

**The American Association of Neurological Surgeons and
the Congress of Neurological Surgeons Joint Section on**



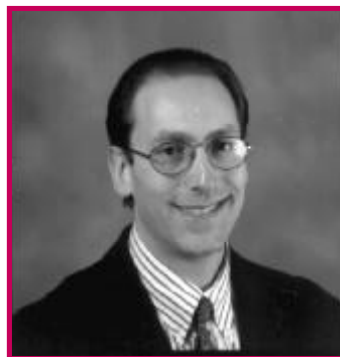
Pain



n e w s l e t t e r

Message from the Chairman

The role of the neurosurgeon in the management of chronic pain has become reflective of a larger issue within the context of the practice of neurosurgery. In many areas where neurosurgeons have traditionally played a pioneering and central clinical role, physicians from other specialties have increased their interest and visibility and neurosurgery has lost this dominance. Thus, spine and peripheral nerve surgery, for example, have become areas of great contention between surgical specialties. As competition in medicine increases, and as neurosurgeons labor to maintain their clinical profile and service to their patients, pain management has become a similar area of conflict.



Robert M. Levy, M.D., Ph.D.

Neurosurgical interest in pain treatment is not new; neurosurgical procedures for pain control can be traced to the latter part of the nineteenth century. In his 1873 book, *Traite de Sections Nerveuses*, Letievant first described sectioning of the cranial and peripheral nerves to alleviate pain.(1) In 1891, Sir Victor Horsley performed a gasserian neurectomy for trigeminal neuralgia (2). This work was continued by Hartley in 1892 (3), then Krause in 1893 (4), and popularized by Frazier in Philadelphia in 1928 (5). The first spinal dorsal rhizotomy was performed by Abbe in 1889 (6) and the first successful cordotomy was performed by Spiller and Martin in 1912 (7). Otfried Foerster made the first thorough

study of the pain pathways and published his article entitled "The Dermatomes in Man" in 1933 (8). Rene Leriche, in his 1939 book *La Chirurgie de la Douleur*, is credited with the development of sympathectomy (9). Spiegel and Wycis added another dimension to neurosurgical operations with their development of the human stereotactic system(10). Egas Moniz's adaptation of Fulton and Jacobsen's observation of frontal lobotomies in chimpanzees to human in 1936 opened a new way to relieve suffering in otherwise intractable painful states (11). New theories on the nature of pain which developed in the 1950s and 1960s led to the use of neuro-augmentative procedures in the spinal cord and brain for relief of pain.

Despite this long-standing clinical and research interest in pain, the neurosurgeon's role in chronic pain therapy has been eroded by both logistic and political factors. The success of neurosurgery in other areas, such as cerebrovascular surgery and neurooncology, made these

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efforts more attractive to the neurosurgical practitioner. Clearly, the unpredictable and often disappointing outcomes of neurosurgical pain procedures and the complex nature of chronic pain complaints made the management of these problems less attractive. On the other hand, the unique skills and knowledge base associated with neurosurgical practice made neurosurgeons particularly effective in the role of treating patients with chronic pain problems. As the logistics of health care have eroded neurosurgical practice in other areas, general neurosurgeons have begun to rediscover the field of pain management. It is this rebirth that has fueled the growth of the Joint Section on Pain of the AANS and CNS and it is toward the general neurosurgeon that we have focused our educational and advocacy efforts.

This past year has been productive on a number of important fronts. Dr. Samuel Hassenbusch has led our educational efforts by organizing two extended courses in interventional pain management. The first of these courses, proximate to the Montreal CNS meeting was very successful, particularly with respect to the strong representation of resident neurosurgeons at the course. The second of these courses will be held just before the Denver AANS meeting next month. A third course will be held before the 1998 AANS meeting in Philadelphia. These comprehensive two-and-one-half-day courses allow for both didactic and hands-on education in patient screening, techniques and follow-up care associated with the many and varied neurosurgical pain procedures.

Other important educational efforts, spearheaded by Dr. Kim Burchiel, have led to the adoption by the Residency Review Committee in Neurosurgery of the recommendation that all neurosurgical residency programs provide rigorous training in pain management. Toward this aim, the Joint Section on Pain has provided a recommended curriculum for the training of residents in pain medicine; this will be refined and made available to all neurosurgery program directors. Dr. Burchiel has also been working on recommendations for fellowship training in pain management for neurosurgeons; this should allow for some consistency and ensure high quality for neurosurgical postgraduate training in interventional pain therapy.

Equally important is the issue of establishing and reinforcing the perception of the neurosurgeon's training and expertise in the field of pain management. While neurosurgeons have been significantly over-represented in the leadership of national and international pain management societies, we have not kept pace in the general membership of these societies. Furthermore, other medical specialties have either led the way in terms of subspecialty certification in pain management, as in the case of anesthesia, or are seriously considering such moves, as in the case of neurology and physical medicine and rehabilitation. The

leadership of the AANS and CNS have been adamant that subspecialty certification in neurosurgery should not be pursued as this would be divisive and limit the practice of most neurosurgeons. The members of the Executive Committee of the Joint Section on Pain believe that this then requires us to ensure that all practicing neurosurgeons are educated and have skills in the field of pain management. Furthermore, we have suggested that organized neurosurgery support other pain management societies, such as the American Board of Pain Medicine, of which Dr. Kim Burchiel is currently president. Membership and participation in these societies and their efforts provides a mechanism for demonstrating expertise in pain management gives neurosurgeons with yet another avenue to maintain their stature in the field of pain medicine.

"...the unique skills and knowledge base associated with neurosurgical practice [makes] neurosurgeons particularly effective in ... treating patients with chronic pain problems..."

Other efforts of the Section on Pain have been to participate with new and ongoing AANS and CNS efforts in the areas of public information and the internet. Toward this aim Dr. Jeffrey Brown and Dr. Jamal Taha will serve as liaisons to the AANS/CNS and their efforts are greatly appreciated. At the request of Dr. Bill Friedman, the president-elect of the CNS and editor of *Neurosurgery*:// On-Call, Drs. Brown and Taha will help us to utilize this resource to provide updated information to current and potential section members, including section information, upcoming meetings, membership, important news, and recent publications.

An additional area of effort of the Joint Section on Pain involves the AANS/CNS agenda to address outcomes in neurosurgery. Dr. Richard North and I have worked for several years on the continuing Consensus Conference series to evaluate the indications, methods, and outcomes of neurosurgical procedures for chronic pain. This project has culminated in the publication by Springer-Verlag last month of a textbook entitled *Neurosurgical Management of Pain*. Both Dr. North and I will serve under the direction of Dr. Robert Harbaugh to investigate neurosurgical outcomes issues as they apply to pain therapies.

Thus, during the past year, several key issues have faced the Joint Section on Pain, including the spectre of subspecialty certification, potential encroachment by other medical specialties, education of the public and of the neurosurgical community, and outcomes research as it impacts interventional pain therapy. The officers of the Joint Section on Pain have devoted their ongoing efforts to

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Of Interest at:



The 65th Annual Meeting of the AANS
 Denver, Colorado
 April 12-17, 1997

PRACTICAL CLINICS

Saturday, April 12 1:00 PM -5:00 PM

006 *Ablative Neurosurgery for Pain*
 Directors: Nicholas Barbaro
 Faculty: To Be Determined

Sunday, April 13 8:00 AM - Noon

012 *Neuroaugmentive Procedures for Pain Control*
 Director: Kim J. Burchiel
 Faculty: Joel Seres, Richard Weiner, Jaimie Henderson, Josh Dowling, Robert Levy, Richard Simpson, Ken Follett, Giancarlo Barolat, Jamal Taha

BREAKFAST SEMINARS

Monday, April 14

111 *Peripheral Nerve Injury and Entrapment Evaluation and Management*
 Moderator: David Kline
 Panelists: James Campbell, Michel Kliot, Allan Friedman, Eric Zager, Suzie Tindall

Monday, April 14

112 *Neurosurgical Management of Intractable Pain*
 Moderator: Nicholas Barbaro
 Panelists: Samuel Hassenbusch, Ronald Young, Richard North, Yucel Kanpolat

Tuesday, April 15

215 *Contemporary Management of Syringomyelia*
 Moderator: Thomas Milhorat
 Panelists: Jose Montes, Barth Green, Hisoshi Abe, Richard Ellenbogen

Wednesday, April 16

307 *Microvascular Decompression*
 Moderator: Peter J. Jannetta
 Panelists: Takanori Fukushima, Ronald I. Apfelbaum, Thomas J. Lovely, John M. Tew

SECTION SESSION

Tuesday, April 15 2:45 PM - 5:30 PM

Learning Objectives
 Attendees will be able to describe the latest techniques in

the treatment of patients with chronic pain.

2:45- 4:00 PM Symposium: New Frontiers in Intrathecal Pain Therapy

4:00- 4:15 PM William H. Sweet Young Investigator Award in Pain Medicine

Moderator: Robert Levy

807. Trigeminal Neuralgia, Multiple ASclerosis, and Microvascular Decompression. Giovanni Broggi, Angelo Franzini, Domenico Servello, Ivano Dones.

4:15- 5:30 PM Scientific Session

Moderator: Robert Levy

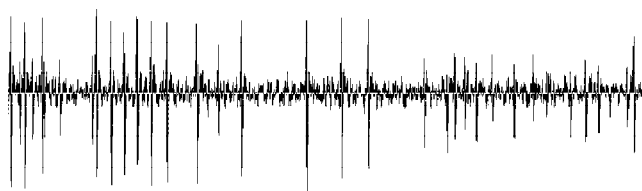
808. Peripheral Nerve Evoked Potentials Successfully Guide Implantation of Spinal Stimulator Electrodes Under General Anesthesia. Robert R. Goodman, Ronald Emerson.

809. Anti-NGF Inhibits the Development of Thermal Allodynia in Chronic Central Pain Following Spinal Cord Injury. Marc Christensen, Claire Hulsebosch.

810. Gene Expression of CGRP and GAP-43 in Dorsal Root Ganglia Following Spinal Hemisection and Nerve Growth Factor. Marc Christensen, Scott Supowit, Don J. DiPette, Claire Hulsebosch.

811. Parenteral Ketorolac in the Management of Postoperative Pain after Lumbar Disc Surgery: A Prospective Double-Blind Randomized Study. Peter D. Leroux, Srinath Saundrala.

812. Extracranial Microvascular Decompression for Occipital Neuralgia. Quentin J. Durward, James L. Case.





Contributions from

The 46th Annual Meeting of the Congress of Neurological Surgeons Montreal, Quebec

September 28 - October 3, 1996

THE ROLE OF REOPERATION IN MANAGEMENT OF PATIENTS WITH FAILED BACK SURGERY SYNDROME

Ken Follett, MD

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Two general approaches to management of the failed back surgery syndrome exist currently: symptomatic treatment of the pain (e.g., spinal cord stimulation, intraspinal analgesics, back rehabilitation) and reparative surgery (e.g., relief of symptomatic neural compression or instability). Few data exist by which to determine whether outcomes of these two approaches are the same and, more importantly, whether subpopulations of patients exist within the FBSS population in whom reoperation is clearly beneficial. Historically, the success of reoperation in patients who have recurrent or persistent back and/or leg pain after lumbar spine surgery is considered poor. The figures reported by Waddell (1979) are frequently quoted by surgeons who wish to sway a patient away from surgery: 40-50% success with a second operation (20% of patients worse after a second operation), 20-30% success after a third operation (25% rendered worse), and only 10-20% success with a fourth operation (45% of patients rendered worse after a fourth operation). Similar figures were reported by Lehman and LaRocca: 57% success following a second surgery, 33% success following a third lumbar spine surgery. On the other hand, many reports in the literature indicate success rates with reoperation that reach 100%

Difficulties in interpreting the literature concerning outcomes of reoperation in FBSS patients arise from shortcomings of literature reports. Most literature reports are retrospective reviews, describe relatively small numbers of patients, and may have prominent bias in patient selection and assessment of outcomes. There is no standard measure of success, and most authors fail to have objective (e.g., third party) assessment of outcome. Many of these issues were addressed in the report of North et al. (1994), who prospectively compared outcomes (in terms of pain relief and functional status) in patients with FBSS with surgically remediable disease treated symptomatically (spinal cord stimulation) or with reparative surgery. In that study, North and his colleagues demonstrated that spinal cord stimulation was significantly more effective than reoperation in providing relief of pain complaints. The authors had several significant exclusion criteria, however, including 1) major or disabling neurologic deficit (e.g., foot drop or neurogenic bladder), 2) radiographically critical neural compression (e.g., extremely large disc fragment or severe central stenosis), and 3) radiographic evidence of gross instability. North and his colleagues suggested that symptomatic treatment of FBSS is more effective than reparative surgery but subpopulations of patients exist in whom reoperation is beneficial or necessary.

Review of the literature describing success rates of reoperation in patients with FBSS according to underlying diagnostic etiology of FBSS reveals that certain populations of patients tend to do well with reoperation and others tend not to do well. In general, success rates for reoperation in patients with new or recurrent herniated intervertebral discs or residual or recurrent spinal stenosis are good, assuming patients are selected carefully. On the other hand, the success rate of reoperation in patients with epidural fibrosis is dismally low, with most reports describing 0% improvement of pain after neurolysis or excision of scar. The success rate of reoperation (fusion) in patients with postoperative instability is generally good (provided that strict criteria for fusion are met) whereas the success rate of reoperation in patients with failed fusion is more variable, ranging from 14 to 100%. Notably, the presence or absence of a pseudarthrosis does not correlate with patient outcome following fusion (Lehman 1987; Linson 1991; Frymoyer 1978), which complicates determination of the cause of persistent pain in post-fusion patients. The outcome following reoperation for failed posterior lumbar interbody fusion has not been studied extensively, but appears poor. In the series of Wetzell and LaRocca (1991), only 25% of patients

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LONG-TERM RESULTS OF THE SURGICAL TREATMENT OF TRIGEMINAL NEURALGIA

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The results of treating 702 patients with medically intractable trigeminal neuralgia over a 20 year interval from 1974-1994 (this cut-off was selected to provide a minimum of 2 year follow-up) were analyzed and long-term follow-up sought by questionnaire and phone contact. Patients were treated by either microvascular decompression (MVD) or percutaneous trigeminal neurolysis (PTN) using either radio-frequency lesioning or glycerol as a chemoneurolytic agent.

Patients ranged in age from 18-92 years with the average age of treatment being 55 years for MVD and 67 for PTN. Patients were distributed similarly in both the MVD and PTN groups, with two-thirds being females and one-third male. Fifty-nine percent had right-sided symptoms and forty-one percent left. The average duration of symptoms prior to treatment was 86 months for MVD patients and 104 months for PTN patients. About 78% of patients had their pain in either the second or third divisions alone or in combination. No patient had first and third division trigeminal neuralgia with sparing of the second division.

At surgery for microvascular decompression, arterial compression was found in 336 of 406 patients (83%), with venous compression in 13% and tumors in 3%. Five patients had a negative exploration (1%). The most common compressing artery was the superior cerebellar artery (67%). Initial pain relief was achieved in 91% and pain was reduced in 6%. There was no pain relief in 2%. Equally good outcomes were seen in patients with arterial, as well as those with venous compression. Significant complications (1%) included perioperative death due to cerebellar hemorrhagic infarction in three patients and supratentorial strokes in two. Three other cerebellar infarctions resulted in prolonged morbidity, but ultimately resulted in good outcomes. The major cranial nerve defects noted were transient fourth nerve palsy (3%), transient sixth nerve palsies (0.5%), transient seventh nerve palsies (1.5%), permanent seventh nerve palsy (1 patient), mild eighth nerve dysfunction (1%), and severe eighth nerve dysfunction (2%, most of which persisted).

In follow-up, excellent pain relief (no pain or minimal pain not requiring medication) was achieved in 56% of our patients and fair pain relief (pain controlled with medication in previously refractory patients) in 15%. Nineteen percent failed to have adequate pain control. Recurrences, if they occurred, were most often seen within the first few years after MVD (average 21 months), but rare recurrences occurred as long as 12 years postoperatively. The majority of recurrences were treated with PTN.

PTN, with either radiofrequency lesioning (RFL) or glycerol chemoneurolysis (GLY), was used in 352 patients (514 procedures). RFL was done in 109 patients and GLY in 227. Sensory loss was almost always seen with RFL and very frequently was moderate to severe. Corneal anesthesia occurred in about 20% and keratitis in about 2%. Sensory loss with GLY was also frequent, but usually mild. Only 20% had moderate to severe loss, with 1% corneal anesthesia and no keratitis. Other complications were infrequent (two cases of bacterial meningitis, two cases of aseptic meningitis) and one sixth palsy (after RFL), all without long-term sequelae. In addition, one patient developed a temporal lobe hematoma and permanent residual significant hemiparesis.

Good pain relief was achieved in 83% of our patients overall. RFL did better, at 87%, but more patients reported residual pain not requiring medication (47%). Probably much of this was dysesthetic pain. Only 11% of our patients out of the 83% in the relieved and minimal pain group who had GLY had this type of discomfort. On follow-up, 71% of RFL patients reported excellent relief and 10% reported fair pain relief, versus 52% excellent with GLY and 12% fair.

Recurrences were usually treated with repeat procedures. The time of recurrence averaged 18 months in both groups but was less frequent in the RFL group. RFL patients averaged 1.1 procedures versus 1.6 with GLY patients. About 72% of patients treated with GLY got at least three years relief regardless of whether this was the initial procedure or a repeat injection.

In conclusion, both MVD and PTN are effective in relieving trigeminal neuralgia in 85-90% of patients treated and both

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THE NEUROSURGEON'S GREATEST RESPONSIBILITY IN TREATING CHRONIC PAIN: "KNOWING WHEN TO QUIT"

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The time comes when a surgical solution for a patient's pain problem is no longer a reasonable option. Since the surgeon is the final arbiter of surgical judgment, she or he is also vested with the awesome power of defining when another operation is no longer a reasonable option for those who suffer intractable pain. The development of new technologies and procedures tends to confuse the surgeon's judgment. Newer procedures promise more positive outcomes and the seduction of new technology influences judgment as we try to find ways to offer help to the suffering patient. The complete surgeon must possess the ability to know when enough has been done and surgery is no longer an option.

Early enthusiasm often gives way to disappointment and discarding procedures that at their onset seemed so efficacious. Newer procedures that seem to relieve pain often escape the pejorative epithet of "experimental", because of financial and market considerations long before their objective clinical efficacy has been demonstrated by standardized research and statistical methods. Later, clinical efficacy may or may not stand up to the earlier expectations or regression of benefit may negate the validity of initial impressions.

There is a need for someone or for some group to question the utilization of yet another eventually ineffective surgical odyssey. Too frequently the records of the chronic pain patient describe initial satisfaction with the later dissipation of benefit. At times, the patient feels that the surgeon has done "all that he can do" and the physician, basking in the initial claims of efficacy by the grateful patient, can lose sight of the real meanings of what has transpired.

Probably one of the major reasons this scenario is so repetitious in modern medical care is that those who are entrusted with surgical judgment are not knowledgeable enough about the real meanings of non-surgical care. Patients are sent to psychologists whose pronouncements about the patient are often not read nor discussed by the surgeons. Physical therapy is ordered and its function, purpose and compliance is ignored. How many back surgeons, for example, know how to check on the proper execution of back exercises by the patient? Yet how quickly they will suggest that the exercises be stopped when the patient complains. It may not be the failure of the exercises that is the issue, it might just be the lack of patient compliance with the proper execution of those exercises.

One of the most important elements in the understanding of the chronic pain patient is understanding the reasons behind regression of benefits, whether from surgical procedures to relieve pain, behavioral programs, injection therapy or any other form of care. One way to understand the patient better is to observe the emotional response the patient demonstrates when regression of benefits occurs. People who really want and need improvement are distressed when initial benefits dissipate. Is the patient distressed about the apparent failure of the procedure, or is this just another "ho-hum response?" Without a full understanding of the reasons for regression and the patient's effectual response, the surgeon too often assumes that because the previous treatment, whatever it was, did not work that only another surgical approach should be considered. Somewhere within each surgeon's armamentarium there needs to be a point where surgery stops. Attached to that point there must be a clear and precise approach.. As clear and as precise as her or his surgical pronouncements. It is no longer acceptable to "try" another procedure because the patient still hurts.

Psychologists have taught us that they may understand the pain patient better than we can. They can often help people in pain once the possibility of surgery has been eliminated. But we tie their hands when we send them patients with the idea that if their care doesn't work, we'll consider doing the procedure we really didn't feel would be efficacious before. Patients will not comply with psychological care when a surgical procedure that will "fix me" has been expressly promised, or even subliminally suggested, if the psychologist isn't successful. Such an attitude predicts its own poor outcome. Psychological care is never an alternative to surgery. It is as indicated as is surgery. It should never be used as a "last resort", anymore than surgery should be used as a "last resort." Treatment for the chronic pain patient should be used as specifically as possible, because the specific treatment being considered is clearly indicated and stands a good chance of being successful in helping the patient. And if the patient regresses after even the most minimal of benefit, the reason for that regression must be fully defined before proceeding with any other form of treatment.

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A PROSPECTIVE, RANDOMIZED CLINICAL EFFICACY AND COST ANALYSIS STUDY OF SPINAL CORD STIMULATION VERSUS REOPERATION

Richard B. North, David A. Kidd

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Introduction: Spinal cord stimulation (SCS) has been reported to be effective treatment for the failed back surgery syndrome (FBSS). Prior series at our institution have revealed success rates (defined as a minimum of 50% pain relief and willingness to repeat for the same result) of 53%, 47%, and 52% at mean follow up of 2.2, 5, and 7.1 years, respectively.

Methods: We have undertaken a prospective, randomized comparison of SCS and reoperation in patients with persistent radicular pain, following lumbosacral spine surgery. Sixty patients were selected for reoperation by standard criteria, and then were randomly assigned to initial treatment by one or the other technique. At the close of the study, 50 of these were at least 1 year post treatment: 24 SCS and 26 reoperations. At 6 months, patients were permitted to choose to cross over to the alternative treatment, if the initial one had failed.

Results: Patients were significantly more likely ($p < 0.02$ by Fisher's exact test) to cross from reoperation to SCS (14/26), rather than in the other direction (5/24). Forty-five patients (90%) were followed long term. At average 3 year follow up, 79% of patients in both arms of the study who received permanent implants were still using their stimulators. 52% were "success" by the above criteria. By contrast, 19% of patients in both arms of the study who received reoperation were "success" by the same criteria. Initial SCS treatment alone was significantly more likely to produce a successful outcome ($p = 0.01$) than initial reoperation alone.

Additionally, we have undertaken a cost analysis comparison of the first forty (40) patients in this study. We hypothesized that SCS, when offered as a late rather than a last resort in the treatment of FBSS, is also more likely to reduce overall health care utilization costs. Although we found SCS initially 21% more expensive than reoperation, over a three year mean follow-up period, SCS produced a 22% cost savings (\$8,835 per implant), when compared with reoperation patients. This is due in large part to the different rates of crossover. In the 40 patients studied, the SCS patients were much less likely to cross to the alternative treatment than the reoperation arm (26% vs 62%).

Discussion: These results demonstrate a clinical advantage for SCS over reoperation in FBSS. In addition to more effectively treating chronic pain complaints, SCS pays for itself in less than 2 years, and cost savings continue to accrue thereafter.

Conclusions: SCS is a cost effective alternative to reoperation in selected FBSS patients. It's judicious use earlier in the treatment of FBSS would reduce direct medical costs as well as more effectively treat chronic pain. ■

Announcing the publication of:

NEUROSURGICAL MANAGEMENT OF PAIN

Edited by:

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Robert M. Levy, M.D., Ph.D. *Division of Neurological Surgery, Northwestern University Medical School, Chicago, IL*

- Step-by-step coverage of today's neurosurgical interventions, including neuroablative and neuroaugmentative procedures
- Reviews patient selection criteria, established operative techniques, potential complications, and expected outcomes
- Includes helpful management of algorithms for cancer pain, chronic low back pain, facial pain syndromes, and neuroathic pain

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Selected Abstracts from the 46th Annual Meeting of the Congress of Neurological Surgeons

September 28 - October 3, 1996

PROGNOSTIC FACTORS FOR EPIDURAL SPINAL CORD STIMULATION IN TREATMENT OF CHRONIC PAIN

Krishna Kumar, Rahul Nath, Cory Toth

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Regina, Saskatchewan*

An analysis of our series of 235 patients treated in the past 15 years has clarified the prognostic parameters in prediction of the success in spinal cord stimulation. Patients have been followed for periods ranging from 6 months to 15 years with a mean follow-up of 66 months. The mean age of the 150 men and 85 women within the study was 51.4 years. Patients with indications for spinal cord stimulation included 114 with failed back syndrome, 39 with peripheral vascular disease, 30 with peripheral neuropathy, 13 with multiple sclerosis, 13 with reflex dystrophy, and 26 with miscellaneous etiologies. One hundred and eighty-nine patients received permanent devices; 111 (59%) of these patients continue to receive satisfactory pain relief. Pain due to failed back syndrome, reflex sympathetic dystrophy, peripheral vascular disease of lower limbs, multiple sclerosis, and peripheral neuropathy responded favorably to spinal cord stimulation. In contrast, paraplegic pain, stump pain, phantom limb pain, primary bone and joint disease pain, and axial midline back pain without radiculopathy demonstrated poor response. Cases of cauda equina injury had promising initial pain relief, but gradual decline on long-term follow-up. Forty-seven of the 111 successfully implanted patients were gainfully employed as compared to 22 patients prior to implantation. Multi-channel implants improved overall success rate. While age, sex, and laterality of pain did not prove to influence prognosis, shorter duration of pain from last surgery to the implant procedure, absence of weakness and lack of any surgical intervention prior to implantation produced a greater response rate. Superimposition of stimulation induced paresthesia on topography of pain remains critical. Complications consisted of hardware malfunction, electrode displacement, infection, and tolerance. This information will be useful in selection of patients for spinal cord stimulation. ■

INTRATHECAL MORPHINE PUMP AS A TREATMENT OPTION IN CHRONIC PAIN OF NON-MALIGNANT ORIGIN

Michael Carey, Hamilton Gould III, Ian Angel

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Introduction:

The options for management of chronic pain of nonmalignant origin are controversial. The development of implantable pumps for the delivery of intrathecal morphine has become an increasingly common option for administering opiate medication. The purpose of this prospective study is to describe the results of intrathecal morphine administration via an indwelling pump in order to relieve chronic pain in 11 patients with failed back syndrome (FBS) and neuropathic pain (NP).

Methods:

The present study reports the results of 11 patients who received an indwelling pump and were followed for up to 3 years. All patients underwent therapeutic trials with intrathecal morphine and placebo over a 3-day period. Candidates were assessed for the appropriateness of their analgesic response as well as for adverse effects prior to receiving the pump.

Results:

A good to excellent result was seen in 8 (73%) of the patients (7 FBS; 1 NP). In the remaining 3 patients (27%), the analgesic response was judged poor (2 FBS; 1 NP). Two patients experienced bladder dysfunction requiring discontinuation of the pump.

Discussion and Conclusions:

In our study the analgesic response was quite variable. Some patients had significant relief in their pain levels at the initial dose (0.125 mg/d) whereas others showed no improvement at the highest dose (14 mg/d). Overall 8 of 11 patients (73%) reported improvement. Although this figure is somewhat higher than that previously reported in other studies the difference may only reflect the limited number of patients to date in this study. We conclude that intrathecal morphine may provide a treatment option in management of intractable pain of non-malignant origin. ■

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**TECHNICAL CONSIDERATIONS AND
OUTCOME IMPROVEMENT IN BALLOON
COMPRESSION OF THE TRIGEMINAL
GANGLION FOR TRIGEMINAL
NEURALGIA**

Robert K. Erickson

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Balloon compression of the trigeminal ganglion was added to the armamentarium of percutaneous procedures directed at trigeminal neuralgia in the 1980s. Its acceptably low morbidity and relative ease of application have been documented, although most surgeons continue to advocate radiofrequency rhizotomy as the percutaneous procedure of choice, citing higher rates of pain relief and lower rates of recurrence. The results of balloon compression were reviewed for 30 consecutive cases between 1987 and 1996. Ten patients had had at least one prior procedure performed (including microvascular decompressions and radiofrequency rhizotomies). The overall initial success rate was 97% (29/30), with the only failure occurring in a patient who had initially failed radiofrequency rhizotomy and recurred following balloon compression. The recurrence rate in this series is 7% (2/30) within the average follow-up period of 30 months. Excellent relief was obtained in 8 of 8 patients with predominant ophthalmic division pain. The incidence of major (permanent) complications such as cranial nerve deficit, corneal anesthesia, dysesthesia, or anesthesia dolorosa in the series is zero with minor (transient) complications noted to include temporary minor dysesthesia (2/30), relative pinprick numbness (15/30), recurrent shingles (2/30), and temporary corneal dryness (2/30). These good results are attributed to careful titration of volume and duration of compression, documentation of ganglionic and retrogasserian compression, and other procedural maneuvers. The procedure is a reasonable first choice at the initial presentation of medically intractable trigeminal neuralgia, and particularly suited to those with significant pain in the ophthalmic division. ■

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addressing these issues on behalf of the best interests of our membership. We will continue to aggressively address these issues and serve an advocacy role for all neurosurgeons and their efforts on behalf of their patients with chronic pain problems.



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The Cleveland Clinic

Pain Management
Center

Presents

**ADVANCES IN
PAIN
MANAGEMENT**

To be immediately preceded by:
The American Neuromodulation Society
1st Annual Meeting:

"Advances in Neuromodulation"

May 17-20, 1997
Cleveland, Ohio

For Additional Information contact:
The Cleveland Clinic
Dept. Continuing Education TT-31
9500 Euclid Ave
Cleveland, OH 44195

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were improved after repair of a failed PLIF, and no patient was pain-free. The success of reparative surgery in this population is limited by the fact that chronic radiculopathy that may occur following PLIF is not helped by reoperation. Frymoyer (1978) notes that "reoperation in patients who have had spinal fusion seems less successful than reoperation in patients who have not initially had spinal fusion." The role of reoperation in patients who are felt to have discogenic pain following previous lumbar spine surgery is unknown. The average satisfactory outcome rate of fusion for discogenic pain is 68% [based upon review of 47 reported series by Turner (1992)]. On the other hand, Rhyne (1994) reported that 68% of patients with discogram-positive low back pain improve without surgery, suggesting that the natural history of the disease is quite good. Linson (1991) has reported that 69-83% of patients "felt better" after anterior and/or posterior fusion for discogenic pain, but Wetzel (1994) reported only 9% improvement in patients undergoing reoperation for discogenic pain, and 26% of patients in his series needed further reoperation.

Examination of the patient and interpretation of radiographic studies must be undertaken carefully to determine the propriety of reoperation for FBSS. Many patients with previous discectomy (with or without fusion) have residual neurologic deficits, and residual neurologic deficits do not correlate with patient complaints (except the physical finding of sensory loss and a patient complaint of numbness), and the residual neurologic deficits do not correlate with the outcome of the initial surgery. Radiographic studies can be particularly troublesome to interpret. The majority of patients over the age of 45 will have radiographic evidence of spondylitic disease, disc degeneration, herniated intervertebral discs, arthropathy, and/or stenosis. Forty-two percent of patients who have undergone lumbar fusion will develop stenosis above or below the fusion site, and 45% will develop radiographic evidence of instability above the fusion, but these radiographic abnormalities do not correlate with outcome of the surgery (Lehman 1987). Radiographic abnormalities must be interpreted in the context of the patient's symptoms and signs. Similarly, many patients will have residual abnormalities on electromyographic or nerve conduction studies that do not correlate with outcome of previous lumbar spine surgery, and such abnormalities must be interpreted in the context of the patient's overall presentation.

In summary, reparative surgery for patients with failed back surgery syndrome may be successful if performed according to stringent selection criteria. Some clear indications for reoperation in a patient diagnosed with FBSS exist (e.g., infection, pseudomeningocele). Reoperation may also be appropriate in select subpopulations of patients with FBSS. These indications include back pain with clear-cut radiographic evidence of instability, or

radicular symptoms with supporting signs and radiographic evidence of a structural lesion corresponding to the symptoms and signs. The history, physical examination, and interpretation of radiographic studies must be performed thoughtfully and carefully, and complicating factors such as psychological abnormalities, issues of secondary gain, chronic deconditioning etc. must be addressed. A patient meeting stringent selection criteria may fare well with reoperation. For such patients, physicians should remember the admonition of Sophocles: "It ill behooves the skilled physician to mumble charms over ills that crave the knife." ■

"LONG-TERM RESULTS..."

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procedures can result in long-term benefit. Only MMD, however, can reliably preserve and avoid dysesthesia, which can be very troublesome. However, the risks of MMD are greater and increase with age and medical problems. Thus, MMD should be the initial surgical treatment for trigeminal neuralgia in younger patients (under 65-70), who are in otherwise satisfactory health. Patients need to understand the risks of both of these procedures and participate in the decision as to which procedure to employ. ■

"THE NEUROSURGEON'S GREATEST RESPONSIBILITY..."

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The requirements for the pain surgeon are that she or he fully understand techniques that are available for the appropriate use of analgesics, narcotics, psycho-active drugs, physical therapy, psychological management, vocational measures and other means of understanding the causes for regression after improvement. The fully equipped surgeon knows how to treat the patient conservatively, or when to get entirely out of the way and let others who do determine the patient's course of care. The most important element in the surgeon's decision-making process is interpreting the patient's return and his or her claims that conservative care hasn't worked. The surgeon's first responsibility is not to consider another operation but rather to ask, "Why hasn't the treatment worked?" If the answer is not readily clear, communication with others who might have real insights is imperative.

Pain relieving surgical procedures have eliminated suffering for so many. However, regression of benefit, repetition of failures, and new technologies demand that we better understand the meaning of what we do. Learn when surgery is no longer a reasonable option and allow the patient to move into other therapeutic arena that might be helpful. Try not to leave the possibility of surgery as a "last resort", if some other treatment fails in the mind of the patient. ■

Calendar of Events

March 25-28, 1997

6th John J. Bonica Pain Conference

Sponsor: The Ohio State University
 Location: Wailea, Maui-Hawaii
 Contact: A Rogers, Dept. of Anesthesiology,
 Ohio State Univ. 410 W 10th Ave.,
 Columbus, OH
 Phone: 614-293-8487
 Fax: 614-293-8153

April 10-13, 1997

*22nd Annual Meeting of the American Society of
 Regional Anesthesia*

Sponsor: American Society of Regional Anesthesia
 Location: Atlanta, Georgia
 Contact: ASRA, PO Box 11086, Richmond,
 Virginia 23230-1086
 Phone: 804-282-0010
 Fax: 804-282-0090

April 12-17, 1997

*65th Annual Meeting of the American Association of
 Neurological Surgeons*

Sponsor: American Association of Neurological
 Surgeons
 Location: Denver, CO
 Contact: AANS, Suite 100, 22 S. Washington Street,
 Park Ridge, IL 60068
 Phone: 847-692-9500
 Fax: 847-692-2589

May 17-20, 1997

Advances in Pain Management

Sponsor: The Cleveland Clinic
 Location: Cleveland, Ohio
 Contact: Continuing Medical Education,
 The Cleveland Clinic, 9500 Euclid Ave.,
 Cleveland, OH 44195
 Phone: 800-762-8173
 Fax: 216-445-9406

June 19-21, 1997

Research Society of Neurologic Surgeons Annual Meeting

Sponsor: Research Society of Neurologic Surgeons
 and the British Neurosurgical Research
 Group Joint Meeting
 Location: Jackson, MS
 Contact: Louis Harkey, MD, Dept. of Neurosurgery
 UMC, 2500 North State St., Jackson, MS

June 30- July 2, 1997

*3rd International Congress in Minimally Invasive
 Neurosurgery*

Sponsor: Allegheny General Hospital and Faculte de
 Medecine Lariboisiere, Saint-Louis, France
 Location: Paris, France
 Contact: Congress Management International, 7,
 rue de Caumartin, 75009 Paris-France
 Phone: (33) 1 4312 3412
 Fax: (33) 1 4312 3410

July 1-4, 1997

*XIIth Meeting of the World American Society for
 Stereotactic and Functional Neurosurgery*

Sponsor: World Society for Stereotactic and
 Functional Neurosurgery
 Location: Lyon, France
 Contact: Organizing Secretariat, Package
 Organisation,
 53, rue Vauban, 69006 Lyon-France
 Phone: (33) 78 24 18 06
 Fax: (33) 72 74 18 33

July 6-11, 1997

11th International Congress of Neurological Surgery

Sponsor: Congress of Neurological Surgery
 Location: Amsterdam, The Netherlands
 Contact: The Congress Secretariat, c/o Amsterdam
 RAI-OBA, PO Box 77777, 1070 MS
 Amsterdam, The Netherlands
 Phone: (31) 20 549 1212
 Fax: (31) 20 646 4469

September 27- October 2, 1997

47th Annual Meeting of the Congress of Neurological Surgeons

Sponsor: Congress of Neurological Surgeons
 Location: New Orleans, LA
 Contact: CNS, 22 S. Washington St.,
 Park Ridge, IL 60068
 Phone: (847) 692-9500

October 23-26, 1997

16th Annual Scientific Meeting

Sponsor: American Pain Society
 Location: New Orleans, LA
 Contact: APS, 4700 W. Lake Ave.,
 Glenview, IL 60025
 Phone: 847-375-4715
 Fax: 847-375-4777

AANS/CNS
Joint Section on Pain
22 S. Washington St.
Park Ridge, IL 60068

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