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A RATIONAL APPROACH TO THE USE OF EPIDURAL MEDICATION IN THE TREATMENT OF SCIATIC PAIN

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The results of a series of 120 epidural injections given as treatment for backache and sciatica using Methylprednisolone and local anaesthetic, performed in the Gloucestershire area, are presented and compared with other published results. Wide variations in the results of this treatment are found and these may in part be explained on the basis of the variable severity of the histological changes known to occur in and around nerve roots in cases of sciatica.

The pathogenesis of sciatica in lumbar disc disease is discussed in relation to its treatment by epidural injections of a long-acting steroid. It is shown that the treatment is more successful in acute onset cases and cases that have epidurals within 6 months of the onset of symptoms and it is suggested that earlier epidurals are given in cases that do not respond to the usual conservative measures. Manipulation of the spine and sciatic stretch should not be carried out at the same time as the epidural, as these procedures may adversely affect the results in some cases and certainly tend to make them more difficult to assess.

Key words: epidural; low back pain; Methylprednisolone; sciatica.

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Sciatica is a common and disabling symptom and the cause of considerable economic loss both to the country and to the individual. The Registrar General's figures show that absenteeism because of sciatica accounted for at least 7 million working days lost in the statistical year 1974–5.

Epidural injections have been used in the treatment of this condition for over 70 years and epidural steroids for over 20 years. Many authors have been very enthusiastic about this form of treatment, stating that it could cure many patients who had had prolonged and unsuccessful conservative treatment and it was instrumental in reducing the operation rate in lumbar disc disease. Because of these favourable reports, epidurals have been increasingly used in the Gloucester area Orthopaedic service. The results obtained, correlated with other published studies, suggest a more rational use of the treatment which should in turn produce better results.

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MATERIAL

An unselected retrospective series of 120 patients treated with epidural injections in the Gloucestershire area up to the end of 1975 was studied. There were 71 male and 49 female patients with ages ranging from 17 to 72 years. All the patients were suffering from "mechanical" low-back pain and sciatica; other causes of back pain were excluded by appropriate radiological and haematological investigations. Forty-five

patients (37.5 per cent) were suffering from lumbar disc disease with no changes on normal plain radiographs, the diagnosis being based on the history and physical findings. Seventy-five patients (62.5 per cent) were noted to have degenerative changes in their lumbar spine with disc space narrowing. No patient had a spondylolisthesis.

Irrespective of the precise pathogenesis of their root irritation, patients were categorized into the following groups on the basis of clinical presentation in order to assess the efficacy of treatment.

(a) Acute: Those with an acute onset, no previous history of sciatica and a total history of less than 6 months.
(b) Chronic: Those with a gradual onset of symptoms or a history of sciatica of more than 6 months and with a poor response to standard treatment.
(c) Recurrent: Those with a history of recurrent attacks of sciatica who had previously been completely cured by conservative treatment.
(d) "Radiculitis": There was a small group of patients who had originally had "acute discs" whose straight leg raising and spinal mobility had been restored to normal by standard measures but who were left with typical sciatic pain.

METHOD

All patients received 80 mg Methylprednisolone in 20 ml of local anaesthetic (normally Lignocaine 1 per cent) by the lumbar route, given in the lateral position with the affected side downwards.

Because this series is retrospective, with patients under the care of different orthopaedic surgeons and injections given by several different anaesthetists there were some variations in the medication and method. In particular, 70 patients (58 per cent) received in addition to their medication, 25 mg of Hydrocortisone Acetate and an ampoule of Hyalase. Thirty-eight patients (32 per cent) had a manipulation of the spine and a sciatic stretch, carried out under general anaesthesia, because of the presence of degenerative changes on plain radiograph of the lumbar spine and suspected root adhesions.

RESULTS

These are presented in Tables 1, 2 and 3. Follow-up was 1 year in all cases.

Success is defined as a very substantial improvement as regards pain, spinal mobility and straight leg raising, maintained for the period of follow-up. Failure is defined as either no improvement or an improvement such as to be of little material benefit to the patient. Those patients who gained only temporary or moderate relief, and had to continue with further treatment, were classed as failures.

Fifteen patients (13 per cent) who showed improvement followed by relapse had a second epidural and of these, 6 patients (40

Table 1. Results of epidural injection in the various categories.

Category	Total number	Success %	Failure %
All cases	120	62	38
Chronic cases	65	44.5	55.5
Acute cases	31	81	19
Recurrent cases	16	81	19
"Residual radiculitis" cases	8	87.5	12.5
Postlaminectomy	7	28	72
Those with a history of the present attack of pain			
(i) less than 6 months (irrespective of total length of history)	65	80	20
(ii) more than 6 months	51	45	55

Increased success rates in "acute cases" and those with a history of pain of less than 6 months are statistically significant ($P < 0.005$ and $P < 0.001$ respectively on χ^2 test).

Table 2. Results of epidural injection related to X-ray changes.

Category	Total	Success %	Failure %
All patients	120	62	38
Those with X-ray changes	75	60	40
Those without X-ray changes	45	63	37

Table 3. Results of epidural injection related to associated administration of Hyalase (H) and Cortisone Acetate (CA), and manipulation under anaesthesia (MUA), and straight leg stretch (SLS).

Category	Number	Success %	Failure %
(a) All cases			
Total	120	62	38
Having H and CA	70	63	37
Not having H and CA	50	60	40
Having MUA and SLS	38	50	50
Not having MUA and SLS	82	67	32
(b) Chronic cases			
Total	65	44.5	55.5
Having H and CA	40	40	60
Not having H and CA	25	44	56
Having MUA and SLS	24	45	55
Not having MUA and SLS	41	44	56
(c) Acute Cases			
Total	31	81	19
Having H and CA	16	87	13
Not having H and CA	15	80	20
Having MUA and SLS	8	63	37
Not having MUA and SLS	23	87	13

There were insufficient "Recurrent" and "Residual radiculitis" cases to analyse separately.
None of these differences in success rate is statistically significant.

per cent) benefitted from the second injection and were classed as successes.

It can be seen that there was a significant improvement in the success rate in patients having their epidural within 6 months of the onset of symptoms and those in the "Acute" category.

The presence of degenerative changes on plain X-ray of the lumbar spine did not affect the results of epidural treatment (Table 2).

Variations in medication (Table 3) did not affect the results of the treatment but manipulation of the spine and sciatic stretch appeared to worsen the results in acute cases. [This however just fails to be statistically significant ($P=0.1630$).]

DISCUSSION

Widely differing results have been published by various authors using epidural injections, and it is evident that the medication used in the injections is only of secondary im-

portance. Various combinations of saline, local anaesthetic and steroid injections have been used and the results differ significantly even in series using the same medication. For example, using small volume steroid injections alone, the success rates are as follows:

Dilke et al. (1973)	65 per cent
Swerdlow & Sayle Creer (1970)	90.8 per cent
Winnie et al. (1972)	100 per cent

It is therefore obvious that the precise pathogenesis of the sciatic pain is of importance in determining the results in individual cases and indeed a perusal of published work shows that very little attempt has been made to relate the results of treatment to the precise cause of the symptoms and this almost certainly accounts for the differences in the results.

Despite these differences however, certain important facts emerge from the published series:

1. The method is safe and indisputably more effective than standard conservative treatment as shown by a controlled trial (Dilke et al. 1973).

2. The route of injection (caudal or lumbar) is probably immaterial provided sufficient volume is used to distribute the epidural fluid to the desired level (Swerdlow & Sayle Creer 1970, Mathews & Yates 1969, Goebert et al. 1961).

3. In chronic or long duration cases, a steroid preparation is required to improve the results (Swerdlow & Sayle Creer 1970, Beliveau 1971) and there appear to be advantages in the use of a long-acting steroid suspension such as Methylprednisolone (Fishman & Christy 1965, Burn & Langdon 1974, Seghal et al. 1963).

4. The use of very large volumes of fluid appears to offer no advantages and may increase side effects; furthermore there is no evidence in the published work that a routine manipulation of the spine or a sciatic stretch improves the results.

5. Irrespective of the medication used, the results are better in acute cases and in cases that have epidurals within 1 year of the onset of symptoms (Swerdlow & Sayle Creer 1970, Burn & Langdon 1970, Winnie et al. 1972, Warr et al. 1972).

The precise cause of sciatic pain in individual patients may be difficult to diagnose but whether it is due to mechanical pressure from an acute disc prolapse or chronic osteophyte formation or chemical irritation from abnormal acid metabolites in degenerate discs (Lindhal 1966, Nachemson 1969) there is evidence that the common factor is inflammatory change of variable histological severity in and around the nerve root and perineurium (Lindhal & Rexted 1951).

As these histological changes appear to be progressive, it is reasonable to assume that the earlier a steroid epidural is given the more effective it will be, and that a nerve root infiltrated with chronic inflammatory cells will not be affected by a local steroid injection.

This concept is borne out by the observations from other series already mentioned and also by further observations from the present series, i.e., 81–87.5 per cent success rate in "acute", "recurrent" and "residual radiculitis" cases; 84 per cent of these patients having epidurals within 6 months of the onset of symptoms. There is an 80 per cent success in all patients having epidurals within 6 months of the onset of symptoms. There is only a 44.5 per cent success in "chronic" patients, 61 per cent of these having had symptoms for longer than 6 months when given their epidural.

Conclusions

This series confirms the value of epidural injections in the treatment of sciatic pain. It is felt that while there will always be some failures due to continued mechanical pressure on the nerve root, especially with degenerative osteophytosis, at least some of the failures are due to potentially reversible inflammatory changes in the nerve root being allowed to progress to the stage where they are beyond the help of a steroid injection.

This is confirmed by a statistically significant increase in the success rate in acute cases and those who have an epidural within 6 months of the onset of symptoms. It is therefore felt that:

(a) Every effort should be made to prevent the occurrence of established root inflammatory change. All patients with sciatica should therefore be assessed at an early stage by an orthopaedic surgeon. Standard treatment may be instituted but if there is a poor response then an epidural should be given in every case, certainly before 6 months have elapsed.

(b) A long-acting steroid should be used, probably in all cases and certainly in the longer duration cases.

(c) A routine manipulation and sciatic stretch should not be carried out at the same time as the epidural as there is no evidence that it improves the results (the present series in fact suggests that it may worsen the results if carried out in acute cases although these figures just fail to be statistically significant) and it makes it difficult to assess the results of the epidural.

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