

The Application of Sclerotherapy in Spondylolisthesis and Spondylolysis*

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SLIPPING of vertebrae, spondylolisthesis, and the oft associated spondylolysis, destruction of a portion or portions of a vertebra, are thought to be due to aplasia, dysplasia and/or trauma.^{1,2} We shall neither join nor enjoin the controversies concerning the etiologies. We shall present our evidence and hope to interest and to transfer some of the discussion to a more meaningful field: therapeutics.

It is generally agreed that the cause of the disability in these cases is the mechanical instability of the resulting abnormal anatomical relationships of the parts involved. The osseous elements have lost their integrity and with it their ability to contribute to the basic stability of the spine where involved. This important function now devolves upon the ligamentous and muscular systems and they do a tremendous job until the odds become too great against them.

Ligaments are the structures which bind the joints together and are grossly responsible for the continuity

of joint function. As the degeneration of the components of the joint continues and the now lax state compounds, the ligaments may be unable to contribute much, even with the help of local intimately placed tendons of associated muscles, except to prescribe the limits of the hypermobility.

Rectification of this laxness with the use of sclerosing solutions properly and adequately injected into these affected ligaments both shortens and strengthens them to the point where they may regain their purchase and stabilize the embraced articulation.

Obviously there are some situations which are irreversible with this therapeutic weapon. We have tried to help Charcot's joint but the results have been inconclusive and transiently beneficial at best. There is still no substitute for plication of the grossly stretched ligament accompanying some dislocations or transpositions under other circumstances. Bony fusion also has its place.

We have found, on the other hand, that sclerotherapy is especially effective in treatment of the

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conditions under discussion in our series of cases. Whether the posterior arch has been separated and is gliding posteriorly while the anterior arch with the body proceeds in the opposite direction, or the whole vertebra is gliding forward or backward for that matter, makes little difference in our approach. The same ligaments are involved and it follows that the same ligaments are treated.³ Even in those vertebrae which have migrated to the limit anteriorly and then have suffered total degeneration of the underlying supporting disc annulus, we have succeeded in restoring the necessary functional stability with relief of pain.

Before attacking the segment directly involved, we ascertain the condition of the underlying supporting structures: the sacroiliac joints, and if the patient can tolerate the existing pain, we try to inject and stabilize them before proceeding elsewhere. On occasion this is all that we have had to do. The pain stopped and the patient chose not to pursue the subject beyond this much desired point.

The retrolisthitic vertebra occasionally will respond to direct pressure over the spinous process in the direction of the normal with the patient prone and flexed over a table break. The relief of pain is dramatic as is the ease with which the vertebra can be held in place

with sclerotherapy to the interspinous and supraspinous ligaments.

The technic of this treatment is first to lay sufficient anesthetic solution into the superficial tissues staying above the supraspinous ligament in order not to dilute the therapeutic agent to be placed deeper. After a few moments this is followed through the same needle hole with the desired amount of the selected sclerosing solution using a 1½" No. 22 needle depositing it in desired amounts into both ends of the ligament as recommended by Hackett⁴ or throughout it as recommended by us. Smaller amounts are used at first to test the patient's sensitivity but later if progress is delayed and larger doses are needed to build up tissue, they must be used regardless of pain. Strong analgesics, even narcotics, may be used for control of postoperative reactional pain.

The olisthitic vertebral body also must be controlled and can be by reaching the lateral spinal ligaments and building them strong enough to restrict its motions and bind it to the underlying sacrum or vertebrae as the case may be. It is not always easy to reach and identify the lateral ligament via the posterolateral route, especially when complicated by a laterally shifted pelvis with a spastic psoas or by a lateral or rotoscoliosis. We use a 4 or 4½" Pitkin spinal needle depending up-

on the estimated depth of the target. Estimation of the depth will depend upon the amount of subcutaneous tissue, the type of pelvis and build of the patient, as well as a good look at the films of the lumbar spine about to be treated. We treat only with the films on the view boxes and almost never without consulting them.

The patient is prone and flexed over a table break: the initial needle puncture should be made with a 3" No. 20 needle above the crest of the ilium at about 4" to 4½" from the supraspinous ligament of the same segment as the deeper lateral ligament about to be treated. It is carried down to the intertransversarial fascia but again not through it, laying the selected anesthesia in about equal amounts ahead of the advancing needle subcutaneously, above and below the fascia and into the belly of the muscles traversed. No anesthesia should be placed below the intertransversarial fascia unless there is so much extreme local tenderness that the area and the indwelling lumbar nerve must be blocked in order to instrument it. This happens occasionally and only needs about 1 or 2 cc. of mild 1% procaine.

Through the same needle hole the 4" or 4½" Pitkin needle is inserted at an angle of about 45 degrees with the sagittal plane and directed caudad to a perpendicular dropped in

the same plane from the supraspinous ligament. This will usually take the needle tip across the transverse process and through the fascia on its way to the involved lateral spinal ligament. The nerve root may be interposed and some slight change in position may have to be made to circumvent it. The ligament is yielding on contact with the exploring needle as opposed to bony contact and the ligament is sometimes very tender on contact. This tenderness was first noted over the posterior spinal ligament of the disc by K. Lindblom in his studies with discography⁵ more recently again by Cloward with an interesting approach to therapy.¹ All maneuvers of the needle are guided with end-to-end pressures while the fingers of the operator's other hand palpate the advancing stem on a true course.

The foregoing applies very well to both L-4 and L-5 segments but must be varied to approach the deeper structures in about the transverse plane, about opposite the spines at L-2 and L-3 at about the same angle. L-1 is avoided if possible for obvious reasons.

Intensive disc ligament treatment with multiple separate injections are used unilaterally as necessary but undertreatment is generally administered in our practice hoping to give mother nature a chance to exert her influence. We treat the sacroiliacs bilaterally through an

anesthetized zone above the joint, injecting the posterior ligaments at about five points equally spaced from top to bottom and placed deeply into the short capsular ligaments where the sclerosing action of the solution can have its greatest effect. The interspinous and supraspinous areas may be treated singly or in multiples as the patient or doctor desire.

Positioning the patient for injection and examination can run concurrently since after the initial diagnostic visit, one tests the treated segments to note if improvement in the chief complaint mirrors the locally stepped-up stability.

The interspinous and supraspinous ligaments can be tested by direct palpation with flexion and extension in lateral decubitus and treated where they lie in flexion for better exposure of the spines. The sacroiliac ligaments are best examined and treated in the prone position. Pressure over the sacrum will sometimes produce a separation unilaterally or bilaterally and indicates an unstable joint. Likewise, deep palpation of the sacroiliac joint tissue, the while extending the fully extended lower extremity, will often quickly illustrate the abnormal motion, though in extreme tenderness it is difficult to elicit due to spasm.

Injection of the selected anesthesia is followed by treating solution through a single puncture wound in

the skin medial to the ilium in the direction of the joint fissure. The anesthesia is fanned out over the ligament throughout its full length and the sclerosing solution injected into the depths of the short sacroiliac or, in my opinion, better labeled the capsular ligaments. The latter is placed in these deeper ligaments in one or two minim doses or smaller or larger as tolerance is noted.

Return to normal full activity is predicated upon several things. The condition of the patient's general health must be considered. We have had chronic cardiacs regain their back stability and feel so well that they overdid with subsequent serious involvement. These people must be warned about physical exertion and likewise any inactive person cannot return to normal activity too soon. We can slow this return by lengthening the interval of treatment and not allowing ligaments to heal too fast. We do not allow formal exercises but recommend swimming since it is exercise without weight bearing and the patients like it.

We do not allow our patients to do heavy work until the ligaments have been built up to a state of capability necessary to accomplish the work with no harm to the organism. We rate our ligament status on resistance to needle penetration

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and resistance to instillation of solutions and use -1 to 4+ to grade them mathematically, similarly to other situations in medicine. At about 3+ we start heavier duties, all things being equal, and when the joint under manual control feels as if it were recovering its stability. In the more rigorous occupations with real heavy lifting, we stop treating only at 4+ and return the patient to work.

On selection of solutions, remember that new ones are coming out all the time and many have been tried and found wanting. Better ones may come and should be given clinical trial by each operator to his own satisfaction. Certain problems of weight bearing demand heavier and stouter ligaments as is required in the sacroiliac region and may require more irritating solutions including those incorporating more organized material in the form of silica or talc. In the disc ligament, we have found the use of a stock solution recommended to us by Biegeleisen and found in Hackett's books containing: zinc sulphate 8.0 gm., phenol crystals 12.0 gm., glycerin 24.0 gm., sterile aqua dist. q.s. 100 cc. One cc. of this solution is added to each 9 cc. of novocaine or 2% procaine and used as a sclerosing solution in

small half cc. amounts. It should be shaken before using each time since the glycerin has a tendency to settle. Sylnasol has gone off the market so if a soap is insisted upon, others are available for trial in various percentages. Farnsworth No. 61 is a solution we have used extensively in rather large amounts and we have had little trouble with it. In any case, start with small amounts and graduate them to the patient's tolerance for pain of the reaction.

Allergies are our principal and most unexpected problems and are most often immediate. I have seen them delayed several hours, however, but even though they appear that late are fairly severe. Antihistamines may be employed prior to administration of treatment and can be quite helpful. We keep Adrenalin 1-1000 readily available on our trays for emergency treatment should it be necessary.

Statistical Studies

We have 28 cases to report who range in age from 17 to 84. Almost one-half, or 13, were in the 4th decade of life when they became symptomatic enough to call on us for help. We had only one patient in the teens and the 6th, 7th and 8th decades with two patients in the 2nd, four in the 3rd and five in the 5th decade.

The length of time from when the

patients began treatment to when we were consulted ranged from one to eleven years, averaging five years for all. We were able to maintain all of the patients with a 100 per cent follow-up.

Various types of occupations were well represented ranging from the more sedentary to the more active and athletic and the heavy-lifting life of the farmer.

Skidding was seen in the films to range from 10 per cent all the way to 50 per cent. Two of the latter patients exhibiting this were seen with total degeneration of the underlying disc, the disc ligaments stretched to their limits and the drifting body perched atop the body below. One of these was quite stable and required only treatment to the sacroiliac and inter- and supraspinous ligaments, the other patient required additional treatment to the lateral spinal ligaments before the needed relief was obtained.

Three patients complicated with further disc degeneration and increased their percentage skid of the body. This represents only about 10 per cent and is approximately the rate of the same complication, found in previous studies,⁶ in our whole group of back problems. We feel it follows then that disc degeneration is not necessarily ubiquitous to the olisthitic vertebra and probably has the same etiology extant in other vertebral problems.

Twenty per cent of our patients were females which corresponds to other studies. They responded to this treatment in a direct proportion with the response of male patients.

Good results were obtained in all but two cases. One was given a fair rating and another was a failure, the latter being complicated with a spastic paraplegia with ultimate relief of pain from a surgical spinal fusion and confinement to bed for five months. The patient rated fair discontinued treatment for financial reasons and is being contacted with the hope that she will accept charitable care with the thought that her condition might be improved with further treatment.

Definitions

1. *Retrolisthitic*: Posterior slipping.
2. *Olisthitic*: Adjective form of olisthy meaning a slipping, as the slipping of the bones of a joint from their normal relation in the joint.
3. *Rotoscoliosis*: Rotation with scoliosis.

References

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