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Intraarticular Facet Block: Diagnostic Test or Therapeutic Procedure?[1]

The specificity of the intraarticular facet block as a diagnostic test for facet joint disease is currently unknown. Capsular rupture with epidural and periarticular diffusion is probably responsible for many false positive findings. We found a comparatively low success rate of the procedure in 25 patients in whom maximal volumes were strictly controlled to avoid extravasation.

Index terms: Spine, arthritis • Spine, facet joints, 36.775

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THE assumption that the facet joints may be an important source of low back pain was originally suggested by Ghormley (1) and has recently been popularized by Rees (2). However, there is some evidence to suggest that the operative procedure that Rees described as rhizolysis is, in fact, a myofasciotomy (3). The success of this therapeutic procedure encouraged other investigators to work in the same direction. Shealy's (4) radiofrequency lesion is a sizable one and could include many if not all of the branches of the posterior ramus (5); since other posterior paraspinal structures may be denervated, a successful procedure does not imply facet joint disease. There is also good evidence that spread of the local anesthetic during facet block can be such that a more extensive anesthesia occurs than is possible to reproduce with a radiofrequency lesion, as illustrated by the failure of denervation in a significant portion of positive blocks (5). Routine extravasation of the contrast agent, especially in the epidural space, during lumbar facet joint injection is well known (6, 7). It may permit the anesthetic injection subsequently to diffuse widely and conceivably involve branches of the sinuvertebral nerve, relieving pain from any spinal causes. It is also possible that corticoid medication, often added to the solution, diffuses in the posterior periarticular tissues during capsular rupture, resulting in a therapeutic infiltration, which is known to be quite successful in the treatment of myofascial pain syndrome (8). We firmly believe that pain may originate from other sources than the facet joints including such posterior elements as ligaments (9) or muscles and fascia (3). Even in those circumstances, pain may be relieved by Rees's procedure, which may be a myotomy; by Shealy's denervation, when the lesion involves more branches than expected; or by intraarticular block following a rupture of the capsule and diffusion of the anesthetic solution, with or without steroids.

This discussion is purely academic when the procedure is a therapeutic end in itself since any improvement in a patient who has intractable pain is welcome. But the problem is real when a positive response is interpreted by the referring orthopedist as a relative indication for surgical fusion, which is often the case at our institution. For this reason we have tried to increase the specificity of the test by preventing extravasation simply by restricting the total volume of fluid injected in each joint to 1 ml. We believe that the striking diminution in the success rate compared with a previously reported success rate (6) is worth some discussion.

MATERIALS AND METHODS

The population studied included 25 patients who were suffering from chronic back pain. There were 21 men in the third to fifth decade and four women who ranged in age from 18-72 years. This population was subdivided into five groups: nonsurgical patients with normal findings on plain radiographs (Group I, seven patients); nonsurgical patients with degenerative changes seen on plain radiographs (Group II, six patients); postdiskectomy patients (Group III, six patients); postdiskectomy patients who had undergone bilateral surgical fusion (Group IV, four patients); and those who had Grade I spondylolisthesis (Group V, two patients). All patients were referred by

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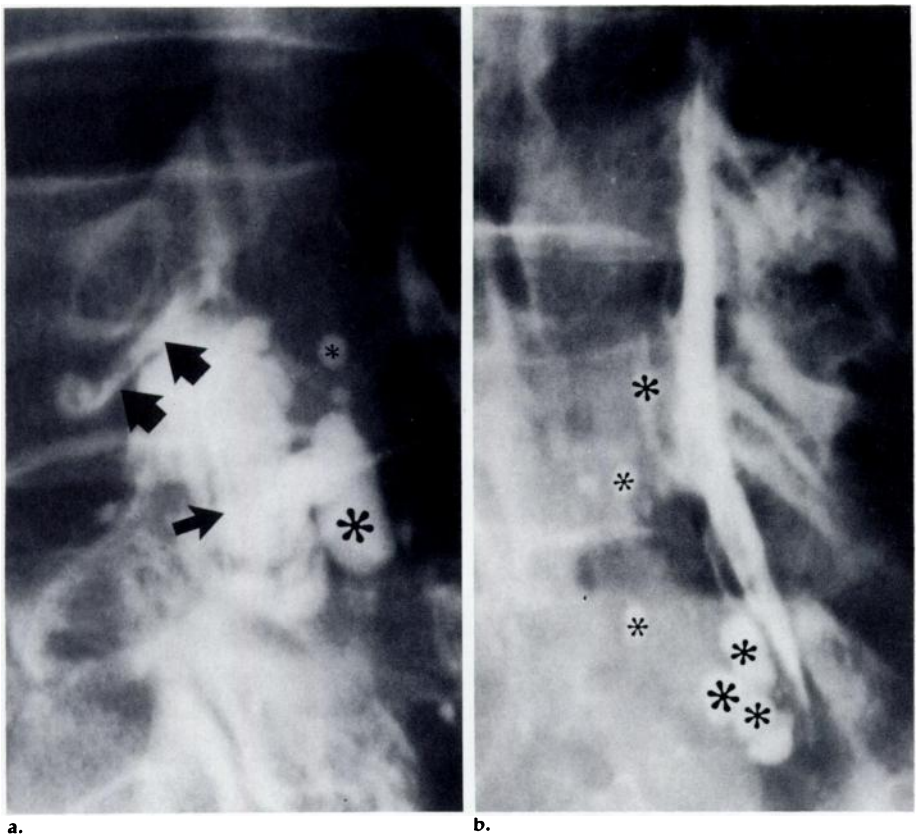
See also the opinion by Murphy (pp. 533) in this issue.

TABLE I. Results of Facet Block

	Groups					Total
	I	II	III	IV	V	
Number of patients	7	6	6	4	2	25
Positive results	0	1	1	2	0	4

Figure 1



a. b.

a. Arthrography after injection of 1.5 ml of metrizamide (300 mg I/ml). The contrast material is present in the joint space (black arrow). Extravasation into the intervertebral foramen is documented by opacification of the epidural space below the segmental nerve (arrowheads).

b. A total injection of 3 ml (same patient, opposite oblique projection) resulted in epidurography. Note persisting oily contrast material in the subarachnoid space from a previous myelogram (*).

orthopedic surgeons for examination when the complete clinical and radiological investigation, including plain radiography, nuclear imaging, metrizamide or Pantopaque (iophendylate injection) myelography, and, for patients of Groups IV and V, both CT and conventional tomography and diskography, failed to demonstrate a pertinent abnormality. (Exceptions included changes from previous surgical procedures and degenerative changes of the facet joints, which when combined with clinical findings would raise the possibility of a cause and effect relationship.) The patients were suffering from chronic unilateral or bilateral low back pain, with or without radiation to the hip or leg, that was not relieved by rest, physiotherapy, or a course of antiinflammatory analgesic therapy. They had no neurological findings on physical examination. Those patients who were eligible for examination had no definite clinical or radiological diagnosis: they did have persistent symptoms that usually conformed to a poorly defined clinical syndrome of localized low back pain and tenderness, with or without radiation, and with varying temporal factors and relationship to rest and activity.

The facet blocks were all performed with 22-gauge spinal needles that were inserted under fluoroscopic control into the joints of interest without previous infiltration of the subcutaneous tissue with a local anesthetic. Strictly less than 0.5 ml of metrizamide (300 mg of iodine per ml) was injected to demonstrate the intraarticular position of the needle. Anesthesia was then achieved with 0.5–0.7 ml of lidocaine (2%), for a total injection of less than 1 ml. All blocks were bilateral. Multiple levels were performed sequentially in caudo-cephalad progression when no significant improvement was achieved at the preceding level. The levels selected were: those cephalad to the fusion, and the joints not incorporated into the fused mass, as seen on plain radiographs for Group IV; the last mobile lumbar segments, followed by successive cephalad levels until L2–L3 was reached, in all other patients. A positive block occurred when more than 50% of the pain disappeared following the procedure for any period of time from minutes to days. A negative block occurred when all the levels previously selected had been tested without success. The patients were interviewed 24 hours, seven days, and three to six months after the examination to assess a possible change in their symptoms.

RESULTS

Results are summarized in TABLE I. Extracapsular extravasation was not seen in this series. Four patients showed complete (two patients) or incomplete (two patients) improvement of a time varying from two hours to 48 hours; there was no long term success and no long term change in symptomatology.

Eight patients spontaneously complained of moderate to severe exacerbation of back and leg pain for 24 to 72 hours, sometimes similar, sometimes different from their original symptoms.

DISCUSSION

There is currently no strict scientific way to identify facet joints responsible for significant pain in patients who have low back symptoms. Overlapping and poorly defined clinical syndromes, absent or misleading unrelated radiographic findings, empirical medical and nonmedical treatments make patient selection difficult. Often, the possibility of a facet syndrome is raised when all other diagnostic possibilities have been excluded. Furthermore, many still question the existence of such an entity. The relationship between facet joints and unexplained chronic low back pain, which was suggested by Ghormley (1), was popularized by successful but empirical operative procedures. To explain their success (2, 4), investigators developed theories to link a poorly defined structural lesion (5) with an interesting intellectual concept, but they did not provide a strict experimental basis. The facet block, originally devised for preoperative selection of patients, seemed to result in longterm therapeutic benefits in some patients (5). The longterm effect of the injection of local anesthetic agents, already difficult to understand, was further confused with the subsequent addition of steroid agents in other studies in an effort to increase the rate of therapeutic success. The lack of patient-selection criteria, the poorly defined clinical syndromes, the frequent absence of

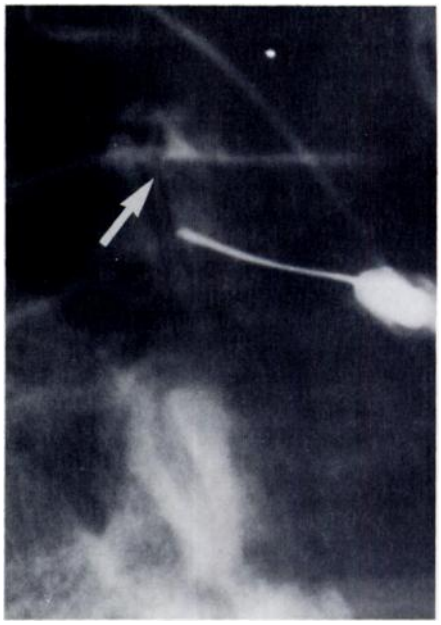
morphological abnormalities, the uncertain location of the infiltration, the obscure short and longterm results with different cocktails of local anesthetic, and the use of corticoid and radiopaque substances, coupled with the absence of an experimental basis for the pathogenic concept make assessment and comprehension in this field an almost impossible task.

Our effort has focused on the diagnostic aspect of the facet block procedure. In our institution there was a need for a procedure that could identify the individuals who were suffering from pain presumably originating from facet joints, who would benefit from a surgical fusion, the current therapeutic procedure favored by our orthopedic surgeons for this condition. Our preliminary experience with periarticular facet block under fluoroscopic guidance and intraarticular block with arthrography and injection of xylocaine (without corticoid), although frequently successful and sometimes with longterm therapeutic benefit, was difficult to understand. Popular explanations were capsular rupture of an adhesive capsulitis or the placebo effect. Nevertheless, we seriously questioned the specificity of our results. We established the current study with one hypothesis in mind: a specific diagnostic test occurred if pain relief followed administration of anesthesia that was strictly confined to the facet joint.

The total capacity of the lumbar facet joint capsules is somewhat between 1–2 ml (10). If more than this amount is injected, extravasation occurs, most frequently in the epidural space and often in the intervertebral foramen or in other paraspinal tissues (Fig. 1). The subsequent injection of an anesthetic agent is then not restricted, and the specificity of the test is lost. Previous authors have used large quantities of fluid and, as expected, report routine extravasation (6, 7). The success rate of such studies is high, but we question the specificity of the results. Mooney and Robertson (11), in their classical work, tried to delineate the pattern of pain radiation from the facet syndrome following injection of extraordinary quantities of contrast agent, saline, and lidocaine, (total of 4–9 ml), which certainly did not respect the articular capsule. Since the intraarticular facet injection was developed according to this study, we feel there is still no strict scientific data suggesting the diagnostic validity of this procedure. Its therapeutic value, even if poorly understood, is certainly well appreciated in clinical practice. With some experience, 0.1–0.3 ml of contrast agent is almost always sufficient (Fig. 2). The intraarticular position is proved when the drops freely escape from the joint surface to lodge in one of the recesses. We have used a small volume of lidocaine, but of a greater concentration (2%), and this volume was less diluted in contrast agent. For these reasons, we believe the effectiveness of the procedure could not be different on this basis alone. Being aware of the possibility of capsular rupture, we have used metrizamide to decrease further the possibility of root irritation described when water soluble contrast material reached the epidural space (12). In this, series, we have not seen extracapsular extravasation, although, it could be argued there was insufficient contrast material for accurate detection. Whether the combination of metrizamide and local anesthetic could be responsible for the changes in the results is currently unknown. The addition of steroid substances to the injected solution was an option we rejected for our purposes. Since diagnosis of the condition was our first goal, steroids would not help select the target population; what should we conclude if a patient did not respond to the anesthetic block but improved with steroids on a longterm basis? The myofascial pain syndrome is another well known nonfacet joint cause of pain often improved by local infiltration of steroids. Longterm benefit, although unexplained, is known to occur with xylocaine alone in patients with the facet syndrome (5). These very confusing therapeutic results, although welcomed by the patients, do not permit scientific analysis. We hoped to clarify this matter by excluding this additional variable and observing whether longterm improvement would still occur without steroids and without capsular extravasation. Steroids may be beneficial in the management of these patients; the absence of any longterm success in this series may give support to this speculation.

The population we studied was small. After performing more than 80 arthrograms for a possible diagnostic yield of four cases, we felt the study had to be stopped for further evaluation. The group was subdivided as previously described to appreciate better its heterogeneity and its probable similarity to most groups referred for such a test. Our overall response rate of 16% (four patients) for temporary relief and the absence of longterm therapeutic benefit was in striking contrast to the 54% initial improvement rate (including 11 patients with longterm relief) reported by Destouet (6). It is easy to incriminate a significant difference in the population studied as the sole factor involved. For reasons already mentioned, apart from exclusion of other entities, such as disk herniation, patient selection is a difficult problem. Our current hypothesis to explain the discrepancy in results involves the contamination of the results by patients not suffering from facet joint disease in studies where extravasation from the capsule was not kept at a minimum rate. These results may in fact support the thesis that proposes that most patients responding favorably to the conventional facet block are affected by an extra-articular disorder rather than a genuine arthropathy. Alternatively, capsular distention or rupture may have a therapeutic value.

Figure 2



An injection of 0.1 ml of metrizamide (300 mg I/ml) was sufficient to demonstrate the intra-articular position of the needle in this patient.

The evaluation of the diagnostic value of the intra-articular block is currently impossible because of the absence of any reliable marker of facet joint disease. In our opinion, CT will increase the detection of morphological abnormalities without giving any more indication of their clinical significance, as is often the case with conventional radiography.

Because of the possible effects of patient selection, it is impossible to make dogmatic conclusions. However, we feel that a search for a precise diagnosis is an important preliminary step to the identification, characterization, investigation, and treatment of a clinical entity. This study may suggest two different approaches. When the intraarticular facet injection is performed mainly for therapeutic

purposes, utilization of relatively large volumes, and the addition of steroids, may be indicated. But when a specific diagnosis of facet joint disease is mandatory, extra care to limit the injection to the capsular capacity may have some value.

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