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Effect of Epicondylectomy in Early Ulnar Neuritis Treated with Steroids[1]

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Leprosy is the most common cause of peripheral neuropathy in the world today. The ulnar nerve is the most common nerve to be affected early in leprosy, resulting in damage leading to physical, economical, and social handicaps to the leprosy patient ([1]). The pathogenesis of this neuropathy is still poorly understood making a rational approach to its management difficult.

The treatment of neuritis has been mainly oriented towards the treatment of pain due to neuritis ([12]). Many studies in the literature report varying degrees of success following conservative and surgical treatment of neuritis ([2, 4, 9, 11, 12, 16]).

The objective of this study is to compare the results of medical treatment with the combination of medical and surgical treatment of early ulnar neuritis in leprosy.

MATERIALS AND METHODS

All patients reporting to the Schieffelin Leprosy Research and Training Center (SLR&TC) or to the field team in the control area during the period February 1980–May 1982, with complaints suggestive of ulnar nerve dysfunction of less than 24 weeks' duration were referred to the study team for assessment. Early ulnar neuritis was defined as recent occurrence of objective sensory or motor impairment with or without associated pain or tenderness in the ulnar nerve.

The patients were allocated according to a predetermined randomized list into two groups: a) medical group, steroids only; and b) surgical group, steroids + medial epicondylectomy with external decompression. If one patient had bilateral ulnar neuritis, the right side was allocated to the group drawn by random selection, while the left side was treated as the other group.

All cases were admitted to the hospital for a minimum period of six weeks. The following were not included in the study: a) lepromatous and borderline lepromatous cases with erythema nodosum leprosum; b) nerve abscess cases; c) cases who refused to be admitted to the hospital; d) patients who were allocated to the surgical group but refused surgery; e) patients who had had steroid therapy within one week prior to reporting to the hospital; f) patients who had had previous surgery on the ulnar nerve; g) patients who had had previous ulnar intrinsic muscle replacement surgery; and h) patients suffering from other conditions where steroid therapy is contraindicated.

Initial assessment

Standard voluntary muscle test (VMT). The standard VMT of the abductor digiti minimi, the first dorsal interrosseous, and the third palmar interrosseous using the Medical Research Council grading, were done. The maximum VMT score for each muscle is 5 and for the whole nerve is 15.

Sensory test. This was done with No. 3 and No. 6 nylon at 15 sites on the ulnar distribution area (The Figure). A piece of nylon 2.5 cm in length is mounted at the tip of a wooden handle. The pressure exerted by the No. 3 nylon (0.38 mm in diameter) and the No. 6 nylon (0.75 mm in diameter) when bent to 45° in contact with the patient's skin is approximately 0.2 g and 5.0 g, respectively. One point was given for each correct response to the No. 3 nylon

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and half a point was given for each correct response to the No. 6 nylon. No. 6 nylon was used only on those sites which showed misreference or no response to No. 3 nylon. The maximum sensory test score was 15.

Pain. The degree of nerve pain was graded as follows:

Grade	Score
Absent	3
Mild (only aware intermittently, sleep not disturbed)	2
Moderate (sleep disturbed)	1
Severe (incapacitating)	0

Tenderness. The degree of nerve tenderness was graded as follows:

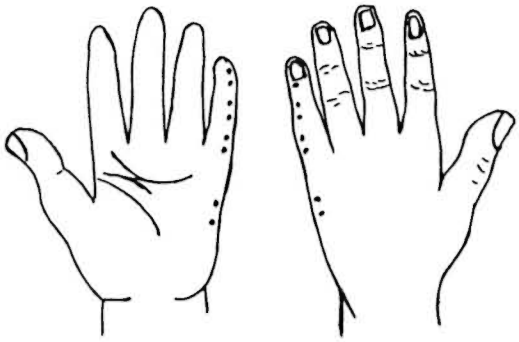
Grade	Score
Absent	3
Mild (absent if attention is distracted)	2
Moderate (present even if distracted)	1
Severe (patient withdraws the arm)	0

Stretch test. The grading and scoring system for the stretch test was:

Grade	Score
Negative (no pain, even on full passive elbow flexion)	3
Mild (pain only when elbow is passively flexed beyond full active flexion)	2
Moderate (pain at more than 90° active elbow flexion)	1
Severe (pain at less than 90° active elbow flexion)	0

Size of the nerve. The size of the nerve was assessed by manually grasping the nerve between thumb and index finger percutaneously. It was graded as: 3–4 mm = 3, 5–7 mm = 2, 8–10 mm = 1, and more than 10 mm = 0.

Mobility of the nerve. The mobility of the nerve was recorded as normal, partial, or fixed.



THE FIGURE. Sites for sensory testing. Anterior = 8; posterior = 7.

Management

All of the patients received the following treatment: Dapsone, 10 mg/kg body weight/week; one tablet vitamin B complex, three times daily; one tablet paracetmol when necessary; prednisolone, 30 mg/day in the morning for one week, reducing the daily dose by 5 mg every week; splintage of the elbow at the position of comfort with a padded plaster of Paris back-slab until nerve tenderness subsided.

In addition, the nerve randomly selected for surgical treatment underwent simple subperiosteal medial epicondylectomy and external nerve decompression. The nerve bed or intraneural structures were not interfered with.

Thirty-nine nerves were exposed to purely medical management, and 36 nerves were exposed to both medical and surgical management.

Reassessments

Reassessments were carried out: a) two weeks after the commencement of treatment or at the time of removal of sutures for the nerves in the surgical group, b) at the completion of steroid therapy, c) at the

TABLE 1. *Sex of subjects.*

Sex	Group	
	Medical	Surgical
Male	25	22
Male child	1	4
Female	2	3
Female child	3	2
Total	31	31

TABLE 2. *Disease classification of subjects.*

Type of leprosy	Group	
	Medical	Surgical
TT	2	1
BT	18	17
BL	11	13
Total	31	31

end of six months, and d) at the end of 12 months. Due care was taken to see that previous assessment reports were not available to investigators while reassessing the patients.

RESULTS

At the end of one year, results were available for 31 out of 39 nerves which were treated medically and 31 out of 36 nerves which were treated surgically. The two groups were comparable in age and sex distribution, severity of clinical illness, and duration of neuritis (Tables 1, 2 and 3).

The percentage of smear positive patients in the medical group was 32.3%; in the surgical group, 42%. The two groups were also comparable in their distribution by duration of treatment, history of reactive episode, and occupation.

Voluntary muscle test. Reassessment of the VMT scores at the end of one year showed a significant improvement in both groups. However, there was no significant difference between the two groups (Tables 4 and 5).

Five nerves in the medical group and eight nerves in the surgical group showed deterioration in the VMT score. Interestingly, 3 of these 5 nerves from the medical group and 4 of these 8 nerves from the surgical group showed signs of improvement when reassessed at the 18th month. This calls for caution before planning for intrinsic replacement surgery based on the presumption that no improvement occurs after one year.

TABLE 3. *Duration of neuritis.*

Duration in weeks	Group	
	Medical	Surgical
4	17	15
5–8	8	9
9–12	3	4
>12	3	3
Total	31	31

TABLE 4. *Assessment of voluntary muscle test (VMT) after one year.*

Grade[a]	Group	
	Medical	Surgical
Improved	22	20
Static	4	3
Deteriorated	5	8
Total	31	31

[a] Grading system for VMT and sensory test scores:
Improved = positive (+) difference in the score from the initial score.
Static = no (±) difference in the score from the initial score.
Deteriorated = negative (−) difference in the score from the initial score.

Sensory assessment. Sensory test scores also showed significant improvement in both of the groups at the end of one year. However, there was no significant difference between the groups (Tables 6 and 7).

Nerve pain and tenderness. Nerve pain and tenderness cleared completely at the end of one year in both groups.

Stretch test. The stretch test results showed marked improvement in both groups. Of the 11 stretch test positive nerves in the medical group, 9 became test negative at the end of one year. Similarly, 10 out of 12 test positive nerves in the surgical group became test negative (Table 8).

Bilateral involvement. There were 18 patients with bilateral ulnar neuritis. As previously mentioned, they underwent unilateral surgical procedure. Reassessment of these patients gives us an excellent opportunity to study the additional advantages, if any, offered by surgical intervention. Both

TABLE 5. *Average VMT score.*

	Group	
	Medical	Surgical
Initial average	6.8	7.2
Average at 12th month	9.6	9.6
Average improvement	+2.8[a]	+2.4[a]

[a] Significantly improved compared to initial values, $p < 0.05$, Student's t test. No significant difference between medical and surgical groups.

TABLE 6. *Assessment of sensory test after one year.*

Grade[a]	Group	
	Medical	Surgical
Improved	16	18
Static	11	7
Deteriorated	4	6
Total	31	31

[a] See Table 4, footnote [a].

TABLE 8. *Stretch test results after one year.*

Grade	Medical group		Surgical group	
	Initial	12th mo.	Initial	12th mo.
Pain at <90°	4	0	2	0
Pain at >90°	7	2	10	2
No pain	20	29	19	29
Total	31	31	31	31

sides improved in 11 patients; 6 patients showed no improvement in either side. In one instance, the side which underwent surgery showed no improvement, whereas the other side improved. There were no instances in which the side which underwent surgery improved and the other side did not (Table 9).

DISCUSSION

In this study we found that medical treatment of early ulnar neuritis with steroids gives as good a result as the combination of steroids and medial epicondylectomy with external decompression. This would make management of early neuritis simple, inexpensive, and practical. However, the possibility exists that the surgical procedure used was too limited, and this is being tested further.

The evaluation of treatment of neuritis ([8]) is a difficult problem. We have used subjective, semi-objective, and objective tests ([14]) for evaluation in this study. The VMT and sensory tests furnish rapid, reliable, and reproducible assessments of the nerve function ([6, 8, 10]).

It is difficult to explain continuing improvement, even after 19 months in some of the nerves reassessed, on the basis of the axonal regeneration theory. There are probably other mechanisms involved in leprosy neuropathy. These cases will be followed for a longer period of time in order to understand the process of recovering from neuritis.

In conclusion, this study compared two treatment policies under controlled conditions for the management of early ulnar neuritis. The study failed to demonstrate any additional benefit in carrying out medial epicondylectomy and external decompression in cases of early ulnar neuritis treated with steroids.

SUMMARY

Sixty-two ulnar nerves belonging to 44 patients with early neuritis were studied to assess the benefits offered by medial epicondylectomy and external decompression in addition to steroid therapy. The patients were randomly allocated to the surgical or the medical group. In those cases where there was bilateral involvement, surgery was carried out only on one side. All cases were assessed prior to treatment, and at predetermined intervals following treatment. This study presents the results after a 12-month follow-up.

There was statistically significant improvement in both groups following treatment as assessed by improvement in motor and sensory functions and in the reduction of pain and tenderness. The study, however,

TABLE 7. *Average sensory score.*

	Group	
	Medical	Surgical
Initial average	2.37	1.69
Average at 12th month	4.46	4.35
Average improvement	+2.09[a]	+2.66[a]

[a] Significantly improved compared to initial values, $p < 0.01$, Student's t test. No significant difference between medical and surgical groups.

TABLE 9. *Bilateral involvement at the end of one year.*

Improvement	Group	
	Medical	Surgical
Improved	12	11
Not improved	6	7
Total	18	18

failed to demonstrate any added benefit with surgical intervention as compared to steroid therapy alone in the treatment of early ulnar neuritis.

RESUMEN

Se estudiaron 62 nervios ulnares correspondientes a 44 pacientes con neuritis temprana para establecer los beneficios de la epicondilectomía medial y la descompresión externa en adición a la terapia con esteroides. Los pacientes fueron asignados al azar al grupo quirúrgico o al grupo médico. En los casos donde hubo afección bilateral, la cirugía sólo se practicó en un lado. Todos los casos fueron valorados antes del tratamiento y después del mismo a intervalos predeterminados. Este estudio presenta los resultados después de un seguimiento de 12 meses.

En ambos grupos, el tratamiento condujo a una mejoría significante según se estableció por mejoría en las funciones motora y sensorial, y por la reducción del dolor y de la hinchazón. Sin embargo, el estudio no reveló ninguna ventaja adicional de la intervención quirúrgica sobre la terápia esteroidal sóla en el tratamiento de la neuritis ulnar temprana.

RÉSUMÉ

On a étudié 62 nerfs cubitaux, provenant de 44 malades atteints de névrite précoce, en vue d'évaluer les avantages offerts par l'epicondylectomie médiane et la décompression externe, en complément du traitement par les stéroïdes. Les malades ont été distribués au hasard en deux groupes, un groupe recevant la thérapeutique médicale, et un groupe soumis à l'intervention chirurgicale. Chez les malades où l'atteinte était bilatérale, l'intervention n'a porté que d'un côté. Tous les cas ont été évalués avant le traitement, et ensuite à des intervalles déterminés d'avance. Cette étude présente les résultats après un suivi de 12 mois.

On a observé une amélioration statistiquement significative dans les deux groupes, mise en évidence par l'amélioration des fonctions motrices et sensorielles et par une diminution des douleurs. Cette étude n'a cependant pas permis de démontrer que l'intervention chirurgicale était supérieure à la thérapeutique par les seuls stéroïdes pour le traitement de la névrite cubitale précoce.

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