

## EVIDENCE-BASED GUIDELINES

### Intrathecal Pain Pump

The Rand Institute for Civil Justice and Rand Health has published a document at the request of the State of California in 2005. This document is available from [www.Rand.org](http://www.Rand.org). The title of the document is “Evaluating Medical Treatment Guideline Sets for Injured Workers in California”. The five guideline sets that met all their screening criteria include:

1. AAOS Clinical Guidelines by the American Academy of Orthopedic Surgeons.
2. ACOEM American College of Occupational and Environmental Medicine Occupational Medicine Practice Guidelines.
3. Intracorp Optimal Treatment Guidelines, part of Intracorp Clinical Guidelines Tool
4. McKesson McKesson/InterQual Care Management Criteria and Clinical Evidence Summaries.
5. ODG Official Disability Guidelines: Treatment in Workers Compensation by Work-Loss Data Institute.

A multidisciplinary clinical panel evaluated the guideline content, and 11 clinicians were selected from national specialty societies. They were national experts that were practicing at least 20% of the time and who had experience in treating injured workers. Each guideline had its strengths and weaknesses. These are summarized in the document. There were some panelists that reported preferring the “specialty” society guidelines to the five guideline sets that they reviewed. The conclusion of the clinical content evaluation is as follows:

1. All five guideline sets appear far less than ideal and barely meet standards.
2. The clinical panel preferred the ACOEM Guidelines to the alternatives, but they were not comprehensive in the entire content rating.
3. ACOEM Guidelines had surgical weakness specifically as it relates to lumbar spinal fusion, which was well addressed in the AAOS Guideline sets.

Short-term recommendations were as follows:

1. The ACOEM Guidelines were preferred, and there was no reason to switch to a different comprehensive guideline set.
2. California can confidently implement the ACOEM Guidelines for carpal tunnel surgery, shoulder surgery, and lumbar spinal decompression surgery.
3. For spinal fusion surgery the AAOS Guidelines should be followed.
4. Other surgical topics could be implemented utilizing the ACOEM Guidelines.
5. The validity of the ACOEM Guidelines for physical modalities remains uncertain, and they are **not confident** that the ACOEM Guidelines are valid for non-surgical topics.

6. The stakeholder interview suggested that acupuncture, **chronic conditions**, and other topics may not be covered well by the ACOEM Guidelines.
7. For topics to which the adopted guidelines (ACOEM) do not apply, the State should clarify who bears the burden of proof for establishing appropriateness of care.
8. Because medical literature addressing the appropriateness and quantity of care may be limited for some physical modalities and other tests, as well as therapies, some guideline content will include a component of **expert opinion**. Therefore, the State should clarify whether expert opinion constitutes an acceptable form of evidence within “evidence-based, peer-reviewed, nationally recognized standards of care”.
9. The stakeholder interview suggested that payers are **uncertain** whether they have the authority to approve exceptions to the guidelines for patients with unusual medical needs. Therefore, the State should consider specifically authorizing payers to use **medical judgment** in decided whether care at variance with the adopted guidelines should be allowed.

The Blue Cross/Blue Shield surgery section, fully implantable infusion pump policy number 18, effective date 04/05/2005, will now be reviewed as it relates to the policy criteria for fully implantable infusion pumps. This includes “severe, chronic, intractable pain of malignant or nonmalignant origin in patients with a life expectancy of at least three months and who have proven unresponsive to less-invasive medical therapy as determined by the following:

1. The clinical history suggests the patient would not respond adequately to non-invasive pain control methods such as systemic opioids (such as this patient) and
2. A preliminary **trial** of opioids with a temporary intrathecal epidural or intravenous catheter must be undertaken to substantiate acceptable pain relief, degree of side effects, and patient acceptance.

The ACOEM Guidelines are not helpful in terms of direction in terms of intrathecal opioid delivery systems. However, the Official Disability Guidelines have an excellent section reviewing this topic. The web site can be reviewed at [www.odgtreatment.com](http://www.odgtreatment.com), and it, indeed, yields the following information:

Implantable drug delivery systems should be used for most patients as part of a program to facilitate restoration of function and return to activity, not just for pain reduction. The specific criteria in these cases include the failure of at least six months of other conservative treatment modalities, intractable pain secondary to a disease state with objective documentation of pathology, further surgical intervention is not indicated, psychological evaluation unequivocally states that the pain is not psychological in origin, and a temporary trial has been successful prior to permanent implantation as defined by a minimum of 50% reduction in pain. Generally, the use of implantable pumps is FDA approved and indicated for chronic intractable pain. Treatment conditions may include failed back syndrome, CRPS, arachnoiditis, diffuse cancer pain, osteoporosis, and axial

somatic pain. Implantable infusion pumps are considered **medically necessary** when used to deliver drugs for the treatment of:

1. Primary liver cancer.
2. Metastatic colorectal cancer.
3. Head/neck cancers.
4. Severe, refractory spasticity of cerebral or spinal cord origin in patients who are unresponsive to or cannot tolerate oral baclofen.

**Permanently** implanted intrathecal (intraspinal) infusion pumps for the administration of opioids or non-opioid analgesics, in the treatment of **chronic intractable pain** are considered medically necessary when used for the treatment of malignant pain and all the following criteria are met:

1. Strong opioids have failed to relieve pain or intolerable side effects to systemic opioids or other analgesics have developed.
2. Life expectancy is greater than three months.
3. Tumor encroachment on the thecal sac has been ruled out by appropriate testing.
4. No contraindications to implantation such as sepsis or coagulopathy.
5. A temporary trial has been successful as defined by 50% reduction in pain.

Permanently implanted intrathecal infusion pumps are used for the treatment of non-malignant (non-cancerous) pain with a duration of greater than six months when all the following criteria are met:

1. Documentation in the medical record of the failure of six months of other conservative treatment modalities (pharmacologic, surgical, psychological, or physical) if appropriate and not contraindicated.
2. Intractable pain secondary to a disease state with objective documentation of pathology in the medical record.
3. Further surgical intervention is not indicated.
4. Psychological evaluation has been obtained, and evaluation unequivocally states that the pain is not psychological in origin and that benefit would occur with implantation.
5. No contraindications to implantation exist such as sepsis or coagulopathy.
6. A temporary trial of spinal opioids has been successful prior to permanent implantation as defined by 50% reduction in pain and documentation in the medical record of improved function.

A temporary trial of intrathecal infusion pumps is considered medically necessary when all the criteria above have been met.

Specialty-specific guidelines also apply, and the best specialty-specific guidelines are the ASIPP Guidelines.

Evidence-based practice guidelines for interventional techniques in the management of chronic spinal pain have been systematically developed and professionally derived. I have downloaded appropriate information from the National Guideline Clearing House at [www.guideline.gov](http://www.guideline.gov). The search strategy utilized for evidence synthesis was comprehensive and included an extensive search of Index Medicus and EMBASE. In addition, all relevant and published peer-reviewed indexed and non-indexed journals were utilized, as well as scientific meeting proceedings, scientific newsletters, and cross-references from articles as well as systematic and narrative reviews. In the analysis of the evidence systemic reviews, randomized clinical trials, observational reports, and diagnostic test studies were utilized.

Despite continuing controversy, the use of oral opioids to treat chronic spinal pain has gained broad acceptance. Spinal administration of opioid medications has been increasingly advocated for those patients who failed to achieve pain relief or experience undue side effects with oral opioid regimens. Continuous infusion of intrathecal opioid medication for control of chronic spinal pain is now a widely accepted practice among interventional pain physicians worldwide. The advantages include a more powerful analgesic effect, a significantly lower dose of administered drug, in addition, more consistent analgesia with a lower incidence of somnolence, mental cloudiness, constipation, and euphoria.

The existing data reviewed was sufficiently **robust** to guide clinical practice when the patient need was compelling, and consistent reports of good to excellent outcomes in the **majority** of patients supported the use of intrathecal pain management where more conservative approaches had proven unsatisfactory. Smith, et al. (1151) reported significant improvement in patients treated with intrathecal infusion systems when compared to patients treated with conventional aggressive medical management. This study was performed using a prospective randomized intent-to-treat model. The study concluded that the pump group had significantly improved pain control and quality of life demonstrated by significantly better pain scores, quality of life ratings, patient satisfaction, caregiver satisfaction, and nutritional status.

In addition, Hassenbusch, et al. (1152) in 1995 studied patients with longstanding **non-malignant** pain who had undergone implantation of a programmable infusion pump for long-term opioid therapy. Eighteen patients were followed for a mean of 2.4 years. Good pain control was defined as greater than 40% pain reduction. Eleven patients, 61%, reported good pain control for the duration of the follow-up.

In 1998, Angel, et al. (1153) published **prospective** data on 11 patients with a **good to excellent** analgesic response seen in 73% of the patients.

In 1999 Anderson and Burchiel (1154) reported **prospectively** 40 patients with chronic intractable non-malignant pain. Thirty of these patients obtained greater than 50% pain relief from a trial of intrathecal morphine and were subsequently implanted with a programmable intrathecal drug delivery system. After 24 months of treatment 36%, 8 of 22, patients reported 50% or greater reduction in pain. Seventy percent of all patients had discontinued oral opioids and were using intrathecal opioids exclusively.

In 2000 Corrado et al. (1155) reported **prospective** data on 40 patients suffering from chronic intractable low back pain who were treated with either oral medications or an implanted intrathecal infusion pump. The infusion pump group was compared with a non-pump control group over a three-month period. The results revealed a significant difference in pain reduction between the pump and the non-pump group, and there was a significant decrease in **disability** in terms of a measured disability index from the pump group to the non-pump group.

In 2001 Kumar (1156) **prospectively** analyzed long-term effects of continuous intrathecal morphine infusion in 16 patients with chronic non-malignant pain. The follow-up period ranged from 13 months to 49 months. Ten patients were satisfied with the delivery system, and 11 reported improvement in their quality of life.

### **Cost Effectiveness**

Mueller-Schwefe et al. (1161) evaluated the cost effectiveness of intrathecal therapy for pain secondary to failed-back syndrome. They compared alternative therapies in terms of achieving a defined outcome. The reported cost of medical management was \$17,037 per year or \$1,420 per month. They demonstrated that intrathecal morphine delivery resulted in lower cumulative 60-month costs of \$16,579 per year, reflecting a \$1,382 dollar cost per month.

In 1997 de Lisovoy et al. (167) examined the cost effectiveness of long-term intrathecal drug delivery systems in patients with failed-back syndromes. The objective of the study was to estimate the **direct** cost of intrathecal morphine therapy to conservative medical management over a 60-month course of treatment. The patients were kept on a 65% to 81% good to excellent pain relief in both groups. The calculated cost for the morphine pump group was \$1,382 per month.

### **Summary of Evidence**

Three randomized studies (1149 to 1159) and multiple non-randomized studies (1152 to 1160) were included in evidence synthesis. Based on available literature there is **moderate** evidence indicating the long-term effectiveness of intrathecal infusion systems.

### **Complications**

The complication rate has minimized due to the tremendous advancement in the technology of infusion systems. Now there is a pump which is low profile and has a 20-cc volume. The pump batteries last approximately five to eight years now, and the pumps are replaced on an outpatient basis. The intrathecal catheters have been improved dramatically, and complications with catheters have almost vanished.

This patient understands there is a possibility of respiratory depression and arrest leading to death. This patient further understands that the risk of infection leading to possible explantation of the trial and/or permanent system exists. The risk of infection is higher in the diabetic

population. In addition, catheter entrapment in spinal nerve roots is also a possibility, which can lead to permanent neurological sequelae inclusive of permanent paresis and paralysis. Catheter tip granulomata have been reported and are linked to high daily doses and/or concentrations. C.T. Myelography is the best diagnostic tool to evaluate this issue. Paresis and/or paralysis can result despite aggressive neurosurgical exploration. Intrathecal opioids can cause the same side effect profile as oral opioids to include nausea, vomiting, itching, urinary retention, and constipation. Patients are made aware that the pump is an externally applied system over the abdominal fascia and that, indeed, it is uncomfortable for some time until the patient adjusts to such. Furthermore, patients are made aware that pump trials involve continual **adjustment** of the intrathecal opioid delivery system to maximize analgesic response. The patients are fully aware that the goal for analgesic response is not 100% relief, but rather in the range of 60 to 80% benefit. Furthermore, the development of tolerance, although minimal, does apply to intrathecal opioid delivery systems, and the patients should be made aware of such. Rescue pain can be addressed with oral adjunctive agents carefully and judiciously applied. Intrathecal opioid rotation may also occur with the possibility of adding a myospasmodic (baclofen) and an anti-neuropathic agent (Prialit) as well. Pump pocket hematoma and epidural hematoma can also occur. Should an epidural hematoma occur, there can be a paresis or paralysis that may be reversible or can be permanent. Pump pocket seromas do occur, and those will be appropriately diagnostically addressed and therapeutically drained. These can also lead to potential infection and explantation of the entire system whether it be the trial or the permanent system. Although the pumps are sutured to abdominal fascia, they can still migrate into areas of discomfort, and the pumps may, indeed, require a revision. This also occurs to the implanted intrathecal catheter in terms of a potential revision for a possible kinking of the catheter system or a mechanical inability to deliver the pump intrathecal product directly to the intrathecal space. Patients are also made aware that excessive physical activity immediately after intrathecal permanent placement can potentially cause damage to the system which may need revision, and should the patient be involved in any type of a significant traumatic accident or event, insult or damage to the implanted system can occur which may require revision or explantation. Furthermore, these patients are aware that they must present to the office in at least monthly intervals or possibly six-week intervals for pump refill and replacement which occurs with local anesthetic, and there is an element of discomfort associated with such. In addition, the patients are made aware that the battery generally will last between five and eight years of the pump that will be placed, and the pump needs to be surgically replaced after battery exhaustion. Unusual pelvic disorder syndromes following pump implantation have occurred and are agent specific in terms of the type of opioid utilized. In addition, there have been cases of generalized edema related to the agents utilized by the pump and also by patient-specific responses to the intrathecal delivery systems. Should any type of neurological symptomatology develop that cannot be appropriately addressed conservatively, the entire system will be removed. Should the patient at any time continuously feel that the system is cumbersome or they clearly are not in favor of continuing intrathecal opioid delivery, the entire system will be explanted.

## **Final Comments**

Emerging technologies play an important role in how we manage patients with chronic pain and provide a foundation for advancing care options. Many new therapeutic strategies (emerging

technologies) cannot be subjected to the “gold standard” of randomization, double-blinded, placebo-controlled studies due to **ethical or methodologic issues** (44).

Therefore, emerging strategies (intrathecal opioid delivery systems) first appear in the literature with single case reports or a series of case reports. **Initially these therapies cannot be unconditionally embraced** until complete weighing of the risks and benefits compare to conventional therapy. In addition, thorough consideration must occur on the basis of scientific foundation upon which the emerging technologies are based. Unfortunately, many insurers use a **lack of evidence** from a randomized control trial as an **excuse** to deny covering the cost of emerging therapies. Paradoxically, this may lead patients down a road of **conventional, accepted, equally unproven, more expensive, lower-yield, and higher risk procedures** such as spinal fusion with instrumentation.

Intrathecal opioid trials are performed over a course of five to ten days on an outpatient basis.

**A complete discussion of the potential risks benefits, alternatives, and complications to intrathecal opioid therapy as they relate to the previous discussion has occurred with this patient. The patient is in full agreement to proceed with pump trial and permanent implantation should the trial be successful.**

## **UPDATED 2009 CHRONIC PAIN MEDICAL TREATMENT GUIDELINES**

Chronic Pain Medical Treatment Guidelines 8 C.C.R. §§9792.20 – 19792.26 MTUS (Effective July 18, 2009)

### **Implantable drug-delivery systems (IDDSs)**

Recommended only as an end-stage treatment alternative for selected patients for specific conditions indicated below, after failure of at least 6 months of less invasive methods, and following a successful temporary trial. Results of studies of opioids for musculoskeletal conditions (as opposed to cancer pain) generally recommend short use of opioids for severe cases, not to exceed 2 weeks, and do not support chronic use (for which a pump would be used), although IDDSs may be appropriate in selected cases of chronic, severe low back pain or failed back syndrome. This treatment should only be used relatively late in the treatment continuum, when there is little hope for effective management of chronic intractable pain from other therapies. (Angel, 1998) (Kumar, 2002) (Hassenbusch, 2004) (Boswell, 2005) For most patients, it should be used as part of a program to facilitate restoration of function and return to activity, and not just for pain reduction. The specific criteria in these cases include the failure of at least 6 months of other conservative treatment modalities, intractable pain secondary to a disease state with objective documentation of pathology, further surgical intervention is not indicated, psychological evaluation unequivocally states that the pain is not psychological in origin, and a temporary trial has been successful prior to permanent implantation as defined by a 50% reduction in pain. (Tutak, 1996) (Yoshida, 1996) (BlueCross, 2005) (United Health Care, 2005) See also Opioids. In a study of IDDS in 136 patients with low back pain, after one year 87% of the patients described their quality of life as fair to excellent, and 87% said they would repeat the implant procedure. However, complication rates (i.e., infection, dislodging, and cerebrospinal fluid leak) are likely to rise with time in these procedures and more longitudinal outcome studies need to be conducted. (Deer, 2004) In one survey involving 429 patients with nonmalignant pain treated with intrathecal therapy, physician reports of global pain relief scores

were excellent in 52.4% of patients, good in 42.9%, and poor in 4.8%. In another study of 120 patients, the mean pain intensity score had fallen from 93.6 to 30.5 six months after initiation of therapy. In both studies, patients reported significant improvement in activities of daily living, quality of life measures, and satisfaction with the therapy. Constipation, urinary retention, nausea, vomiting, and pruritus are typical early adverse effects of intrathecal morphine and are readily managed symptomatically. Other potential adverse effects include amenorrhea, loss of libido, edema, respiratory depression, and technical issues with the intrathecal system. (Winkelmuller, 1996) (Paice, 1997) One study in patients suffering from chronic low back pain caused by failed back syndrome found a 27% improvement after 5 years for patients in the intrathecal drug therapy group, compared with a 12% improvement in the control group. (Kumar, 2002) Supporting empirical evidence is significantly supplemented and enhanced when combined with the individually based observational evidence gained through an individual trial prior to implant. This individually based observational evidence should be used to demonstrate effectiveness and to determine appropriate subsequent treatment. Generally, use of implantable pumps is FDA approved and indicated for chronic intractable pain. Treatment conditions may include FBSS, CRPS, Arachnoiditis, Diffuse Cancer Pain, Osteoporosis, and Axial Somatic Pain. As we have gained more experience with this therapy, it has become apparent that even intrathecal opiates, when administered in the long term, can be associated with problems such as tolerance, hyperalgesia, and other side effects. Consequently, long-term efficacy has not been convincingly proven. However, it is important to note that there is a distinction between "tolerance" and "addiction", and the levels of drugs administered intrathecally should be significantly below what might be needed orally in their absence. (Osenbach, 2001) (BlueCross BlueShield, 2005) See also Intrathecal drug delivery systems, medications.

*Refills:* IDDSs dispense drugs according to instructions programmed by the clinician to deliver a specific amount of drug per day or to deliver varying regimens based on flexible programming options, and the pump may need to be refilled at regular intervals. The time between refills will vary based on pump reservoir size, drug concentration, dose, and flow rate. A programming session, which may occur along with or independent of a refill session, allows the clinician to adjust the patient's prescription as well as record or recall important information about the prescription. (Hassenbusch, 2004)

**ROBERT G. SALAZAR, M.D.**

Diplomate, American Board of Anesthesiology

Diplomate, American Academy of Pain Management

Medical Director, Comprehensive Pain Management Center

Member of AIT Laboratories Medical Advisory Board

Medtronic Neuromodulation Education Consultant