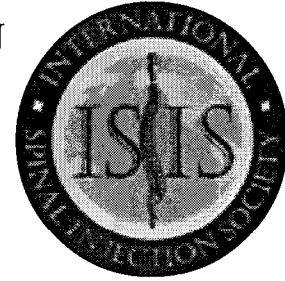


# **RETROGRADE EPIDURAL LYSIS OF ADHESIONS IN A PATIENT WITH RADICULAR PAIN FOLLOWING L1 TO S1 POSTEROLATERAL INTERBODY FUSION WITH HARDWARE**

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## **Background and Objectives:**

Lumbar radicular pain after multi-level spinal instrumentation is a common presentation at pain centers. Although spinal cord stimulation as a treatment modality has demonstrated long term efficacy in properly selected patients, this may not be an option due to socio-economic, psychological or patho-anatomical reasons. Epidural lysis of adhesions by the caudal route (Racz procedure) or transforaminal route (Hammer, M.) may not be possible either secondary to extensive scarring or obstruction to needle access (for placement of a catheter in the epidural space). Dense scar tissue may create an impasse. This case presents a technique whereby a needle was placed at the T11-T12 interlaminar space using a retrograde approach to successfully navigate a catheter to the fourth lumbar nerve root in a patient who had undergone an L1 to S1 posterior lateral interbody fusion to treat low back pain and radicular pain.

## **Methods:**

A 45 year old Caucasian female presented with a six month history of intractable low back pain and radicular pain. Her radicular pain was of recent onset; however, she had suffered from low back pain for several years following an L1 to sacrum fusion with hardware. All conservative treatments had failed to give the patient any relief, and attempts at fluoroscopically guided epidural steroid injections were unsuccessful. Neither spinal cord stimulation nor intrathecal drug administration system implantation was an option due to patient refusal.

## **Results:**

Retrograde epidural lysis of adhesions decreased the patient's pain by 70% as well as total narcotic consumption. Functional restoration including easier ambulation, better quality of sleep, etc. were noted.

## **Retrograde Epidural Lysis: M. Hammer, MD - *Continued***

### **Conclusion:**

Patients with longstanding low back pain and radicular pain following spinal surgery are frequently referred to pain clinics after failure to respond to conservative treatments. Spinal injections, i.e., selective epidural steroid injections, and lysis of adhesions using the Racz technique, often help to alleviate radicular pain and are part of an algorithmic approach to treating intractable radicular pain of spinal origin. We present a case of lumbar radicular pain in a patient with an L1 to sacrum fusion with posterior instrumentation (P.L.I.F.) where traditional approaches to injection (caudal, segmental intralaminar, transforaminal) were not feasible due to the extent of surgery. An interlaminar thoracic retrograde catheter was navigated to the patient's lesion and proved effective in relieving the patient's pain.

### **Case Report:**

A 45 year old, right-hand dominant, Caucasian woman was referred to our pain treatment center with intractable low back and radicular pain. Her original complaint began six years prior to the initial operation to repair a herniated lumbar disc. She subsequently underwent several spine operations including fusion with instrumentation. Her pain symptoms (primarily involving the low back) were manageable for several years. However, six months prior to evaluation at our pain treatment center she developed pain radiating down her left lower extremity from the anterior lateral thigh into the foreleg, medial aspect of the ankle, and extending to the arch of the foot. She described the pain as a hot, stabbing, shooting, burning pain, on a visual analog scale, rating the pain as 7 out of 10. She had undergone fluoroscopically guided epidural steroid injections at another pain treatment facility with minimal, transient relief. She had frequent and early awakening due to pain, which was exacerbated by any physical activity, movement, sitting, standing, sneezing or coughing. The patient denied bowel or bladder incontinence.

### **Social History:**

The patient was a full-time social worker for the Alabama Department of Human Resources. She smoked one and a half packs of cigarettes per day times 23 years. She had no history of alcohol or substance abuse. She had long term depression for which she was seeing a psychiatrist every three to six months.

### **University of Pittsburgh Pain Institute Multiaxial Assessment of Pain Taxonomy System Classification:**

She demonstrated a psychologically dysfunctional profile, as evidenced by elevations in pain severity, interference, low life control, reduced social activities and impaired ability to perform household chores. However, she demonstrated increased outdoor work and activities away from home.

### **Medications:**

K-Lan 375 mg tablet, 1 ½ tablets q. d., Zantac 150mg b.i.d., Tranxene 7.5 mg q.d., Zolofit 100 mg q.d., Darvocet 1 tablet q. 4 to 6 hours PRN pain. The patient refused any increase in her opioids or any other coanalgesics due to a previous experience following a surgery four years prior to this evaluation. At that time, after spinal surgery she developed some neurological symptoms including decreased motor skills, difficulty with her eyesight and coordination secondary to a cerebrovascular accident.

**Retrograde Epidural Lysis: M. Hammer, MD - Continued**

**Past Medical History:**

Mitral valve prolapse; hiatal hernia; depression.

**Past Surgical History:**

Kidney transplant donor

**Physical Examination:**

The patient was a well-developed, well-nourished white female in no acute distress. She was fully cooperative during the physical examination and interview. She was not displaying any overt pain behaviors. The patient had an antalgic gait favoring her right leg secondary to pain. Heel to toe walking was normal.

**Deep Tendon Reflexes:**

Knee jerk, medial hamstrings and Achilles deep tendon reflexes were 2+ bilaterally. No ankle clonus was noted.

**Muscle Strength:**

Muscle strength including L1 through S1 myotomes revealed a full 5 out of 5 strength bilaterally.

**Neural Tension Signs:**

Straight leg raise testing on the left was positive at 35 degrees for L4 radicular pain, negative on the right at up to 65 degrees for low back pain only. Patrick's maneuver was negative.

**Sensory Test:**

Sensory testing to pin prick and light touch revealed left-sided decreased sensation in the L4 distribution from the anterior thigh to the foot.

**Range of Motion:**

Range of motion of the lumbar spine was non-existent with all movement taking place at the hips.

**Special Observation:**

There were no signs of sympathetically mediated or maintained pain such as cyanosis, clubbing, edema or hyperhidrosis. Examination in the prone position of the paraspinal muscles revealed minimal tenderness. No underlying spasm was noted. Hamstring tension was not present. Piriformis examination was negative. Pressure over the posterior superior iliac spine was not convincing for sacroiliac joint pain.

## **Retrograde Epidural Lysis: M. Hammer, MD - Continued**

### **Impression:**

- (1) Post lumbar laminectomy pain syndrome
- (2) Lumbar radicular pain of six months onset
- (3) Depression
- (4) Nicotine abuse
- (5) Mitral valve prolapse
- (6) Hiatal hernia
- (7) Past history of a CVA with decreased eyesight and hand-eye coordination

### **Plan:**

After studying the patient's films at the clinic, it was obvious that any injection to the L4 nerve root would be impossible using a caudal, transforaminal or intralaminar approach either at or below the level of the lesion. A retrograde approach to epidural lysis of adhesions to the left L4 nerve root was discussed.

### **Procedure:**

After full discussion of the procedure and signing of informed consent, the patient was pre-medicated and brought to the interventional pain treatment center. Under monitored anesthesia care, a 17 gauge Tuohy needle was advanced from right to left at the T11-T12 interspace in a craniocaudal direction. After loss of bounce on a pulsator syringe (Concord®), followed by negative aspiration for blood or cerebrospinal fluid, contrast solution was injected outlining the left-sided epidural space. Biplanar imaging was used to correlate appropriate needle and catheter position throughout the procedures, and multiple spot films were taken for documentation. Using a retrograde approach, a Brevi-Kath® (Epimed) was advanced without difficulty to the left L4 nerve root.

Following negative aspiration, additional soluble contrast was injected outlining the left lateral epidural space to the fourth lumbar segmental level. Four cc's of 0.5% Bupivacaine mixed with 100 micrograms of Fentanyl were injected after a slow infusion of 10 cc's of 10 percent sodium chloride (for chemical neurolysis) followed by 3 cc's of Celestone. The catheter was removed with tip intact, and sterile dressing was applied. The patient recovered satisfactorily from the procedure. Appropriate post-procedure precaution instructions were given with follow up at the pain clinic in ten days.

Upon return to the pain clinic, the patient was essentially pain free. Straight leg raise was negative at up to 60 to 65 degrees for low back pain only, and some sensation was restored along the fourth lumbar dermatome. The patient's normal gait had been restored by her follow up visit.

### **Conclusion:**

Patients suffering from intractable back pain and radicular pain following spinal surgery comprise a large proportion of patients seen at pain clinics. Conservative therapies often fail to relieve their pain, and thus interventional treatments are often considered. Epidural lysis of adhesions has been proven to be successful in a significant proportion of these patients. The indications for lysis of adhesions include radicular pain

### **Retrograde Epidural Lysis: M. Hammer, MD - *Continued***

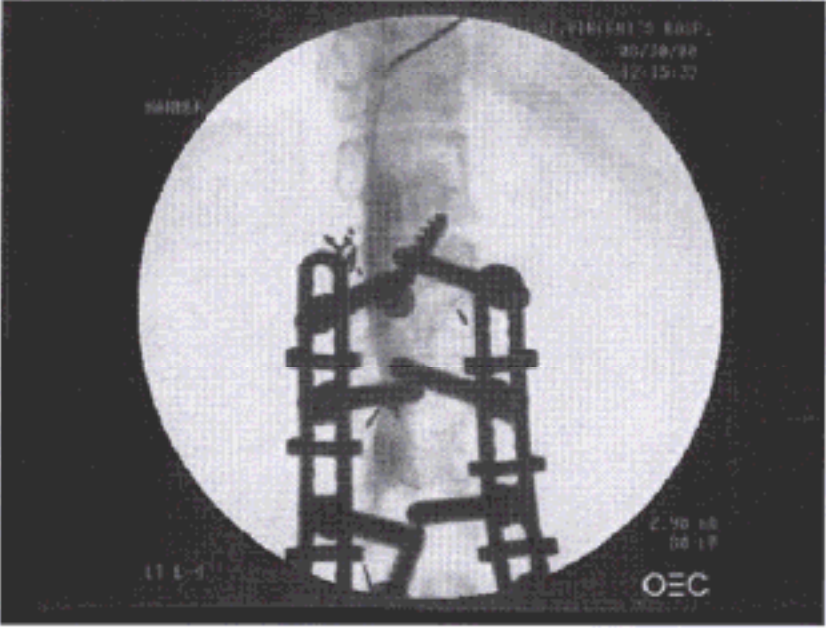
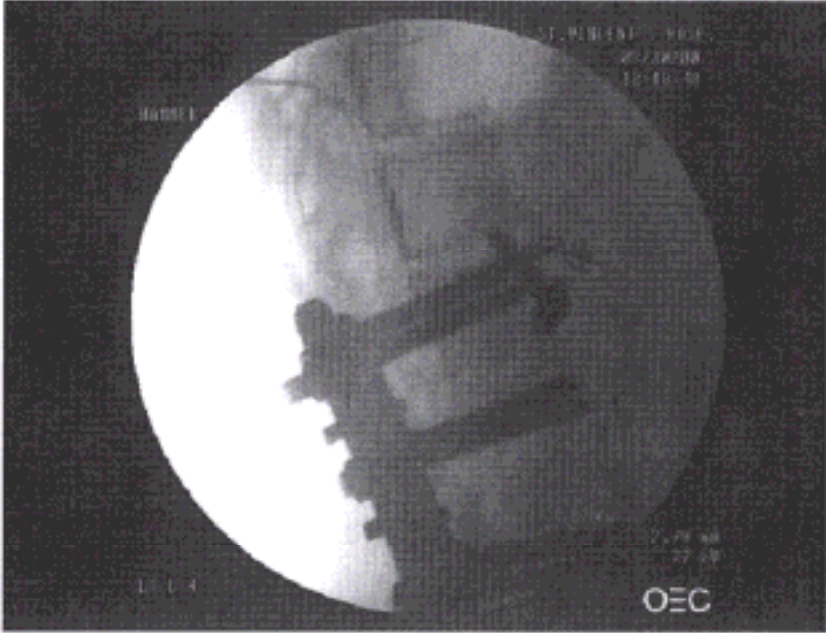
not responsive to conservative treatments and minimal response to selective epidural injections. (Hammer, M) Radicular pain due to epidural scar tissue is difficult to treat. Frequent attempts at lesion-specific injection are unsuccessful either due to anatomical barriers, i.e., posterior lateral fusion, dense scar tissue, etc., preventing medication from reaching the inflamed nerve root. A transforaminal approach at lysis of adhesions may oftentimes be successful. However, due to certain patho-anatomical considerations; i.e., lateral fusion mass, foraminal stenosis, etc. this technique may be contraindicated. Similarly, caudal attempts may fail, due to inability to navigate a catheter to the lesion. Spinal endoscopy may be attempted to reach the root lesion. In the setting of dense scar tissue or surgical destruction of the epidural space, inadvertent dural punctures may often occur, resulting in spinal headache.

With surgical removal of the lamina, traditional posteroanterior injections frequently result in inadvertent intrathecal puncture due to the absence or fragility of the epidural space secondary to the surgical intervention.

Recent interest in a retrograde approach to spinal cord stimulation with selective spinal nerve stimulation (Alo, KM, Yland, MJ, 8, 9,) (Alo, KM) has demonstrated that afferent neuropathic tracks can be neuromodulated by retrograde stimulation. This approach has also been demonstrated to be effective in pelvic pain syndromes (i.e., Interstitial Cystitis) (Ref. Feller, C). In the absence of dense epiradicular neurofibrosis, the ventral or posterior lateral epidural space may be easily reached by a navigable catheter using a retrograde technique similar to the one described by the above authors.

We described a patient presenting with longstanding low back and new onset of radicular pain following extensive spinal surgery with instrumentation. Traditional spinal injection approaches (transforaminal, intralaminar, transcaudal) were not considered due to patho-anatomical barriers or significant risk of dural puncture. The patient was successfully treated with thoraco-lumbar retrograde epiradicular adhesiolysis. We feel this technique should be considered in similar situations. As a result of the adhesiolysis using this procedure, patients who are appropriate candidates for retrograde spinal stimulator placement, can have the additional benefit of better placement of a retrograde spinal cord stimulator electrode and more effective relief.

**Retrograde Epidural Lysis: M. Hammer, MD -Continued**



## **Retrograde Epidural Lysis: M. Hammer, MD - *Continued***

### **References:**

1. Racz GB, Heavner JE, Diede JH: Lysis of epidural adhesions utilizing the epidural approach. In Waldman SD, Winnie AP (eds): *Interventional Pain Management*. Philadelphia, WB Saunders, 1996; pp 339-351.
2. Racz GB, Holubec JT: Lysis of adhesions in the epidural space. In Racz GB (ed): *Techniques of Neurolysis*. Boston, Kluwer Academic Publishers, 1989; pp 57-62.
3. Racz GB, Sabonghy M, Gintautas J et al: Intractable pain therapy using a new epidural catheter. *JAMA*, 1982; 248: 579-581.
4. Racz GB, Haynsworth RF, Lipton S: Experiences with an improved epidural catheter. *Pain Clinic* 1986; 1:21-27.
5. Racz GB, Heavner JE, Sigleton W et al: Hypertonic saline and corticosteroid injected epidurally for pain control. In Racz GB (ed): *Techniques of Neurolysis*. Boston, Kluwer Academic Publishers, 1989; pp 73-94.
6. Lewandowski EM: The efficacy of solutions used in caudal neuroplasty. *Pain Digest* 1997;7:323-330.
7. Hammer, M, Rainwater, S; Lysis of Anterior Epidural Adhesions Using a Transforaminal Approach for Failed Spinal Surgery. *International Spinal Injection Society Newsletter* Volume 3, No 4, Winter 2000.
8. Alo KM, Yland MJ and Redkov and Feller, Naumann C, Lumbar and sacral nerve root stimulation (NRS) in the treatment of chronic pain, A novel anatomical approach, A neurostimulation technique, *Neuromodulation*, 1999; 2;23-31.
9. Alo KM, Lead positioning and programming strategies in the treatment of complex pain, *Neuromodulation*, Vol. 2, No. 3, 1999; pp. 165-170.
10. Feller C, Whitworth LA, Brookoff D, Powell R, Sacral nerve root stimulation for the treatment of intrastitial cystitis, *Neuromodulation*, 1999; 2;211-216.