THE ROLE OF RADICULOGRAPHY IN THE MANAGEMENT OF LESIONS OF THE LUMBAR DISC

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The operative findings in two very similar groups of patients after laminectomy for lumbar disc lesions were assessed. In one group of 55 patients metrizamide radiculography was always performed before the operation but in the other historical control group of 65 patients Myodil myelography had only rarely been done. The results showed that the incidence of positive findings at operation was remarkably similar in both groups, being 89 per cent and 91 per cent respectively, and that whilst myelography was often very helpful it was sometimes frankly confusing.

After Mixter and Barr (1934) first reported that sciatica might be caused by a lesion of a disc in the lumbosacral spine, an added impetus was given to the development of myelography. Although water-soluble contrast agents have been used in Scandinavia since 1931, elsewhere they were generally considered to be too irritant and oil-soluble contrast media were employed. Unfortunately, oil-soluble contrast media gave poor definition of the nerve roots and in some cases seemed to produce arachnoiditis. The development of the less irritant water-soluble contrast media, meglumine iothalamate and, more recently, meglumine iocarmate enabled more detailed radiculography (Grainger et al. 1971; Grainger 1975). Metrizamide, unlike all other aqueous contrast media, is not a salt and does not dissociate into ions in solution; it is therefore even less irritant than other water-soluble agents (Grainger 1979). The incidence of side-effects after metrizamide radiculography is, however, significant and includes: headache, nausea, vomiting, low backache, hyperexcitability and, very rarely, convulsions. For example, Grainger, Kendall and Wylie (1976) reported that in a series of 201 lumbar radiculograms using metrizamide, 43 per cent of the patients suffered headache, 14 per cent had nausea and 12 per cent vomited. Gelmers (1979) found a similar complication rate after using metrizamide in 412 lumbar radiculograms, and convulsions have been reported in three patients, two of whom were epileptic (Skalpe 1976). Adhesive arachnoiditis is almost unknown after metrizamide radiculography (Skalpe 1976; Gelmers 1979).

In spite of this high incidence of side-effects, water-soluble radiculography has gained increasing popularity. Its real advantages in the investigation of disease of the lumbar disc have not been accurately assessed and the object of this paper is therefore to compare the effectiveness of radiculography with clinical diagnosis.

Two similar groups of patients, none of whom gave a history of a previous operation on the spine, were studied. All the patients in one group were screened by radiculography before operation while in the historical control group myelography had been used only occasionally. The operative findings of both groups were compared.

CLINICAL MATERIAL

A total of 120 patients with a clinical diagnosis of a lesion of a lumbar disc were studied. None of the patients had undergone a previous spinal operation or spinal contrast radiography. Case notes were available for all patients and personal details, the symptoms and signs before operation, and the radiographic (if any) and operative reports were extracted and recorded on a proforma. No attempt was made to reassess the radiographs because the clinical and operative findings could not be treated similarly, and because radiculography is a screening procedure. The patients were divided into two groups depending on whether radiculography had been used before operation.

Group A consisted of 55 consecutive patients, 30 men and 25 women, with an average age of 39 years. All had been operated on for a lesion of a lumbar disc between 1978 and 1981 by the same surgeon (K.J.). Before operation all the patients had been screened by metrizamide lumbar radiculography, which was performed by radiologists well experienced in the procedure, and by a standard clinical technique (Grainger et al. 1971).

Group B consisted of 65 consecutive patients, 47 men and 18 women, with an average age of 38 years. All had been operated on for a suspected lesion of a lumbar disc between 1964 and 1968 by the same surgeon (Mr A. Naylor). Only nine patients, seven men and two women, had a Myodil myelogram before operation; two had neurological problems, namely mental subnormality and disseminated sclerosis.

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Table I. Incidence of backache, sciatica, neurological deficit and limitation of straight leg raising in Groups A and B

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per cent</td>
</tr>
<tr>
<td>Number of patients</td>
<td>55</td>
<td>98</td>
</tr>
<tr>
<td>Backache</td>
<td>54</td>
<td>95</td>
</tr>
<tr>
<td>Sciatica</td>
<td>52</td>
<td>95</td>
</tr>
<tr>
<td>Neurological deficit</td>
<td>20</td>
<td>36</td>
</tr>
<tr>
<td>Limitation of straight leg raising (&lt;75 degrees)</td>
<td>47</td>
<td>85</td>
</tr>
</tbody>
</table>

Table II. Analysis of results for the 65 patients in Group B

<table>
<thead>
<tr>
<th></th>
<th>All (65)</th>
<th>Male (47)</th>
<th>Female (18)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Average age (years)</td>
<td>Number</td>
</tr>
<tr>
<td>Without myelography</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ operative findings</td>
<td>53</td>
<td>37</td>
<td>38</td>
</tr>
<tr>
<td>− operative findings</td>
<td>3</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>With myelography</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ operative findings with + myelographic findings</td>
<td>7</td>
<td>43</td>
<td>5</td>
</tr>
<tr>
<td>− operative findings with − myelographic findings</td>
<td>2</td>
<td>39</td>
<td>2</td>
</tr>
</tbody>
</table>

and in three patients the myelogram had been performed before orthopaedic consultation.

The incidence of pain in the lower back radiating to the legs, of neurological deficit in the lower limbs and of limitation of straight leg raising to less than 75 degrees is shown in Table I. Almost all the patients in both groups complained of low backache radiating to the legs. The incidence of neurological deficit in the lower limbs and the limitation of straight leg raising was very similar in both groups, the only difference being in the patients in Group B who had Myodil myelography; these patients showed a much lower incidence of both these clinical signs which had been the reason for myelographic screening.

RESULTS

Group A (55 patients). At operation a disc lesion was found in 49 (89 per cent) of the 55 patients. In five of these 49 patients, the radiculogram was normal, although in one patient, a man aged 58, there was an abnormality on the opposite and asymptomatic side. The other four patients with false negative results included a woman aged 56 years with lateral recess stenosis and three other women aged 27, 29 and 42 years.

In 44 patients the radiculographic and operative findings were both positive, although in 14 of these patients there were discrepancies in the number and level of the lesions: in five patients radiculograms showed abnormalities of two discs whereas at operation only one disc lesion was found; in two patients, operation revealed two disc lesions whereas only one disc lesion had shown on the radiculogram; and in the remaining seven patients the radiculographic abnormality was at a different level to the operative finding. The discrepancy in the level of the disc lesion was by one disc, except in one patient where there was a discrepancy of two discs.

No abnormality was found at operation in six patients, five of whom had negative radiculography. The sixth patient, a man of 29 years with a clinical diagnosis of a lesion at the lumbosacral level and a radiculographic abnormality at L4–5, had no abnormality at either disc.

Taking Group A as a whole, there was complete agreement between radiculographic and operative findings in 35 patients (64 per cent), the radiculograms were either falsely positive or negative in six patients (11 per cent), and in 14 patients (25 per cent) radiculography was helpful in that it showed a disc lesion, although the number and level of the lesions did not correspond to operative findings.

Group B (65 patients). Analysis of the results of the 65 patients in Group B is shown in Table II. At operation a lesion of a disc was found in 53 (95 per cent) of the 56 patients who had not had myelograms. The three patients with negative operative findings were aged 27, 29, and 33 years; none had any neurological deficit in the lower limbs. One was found to have tuberculous meningitis and a tuberculous focus in the body of the third lumbar vertebra one year later.

Seven of the nine patients who had had Myodil myelography before operation had positive myelograms that were confirmed at operation. In the other two
patients both the myelogram and the operation were negative. One of these patients was mentally subnormal and the other was later found to have disseminated sclerosis. Therefore, of the 58 patients submitted for operation on clinical grounds alone, 53 (91 per cent) had a lesion of a lumbar disc.

DISCUSSION

Surgeons vary greatly in their use of radiculography in the assessment of patients with suspected disease of a lumbar disc. The reasons usually given for performing radiculography in these cases are to confirm the diagnosis of a prolapsed disc, to localise the level of the lesion and to exclude the possibility of a tumour (Coppola 1978). Publications which demonstrate the superiority of a water-soluble medium suggest that more frequent use of this technique is indicated to improve the management of these patients (Grainger et al. 1971; Coppola 1978). Nachemson (1976) states that the rate of correct diagnosis of a prolapsed disc before operation rises from 70 per cent to 90 per cent with the addition of radiculography to clinical examination. This implies that the routine use of radiculography before operation should lower the number of negative operative explorations with their usually poor prognosis. However, although various studies have shown radiculography to be a relatively accurate and reliable screening technique with an 80 to 90 per cent correlation with operative results (Hirsch, Rosencrantz and Wickbom 1969; Spangfort 1972; Danziger and Bloch 1973), its routine use, especially in patients with a typical clinical syndrome, is open to question.

It has been stated that the accurate localisation of the level of the prolapse by radiculography is important because surgical exploration may then be confined to the appropriate level (Hirsch et al. 1969; Coppola 1978). However, this is probably only useful when the clinician is uncertain of the level. With a clearcut clinical picture of involvement of a single nerve root, the appropriate disc will be explored first, rather than that indicated by the radiculogram. Indeed Edgar and Park (1974), in a detailed analysis of clinical assessment, stated that using the straight leg raising test is probably more reliable than radiculography, particularly for a lateral protrusion, and could predict a lumbar disc lesion in 80 per cent of patients. Cook and Wise (1979) correctly predicted the level of disc lesions based on plain radiographs of the lumbar spine in 71 per cent of patients.

In the present series, there was no significant difference between the two groups. The control group with myelography did not contain more patients with classical symptoms and signs. In fact the patients of both groups had a remarkably similar incidence of the symptoms of low backache, sciatica, and signs of limitation of straight leg raising and neurological deficit. Hence, judging from this study, patients with a typical clinical picture of a lesion of a lumbar disc may be operated on with a low risk of negative exploration and will thus avoid the side-effects of radiculography.

As stated earlier, many papers have reported a high degree of accuracy in the diagnosis of disease of the lumbar disc by radiculography. The best figures appear to be those of Fassbender, Häussler and Stössel (1958); at operation, they confirmed 97 per cent of the disc lesions shown at radiculography in 417 patients, but they also found lesions in 86 per cent of 53 other patients who had been regarded as showing no abnormality at radiculography. Such papers do not seem to admit to the existence of equivocal results of radiculography, as seen in Group A in this paper, where, in many patients, the radiculography was somewhat confusing with variable discrepancies between radiculographic and operative findings. Cook and Wise (1979) also found similar discrepancies and we agree with their suggestion that previous papers on this subject have tended to maximise the agreement between the radiculographic and operative findings by various methods such as the separation of false negative radiculograms and the exclusion of inadequate myelograms. Indeed the true incidence of false negative myelograms may be much greater, as many patients with a clinical diagnosis of a lesion of a lumbar disc, but with a normal radiculogram, are not subjected to an operation. How many of these really have a disc lesion is not known.

It may be seen therefore that there is a significant incidence of equivocal, false positive and false negative radiculography, the latter possibly being rather higher than it seems. The known incidence of side-effects and the increased use of radiological facilities are further reasons why radiculography need only be used in selected cases, especially when one considers that an operation based largely on clinical grounds is likely to give similar results (Naylor 1974). We conclude therefore that there is little justification for the routine use of radiculography before operating for a lesion of a lumbar disc. It seems quite possible that computerised axial tomography could prove to be a more useful method of investigation.

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