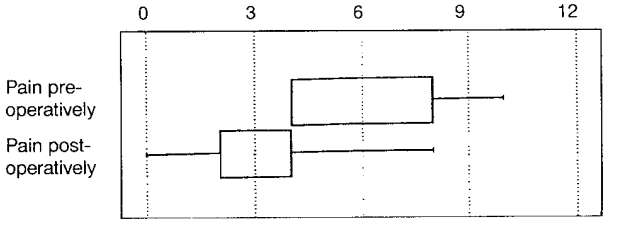


Fig. 1. — Box plot of the pre- and postoperative pain.

Table I. — Preoperative symptoms and residual symptoms at follow-up

Preoperative				At follow-up			
	Pain		Weakness		Pain		Weakness
	Night	Elbow			Night	Elbow	
None	4 (3)	1	2 (1)	None	15	5	3
Slight	10 (9)	7	4 (3)	Slight	3	12	10
Moderate	5	8 (6)	9	Moderate	2	3	6
Severe	3	6	7	Severe	/	/	1

( ) = reviewed patients

DISCUSSION

Radial tunnel syndrome is a neurocompression syndrome of the radial nerve by the free edge of the supinator muscle or closely situated structures. It has been considered one of the possible causes of tennis elbow. In addition to lateral elbow pain, 3 signs are usually present : tenderness over the radial nerve, about 5 cm distal to the elbow crease, and pain induced by resisted supination and by resisted extension of the third finger.

Surgical decompression is the preferred treatment when conservative measures fail. Good and excellent results with these treatments have ranged from 10 to 90% (table III). Most authors use the Roles and Maudsley score with a slight modification (11). In our series the 75% favorable outcome brings no new elements, but despite these findings, only 40% of the patients express satisfaction. This indicates that the usual Roles and Maudsley scoring system does not reflect the real outcome.

Patient satisfaction is associated with a shorter duration of complaints before operation. Furthermore, associated lateral epicondylar release seems to be essential for a satisfactory result, although the groups are too small to allow statistical analysis. In the cases where the tennis elbow had already been treated without success and those where we only decompressed the p.i.n. in the radial tunnel, the outcome was not satisfactory. Compared to the other authors, our results are

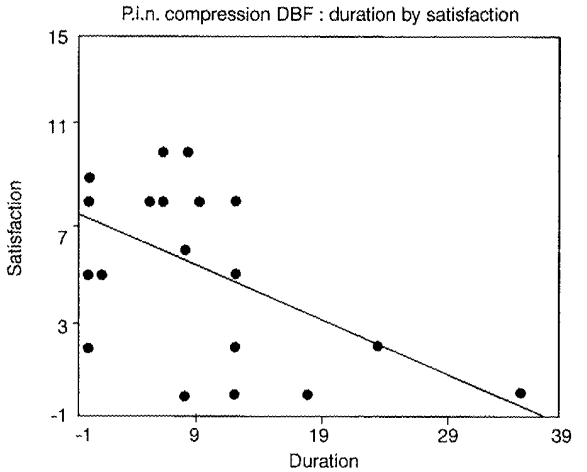


Fig. 2. — Correlation between duration of complaints and patient satisfaction. ($p = 0.018$, $r = -0.52$).

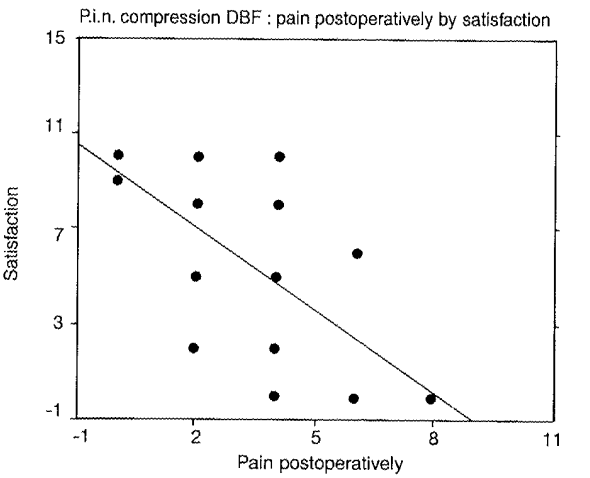


Fig. 3. — Correlation between satisfaction and residual pain ($p = 0.004$, $r = -0.62$).

Table III. — Review of recent literature

Author(s)	Year	N	Good	% Success
Roles and Maudsley	1972	38	35	92
Hagert *et al.*	1977	50	42	85
Lister *et al.*	1979	20	19	95
Werner	1979	90	93	81
Moss and Switser	1983	15	14	93
Heyse-Moore	1984	13	10	77
Ritts *et al.*	1987	39	29	74
Jalovaara and Lindholm	1989	111	57	51
Raimbeau *et al.*	1990	35	25	71
Verhaar and Spaans	1991	10	1	10
Minami *et al.*	1992	30	27	90
Lawrence *et al.*	1995	30	21	70
Atroshi *et al.*	1995	37	15	40
De Smet *et al.*	1998	20	15	75

less favorable. We also included a patient satisfaction score and this element is far more disappointing, but we think this more realistically reflects the impressions of daily practice. This leads us to the conclusion that the so-called radial tunnel syndrome symptomatology is probably secondary to traction tendinitis on the radial epicondyle. The main issue of this paper is probably the fact that compression of the deep branch of the radial nerve plays only a limited role in the pathogenesis of tennis elbow. However the lack of systematic EMG studies before the operation and in the postoperative follow-up of dissatisfied patients, does not allow us to determine the origin of the pain and the reason for its persistence after surgery. This is certainly a weakness in this survey. Confronted with a patient with chronic lateral elbow pain, based on our findings, one can question the value of a systematic search with EMG for radial nerve compression. Prospective studies are required to see if simple release of the lateral epicondylar tendons is sufficient for relief of the radial tunnel syndrome.

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SAMENVATTING

L. DE SMET, T. VAN RAEBROECKX, H. VAN RANSBEECK. Radiale tunnel decompressie en tennis elleboog : ontgoochelende resultaten.

In een retrospectieve studie onderzochten we 19 patiënten met 20 decompressies van de diepe tak van de n.radialis wegens radiale tunnel. De resultaten waren vergelijkbaar met deze uit de literatuur : m.n. 75% gunstige resultaten. Echter slechts 8 patiënten (40%) waren tevreden met als hoofdoorzaak persisterende pijn.
Korter tijdsverloop tussen begin der klachten en behandeling, en gelijktijdige desinsertie van de epicondylaire spieren leidde tot betere resultaten.
Deze bevindingen wijzen er ondermeer op dat het klassieke scoring systeem ontoereikend is. Ook de rol van compressie van de diepe tak van de n. radialis in de pathogenese van chronische laterale elleboogpijn is twijfelachtig.

RÉSUMÉ

L. DE SMET, T. VAN RAEBROECKX, H. VAN RANSBEECK. La neurolyse de la branche motrice du nerf radial dans l'épicondylalgie : résultats décevants.

Les auteurs ont étudié rétrospectivement 19 patients qui ont subi au total 20 neurolyses de la branche profonde du nerf radial au niveau du coude. Les résultats étaient comparables à ceux rapportés dans la littérature : 75 % de bons résultats. Cependant, 8 patients seulement se disaient satisfaits, le plus souvent en raison de la persistance des douleurs. Le degré de satisfaction était influencé positivement par la brièveté du délai entre l'apparition des symptômes et le traitement, et par l'association à la neurolyse d'une désinsertion simultanée des muscles épicondyliens. Ces observations suggèrent que la méthode d'évaluation classique utilisée ici est inadéquate ; elles remettent en question le rôle de la compression de la branche profonde du nerf radial dans la pathogénie des épicondyles.