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EPIDURAL ANAESTHESIA IN LOW-BACK PAIN AND SCIATICA

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INTRODUCTION

Low-back pain and its treatment form a complex problem. Conservative measures are manifold most of which have in common that the long term results are in general questionable. For temporary relief, however, alleviation of pain can be obtained in various ways of which *e.g.* epidural injections of either local anesthesia, corticosteroid preparations or saline separately or a combination of either compound have attracted some interest. (*Sehgal, Gardner 1960, Coomes 1961, Davidson, Robin 1961, Mack 1964*).

Caussade & Queste (1909) reviewed some cases in which they had used amylocaine hydrochloride with good results. A more thorough investigation was published by *Evans* (1930) who injected procaine and saline epidurally and claimed acceptable results in 22 of 40 patients with sciatica. Satisfactory effect was reported by *Kelman* (1944) who had carried out 486 injections in 116 patients with sciatica. 8 of these were cured, 41 markedly improved, 45 moderately improved and 17 only had slight improvement whereas 5 remained unchanged.

Cyriax (1957) advocated epidural anaesthesia as the conservative method of choice for patients with low-back pain. Those presenting neurological signs were treated in the same way.

Coomes (1961) has made a comparison of two groups of 20 out-patients with sciatica, one of which was treated with epidural injections of 50 ml 0.5 per cent procaine, the other with bedrest only. He found that pain relief was obtained in the epidural group within 11 days whereas the bedrest group needed 31 days for recovery.

Other agents than local anesthesia have been used for epidural in-

jections and in 1961 Davidson & Robin reported on 28 patients with sciatica who received large volumes (average 72 ml) of saline epidurally. They believed that nerve root pain was caused by the nerve root being compressed by hypertrophic tissue and adherent to it. They ascribed the successful results in their investigation to be due to the mechanical disruption of adhesions. In their investigation with saline only as injection fluid 4 were permanently cured and 16 obtained temporary relief. In 8 patients the injection had no effect. Of these 5 had a prolapsed disc and the return of symptoms after injection was explained by the nerve root being stretched over the prolapsed tissue. Temporary relief was, however, observed and this was thought to be due to a high hydrostatic pressure acting on the root. After absorption of the injected fluid the pathological situation was retained as before and thus pain returned.

Normally there is a negative pressure in the epidural space. According to *Lindahl* (1952) this disappears in association with sciatica. This disappearance was postulated as a symptom of an exsudative inflammatory process. Corticosteroids injected epidurally have been claimed to yield satisfactory results (*Sehgal, Gardner* 1960, *Mack* 1964, *Jacoby* 1966, *Hanse* 1966).

In 1960 Brown reported on 20 patients in whom he injected first saline and following this 40 mg hydrocortisone tertiary-butylacetate and 40 mg of prednisolone 21-phosphate either separately or in combination. 84 per cent improved with excellent and good results. No untoward effects were noted.

The technique by which the epidural injection is performed also attracts some interest. In 1962 Eriksson reported on long term epidural anaesthesia by a plastic catheter in the epidural space for 3 days. In these patients, numbering 21, a mixture of local anaesthetic and hydrocortisone was injected. 16 patients improved within 5 days and could go back to work in about 11 days.

The rationale behind the effect of this treatment is obscure. It may be unwise to advance any theory of action but it may be worth mentioning the views of *Swerdlow & Mark* (1961) who think that the variation of the extent and duration of analgesia in epidural injections may depend on expanse of epidural space, size of escape routes, level of injection, volume of solution injected, speed and pressure of injection.

The object of this paper was to investigate the results of epidural anaesthesia in patients with low-back pain and sciatica.

MATERIAL

This study comprises 48 patients (Table 1) all of whom received extradural injection treatment on 117 occasions.

Table 1. Age and sex.

Age	Male	Female	Total
20-30		1	1
31-40	5	5	10
41-50	13	6	19
51-60	7	6	13
61-70	4	1	5
Total	29	19	48

Of these 30 had not been operated at the time of the injection treatment whereas 18 who had previously been operated were treated for residual symptoms. The types of pain in both the non-operated and operated groups were low back pain without irradiation and with sciatica. Tables 2 and 3.

Table 2. Diagnosis for injection treatment in non-operated group.

Sex	Low back pain				Total
	without irradiation		with sciatica		
	2 days- one week	3-7 months	2-3 months		
			right	left	
♂	1	7	4	6	18
♀	1	4	4	3	12
Total	2	11	8	9	30

Table 3. Diagnosis for injection treatment in operated group.

Sex	Low back pain					Total
	without irradiation		with sciatica			
			3-4 months			
	2 days- one week	3-7 months	right	left	both	
♂	3	2	2	3	1	11
♀	2	2	1	1	1	7
Total	5	4	3	4	2	18

This investigation has only been concerned with registration of loss of pain in connection with epidural injections and no special reference has been made to neurological abnormalities or the straight leg raising test. From the results the patients in the different groups were classified as experiencing complete, moderate or no relief of pain. Recordings were made immediately after injection by the anaesthetist and then on each consecutive day by the surgeon for at most one week. Checks were also made at the follow-up clinic. Final registration was made one or two years after injection treatment.

METHOD

All patients were premedicated with 25 mg promethazine (Lergigan®). Prior to the injection 2 mg phenyl-ephine was given intramuscularly to prevent fall in blood-pressure. The epidural anaesthesia was performed with the patient lying on his side. The level of injection was either L.III, L.IV or L.V. The extradural space was identified by the loss of resistance technique (Sicard-Forestier). After a test dose of 2-3 ml of anaesthetic fluid had been given, 2-3 min. were allowed to elapse to be sure that no spinal anesthesia accidentally ensued. The decided amount of the anaesthetic was then injected. As anaesthetic 1 per cent mepivacaine (Carbocain®) was used in most of the cases. In 3 cases the 2 per cent solution was injected. In 3 patients 25 mg hydrocortisone was admixed to the anaesthetic. The volume of anaesthetic was around 20 ml. However, in 7 instances less than 15 ml were given, in 5 patients more than 30 ml were injected. 117 epidural blocks were given to 48 patients. 16 patients were given one block each. One patient received 9 blocks in periods for 8 months. The other patients were treated two or three times in periods up to two weeks. Single injection technique was used in all the cases.

RESULTS

The immediate effect of the epidural block was sensory loss and a sensation of heat in the lower part of the body. Motor paralysis was not always present which may be due to the concentration of the anaesthetic solution being weak.

Non-Operated Group at Time of Injection

The pain sensation disappeared during the time of anaesthesia in all but five cases. When the anaesthesia receded, pain returned in all patients. In 2 patients there was a gradual relief of pain to complete alleviation within one and two weeks respectively after the acute onset. At follow-up two years later both patients were pain-free. In one patient the alleviation was moderate after two months and has remained so two years later. In 22 patients the periodicity in the course of low-back pain was in no way affected by the injection treatment (Table 4).

The 5 patients who did not experience any relief of pain during the

anaesthesia were later operated. In two a prolapsed disc was excised. These two patients recovered completely. In the remaining three no prolapse was found but scar tissue was observed to fix the nerve root to the posterior part of the intervertebral disc. After operation no relief of pain was recorded and a new series of epidural injections was instituted. Two recovered completely within 3 to 6 months respectively and are keeping well after 2 years. The patient who recovered in three months had received cortisone in combination with the anaesthetic. The third patient has not yet recovered two years after the final injection treatment.

Table 4. Results of injection treatment in non-operated group.

Relief of pain remaining at 2 years follow-up		
Complete	Moderate	None
6	1	23
(four operated after injection)		(one operated after injection)

Operated Group

Eighteen patients received injection treatment because of pain despite previous surgical treatment at which a prolapsed disc was disclosed in nine although there was no prolapse in the remaining nine patients. If at surgery a prolapse was found, it was removed. If no prolapse was seen, the disc was not excised. No cases fused at this first intervention.

In the prolapsed disc group six have had no relief of pain but can carry out easier work. Of these two were reoperated for a recurrent prolapse but did not experience any relief of pain. Of the remaining three one has improved completely six months after injection treatment and two moderately after three and eight months respectively. In the no prolapse group one patient recovered moderately whereas the remaining eight have not improved (Table 5).

Table 5. Results of injection treatment in operated group.

Finding at operation	Relief of pain			Total
	Complete	Moderate	None	
No prolapse		1	8	9
Prolapse	1	2	6	9
Total	1	3	14	18

COMPLICATIONS

Side effects were very few: those recorded included headaches, fall of blood pressure and intradural administration of the drug. In two patients technical difficulties arose which resulted in failure to obtain analgesia.

In three patients the anaesthetic was deposited intradurally. In one of these this was accompanied by a fall in blood pressure to about 60 mm Hg which was rapidly brought to normal. All three patients experienced headache lasting for 12–24 hours.

Despite prophylactic administration of metoxedrin in connection with the first few ml of anaesthetic a fall in blood pressure was registered in 12 patients to 100 mm Hg and below. On adequate treatment this was normalized in 10–15 min. and no further untoward effects were noted.

COMMENT

The object of epidural injection treatment in lumbago is alleviation of pain. Judging from various reports, however, the postulated mechanism for this varies. Some believe in the local anaesthetic breaking the noxious circle of pain temporarily, which may be all the patient needs to pass over into a state of more permanent relief (*Eriksson 1962*).

In an extensive experimental study in dogs on the dynamic factor in spinal cord compressions *Olsson (1958)* stated: "If now and then a small amount of disc tissue is pressed out through a rupture in the annulus fibrosus by active or passive movements of the spine, the inflammatory reaction and subsequent irritation of the cord will persist together with clinical symptoms. Even very large protrusions may not cause symptoms if they are firm and do not continue to enlarge.—Through its inflammatory effect a dynamic factor seems to be more responsible for the maintenance of symptoms than the actual compression.—Any treatment which will eliminate the dynamic factor and thus reduce the inflammatory reaction seems to be of greater therapeutic value than direct surgical removal of the protrusion".

Corresponding views have previously been offered by *Lindahl & Rexed (1950)* based on a study on histologic changes in the nerve roots of cases operated for sciatica.

The influence of a local anaesthetic on an inflamed and irritated nerve root besides the pure neural block is still unknown. In normal peripheral nerves local anaesthetics slow down the intraneural micro-circulatory events and also cause a vasoconstriction of arterioles and

venules (*Hansson 1966, Lundberg 1966*). It is difficult to understand how an agent which causes a circulatory impairment under normal conditions can combat inflammation and bring about a longstanding relief of pain apart from the pure nerve block which follows the application of the local anaesthetic.

In our hands epidural injections of local anaesthetics have not proved as successful as reported elsewhere and the rationale of it may be questioned.

SUMMARY

The results of epidural injection of local anesthetics in cases of low-back pain with and without irradiation have been reviewed.

One group of 30 patients had not been operated prior to injection treatment. The other group of 18 patients was treated for residual symptoms after previous surgery for a prolapsed disc in nine and in the remaining for a suspected but not operatively verified prolapsed disc.

In all 117 injections were administered to the 48 patients.

Results in non-operated group: Six experienced complete relief of pain. Of these 4 were operated after injection treatment as this did not alleviate pain. One had moderate relief. Twenty-three had no relief. Of these one was operated after injection treatment.

Results in operated group: One experienced complete relief of pain, three moderate and fourteen no relief.

RESUME

Les résultats d'injections épidurales d'anesthésiques locaux dans le cas de douleurs lombaires avec ou sans irradiation ont été réexaminés.

Un groupe de 30 malades n'avait pas été opéré avant l'injection. Un autre groupe de 18 malades avait été traité pour cause de symptômes restés à la suite d'interventions chirurgicales pour hernie discale dans 9 cas et pour les autres malades chez lesquels on soupçonnait une hernie discale qui ne s'était toutefois pas vérifiée à l'opération.

En tout 117 injections ont été administrées à ces 48 malades.

Résultats pour le groupe des non-opérés: Chez six les douleurs ont entièrement disparu. Parmi ceux-ci 4 avaient été opérés après le traitement par les injections, celui-ci n'ayant pas supprimé la douleur. Chez l'un il y avait eu un soulagement modéré. 23 n'ont éprouvé aucun soulagement. Parmi ceux-ci l'un a été opéré après le traitement par les injections.

Résultats dans le groupe des opérés: Un a été entièrement libéré de ses douleurs, trois modérément et 14 n'ont éprouvé aucun soulagement.

ZUSAMMENFASSUNG

Die Ergebnisse von epiduralen Injektionen in Fällen von Lumbago mit und ohne Ausstrahlung wurden durchgesehen.

Eine Gruppe von 30 Patienten waren vor der Injektionsbehandlung nicht operiert worden. Die andere Gruppe von 18 Patienten wurden wegen zurückbleibenden Symptomen nach vorhergehendem chirurgischen Eingriff wegen Diskusprolaps in neun und bei den übrigen wegen eines vermuteten, aber bei der Operation nicht sichergestellten Diskusprolaps, behandelt.

Insgesamt wurden 117 Injektionen an die 48 Patienten verabreicht.

Ergebnisse in der nichtoperierten Gruppe: Sechs hatten ein vollständiges Verschwinden der Schmerzen. Von diesen wurden 4 nach der Injektionsbehandlung operiert, da diese die Schmerzen nicht erleichterte. Ein Patient hatte eine mässige Erleichterung. Dreiundzwanzig fühlten keine Erleichterung. Von diesen wurde einer nach der Injektionsbehandlung operiert.

Ergebnisse in der operierten Gruppe: Einer erfuhr vollständiges Verschwinden der Schmerzen, drei eine mässige Besserung und vierzehn wiesen keine Besserung auf.

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