NEUROLYSIS OF THE COMMON PERONEAL NERVE IN LEPROSY

A REPORT ON 22 PATIENTS

F. CHAISE, B. ROGER

From Hôpital Saint-Louis, Paris

Thirty-two operations on the common peroneal nerve for lepromatous neuritis are reported. A combined medical and surgical approach to treatment is recommended, and the technique of operation is described. Recovery of motor power was satisfactory but depended on many factors, including the duration of the neuritis, the extent of the compression, the immunopathological status of the patient and the efficacy of medical treatment. The main indication for neurolysis is hyperalgesic neuritis. The only contraindication is painless long-standing paralysis; in this condition the degree of neural fibrosis prevents any hope of improvement.

Hansen’s disease is a systemic condition due to Mycobacterium leprae; it mainly involves skin and nerves. The immunological status of the patient, as evidenced by the degree of resistance to the organism, appears to determine the type of disease that develops. When leprosy extends to the common peroneal nerve, the patient is at risk of paralysis of the extensors of the ankle and toes, and of static, dynamic and, in some cases, neurotrophic disorders, which medical treatment alone cannot always prevent.

In France, there is now a trend towards early operation on the painful leprous nerve (Palande 1973; Anita, Vankani and Pandya 1976; Chaise et al. 1982; Kumar 1982) with a corresponding reduction of other therapy proposed by some authors (Garrett 1956; Jopling and Cochrane 1957; Ramanujam 1964; Sepha and Sharma 1964). In the orthopaedic department of L'Hôpital Saint-Louis in Paris, we have been operating directly on the common peroneal nerve for the neuritis of leprosy, and we report our results.

MATERIAL AND METHODS

Twenty-two patients, three women and 19 men, had operations for unilateral or bilateral involvement of the common peroneal nerve by Hansen’s neuritis. Ten patients had bilateral operations, so 32 nerves were explored.

The age of the patients ranged from 16 to 71 years with a mean of 33 years. The duration of the neural disorder ranged from eight days to three years; the significance of this will be discussed later. The period of follow-up after operation was from one to five years.

Immunological tests showed that the disease was lepromatous in eight cases and tuberculoid in 14 (Rydevik and Jopling 1966; Jopling 1971; Pattyn, Dockx and Cap 1981). The forms of leprosy reflect the balance between the cell-mediated immune response of the host and the multiplication of the acid-fast and alcohol-fast Mycobacterium leprae. In tuberculoid leprosy there is a marked response around some nerves; organisms are very scanty and tubercles form but do not caseate. Lepromatous leprosy is the infective form of the disease; abundant organisms are present in the dermis and are widely disseminated, often in large macrophages called “globi”.

Treatment. The initial management of lepromatous neuritis is always medical, using bactericidal drugs and high doses of corticosteroids given systemically; this stage of the treatment is handled by leprologists. Surgery has its place only for certain indications which are discussed later. The usual techniques employed in peripheral nerve surgery must be applied, taking into account the particular fragility of the leprous nerve. The blood supply and its intraneural anastomoses must be carefully respected; this rules out intraneural neurolysis (Lundborg 1975; Rydevik, Lundborg and Nordborg 1978).

Our present surgical approach aims at extensive and wide extraneural neurolysis from the origin of the common peroneal nerve at the division of the sciatic nerve in the thigh to the point where it enters the anterolateral region of the leg. The integrity of its blood supply must be respected and epineurotomy or epineurectomy is performed, depending upon the state of the fibrous and thickened epineurium (Figs 1 and 2). The nerve, where it is swollen, should be carefully incised so as to detect micro-abscesses (though none were seen in our series). This technique was used in the 32 operations which are reported in this paper.
RESULTS

At follow-up each patient was asked about pain, paraesthesiae and weakness. Muscle strength before and after the operation was assessed by the same person, and was evaluated on two scales. The score was recorded using the five-point scale of the British Medical Research Council (1976). Result A (in Table I) is the combined motor score for the tibialis anterior (0 to 5 points) and the peroneal muscles (0 to 5 points). This 10-point score represents one element of the function of the foot and ankle. Result B is the 10-point score for the extensor hallucis longus and the extensor digitorum longus. Impairment of power in these muscles produces less severe effects which are more easily treated.

Pain was relieved in every case, and this relief persisted. Sensory impairment was not considered in detail because of difficulties in interpretation, particularly in the superficial sensory neuritis which is common in Hansen's disease.

Table I. Muscle strength in Group A and Group B muscles, before and after neurolysis, in the 12 legs which gained improvement (see text for details)

<table>
<thead>
<tr>
<th>Patients</th>
<th>Before operation</th>
<th>After operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Lepromatous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Tuberculoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

In the group as a whole the motor score improved in 12 nerves: one recovered completely to score A 10, B 10; six had some dissociated recovery involving mainly the peroneal muscles and extensor digitorum longus, and less frequently tibialis anterior and extensor hallucis longus. Twenty nerves showed no motor changes; six failed to improve on their original scores of A 0, B 0—these cases had rather poor indications for operation in the first place; 14 nerves retained their original scores of A 10, B 10.

There was no deterioration in motor power in any of our patients, and we are now working on early neurolysis for the painful leprosy nerve in the absence of paralysis. Lepromatous group. This group included 17 nerves which showed two types of result.

1. In 10 nerves there was no paralysis before operation and motor power was maintained postoperatively. Eight of these cases had an operation within eight days of the onset of extremely acute neuritis, which occurred during a Type II reaction (Rydley and Jopling 1966). A reaction is an episode of acute inflammation in the course of pre-existing leprosy. A Type I reaction is due to increased hypersensitivity in the tuberculoid form of disease; a Type II reaction, in the lepromatous form, is vasculitis following the deposition of immune complexes.

2. In seven nerves the duration of the disorder ranged from eight days to three years. Two patients with an initial score of zero gained enough functional recovery to make palliative measures unnecessary (Table I).

Tuberculoid group. This group included 15 nerves with three types of result.

1. Four nerves in three patients showed no paralysis before operation, and retained the same motor power afterwards. Neuritis had been present for 10 days and for 15 days in two cases. In the third patient bilateral involvement by non-progressive subacute neuritis had been present for one year.
2. Six nerves showed total paralysis before operation and did not improve afterwards. The duration of the disorder ranged from three months to two years. It is important to note that the tuberculous type of disease does not respond well to surgery because necrosis and fibrosis of the nerves is extensive and permanent.

3. For five nerves the scores were improved by operation from an initial score of 4 to 6 points in each group to a final postoperative score of 6 to 10 points. The duration of the neuritis ranged from 15 days to one month in these cases (Table I).

DISCUSSION

In the French and the English literature there are few reports of operation on the common peroneal nerve in Hansen's disease, though there are many relating to operations on the ulnar, the median and the posterior tibial nerves (Gramberg 1955; Carayon, Bournel and Languillon 1964; Carayon 1970; Carayon and Huet 1972; Palande 1973; Anita et al. 1976; Kumar 1982). The conclusions to be drawn from our results are similar to those we published after a study of leprosous neuritis of the ulnar nerve (Chaise et al. 1982). It is becoming clearer to us that operation on the lepromatous peroneal nerve can be beneficial and that our combined medical and surgical approach is justified by benefits in three time scales.

Short-term. Pain relief is rapid in all cases, and it persists, rendering analgesics unnecessary. Neurolysis prevents the further development of nerve deficits and, in 14 unparalysed nerves, seemed to prevent the development of secondary paralysis.

Medium-term. Motor recovery was seen in 12 nerves and may occur six months after operation. Recovery may be substantial, either sparing the patient from other palliative operations, or limiting their extent. The effective stabilisation of 14 nerves which were unparalysed also proved to be durable.

Long-term. Recovery remains possible in the long term, and improvement in function of the lepromatous peroneal nerve may occur up to two years after operation. Protection of the nerve from local reaction at a later date by less easily explained mechanisms seems to have occurred in some cases. One of our patients experienced a local reaction with further nerve enlargement but distal paralysis did not follow.

In our experience the following factors influence the results of neurolysis.

Duration of the neuritis. This appears to be a fundamental factor, suggesting that there is a threshold which is specific, not just to the common peroneal nerve but to all acutely affected leprous nerves. This threshold depends on the immunopathological form of the disease; it is about 10 days after the onset of tuberculous neuritis but is much later in the lepromatous form of the disease, in which improvement may follow an operation done several months after the appearance of a more or less subacute neuritis.

Severity of the compression. The importance of this factor is related to the enlargement of the nerve and to the thickening of the epineurium. This is well known in experimental surgery (Lundborg 1975; Rydevik and Lundborg 1977); and a study is now under way in our unit to assess this by the measurement of intraneural and extraneural pressures. It appears that there are two zones of possible compression of the common peroneal nerve: one at the neck of the fibula, where the nerve is often spread out, and the other behind the transverse fibres of the popliteal aponeurosis.

Age of the patient. In our small series, the importance of this could not be evaluated, but it is known that recovery is better in young people.

Technique of operation. The importance of the surgical technique has been mentioned; it must provide sufficient decompression without excessive damage. The same technique was used in all our operations.

Form of the disease. The course of the neuritis appears to be much more aggressive in the tuberculoid form of disease and in reverse reactions (Rydel and Jopling 1966), whereas the lepromatous form may benefit from operation much later in its course. This can certainly be explained by the differences between the tuberculoid form, in which the cellular inflammatory reaction is the most important and is accompanied by fascicular necrosis, and the lepromatous form which involves an oedematous intraneural reaction to compression.

Medical treatment. Therapeutic efficiency with the compliance and cooperation of the patient are fundamental elements in the prognosis, while steroids are of great value in the management of acute neuritis.

Indications. Our present indications for decompressive surgery for neuritis of the common peroneal nerve are as follows:

1. Hyperalgesic, hypertrophic neuritis with or without motor impairment: surgery relieves pain, and can prevent or reduce motor paralysis; thus there is substantial recovery, often enough to avoid the need for other palliative operations.

2. Long-standing neuritis with severe paralysis: decompression is aimed at pain relief only, there being no hope of motor recovery.

3. Relatively painless neuritis which progresses despite medical treatment. Subacute discomfort responds well to neurolysis, but in long-standing total paralysis, particularly in the tuberculoid form when the nerve is painless, neurolysis is useless. For such cases, only palliative operations are useful.

CONCLUSIONS

Direct operation on leprous nerves has long been recommended (Gramberg 1955; Carayon et al. 1964; Carayon 1970; Carayon and Huet 1972), but such surgery must be carried out in a strictly defined context for specific indications. Anti-inflammatory drugs and chemotherapy combined with operative decompression will improve
results and help to protect patients from the static and dynamic sequelae of neuritis, which would otherwise cause or aggravate neurotrophic disorders of the foot.

In our unit, neurolysis of the common peroneal nerve is an integral part of treatment for lepromatous neuritis within the limits which have been discussed.

REFERENCES


