**Evidence Table**

**Clinical Area:** Implanted pain pump  

**Study Type:** Case Series  
**Study Aim:** To examine the long-term efficacy and safety of intrathecal morphine in patients with severe, malignant pain refractory to less invasive modalities.

**Outcomes**  
- **Primary:** Pain and function. No measure was identified as the primary outcome.  
- **Secondary:** Adverse effects.

**Design**  
- **Number of subjects:** n=40 trialed for an implanted pain pump; n=30 implanted.  
- **Description of study population:** Patients treated at a single institution in OR. Mean age=58 ± 13 years (range 35-83); 53% women; mean pain duration =8 ± 9 years (range 6 months-40 years). All patients had a history of systemic narcotics and most were taking narcotics regularly at the time of study entry.  
- **Inclusion criteria:** Chronic (>6 months) nonmalignant pain refractory to medical and/or surgical treatments; sensory loss in an anatomic distribution; no contraindications for surgery.  
- **Exclusion criteria:** Psychopathological or substance abuse problems.  
- **Consecutive patients?** Yes.  
- **Intervention:** Patients were approached for study inclusion by a disinterested third party. Patients completed an initial questionnaire and pain assessment. Patients then were admitted to the hospital and underwent a trial of intrathecal medication. 14 patients received a 1-mg intrathecal injection of morphine, with pain response monitored for 12 to 23 hours. The other 26 patients were screened during a 2- to 3-day inpatients trial of epidural morphine delivered via an external pump. Patients who experienced at least 50% pain relief were offered implantation of a pain pump (SynchoMed). Infusion of intrathecal morphine began in the operating room and were discharged 1-2 days after surgery. Patients returned to the clinic in 10 days for suture removal and dose adjustment if necessary. The general practice was to increase the intrathecal dose by 20% every 48 hours with report of severe pain, 10-15% for moderate pain and 0-10% for mild pain, in the absence of side effects.  
- **Source of outcome data:** Self-report data, medical records.  
- **Length of follow-up:** 2 years.

**Validity**  
- **Was population homogenous?**  
- **Potential selection biases:**  
- **Were intervention/ care/follow-up similar in each group?**  
- **Did an objective observer assess outcomes?** Yes.
• **Completeness of follow-up:** 2-year data were available for 20/30 participants (67%). Three patients died, in all cases of causes unrelated to chronic morphine administration.

• **Conclusions regarding validity of methods:** Advantages are that this was a prospective study with a well-defined protocol. Disadvantages are that the sample size was small, there was drop-out and there was no comparison group.

### Results

**Pain in previous week: Visual analogue scale (0 to 100)**

<table>
<thead>
<tr>
<th></th>
<th>No. patients</th>
<th>Mean (SD)</th>
<th>p-value (change from baseline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>30</td>
<td>78.5 (15.9)</td>
<td>--</td>
</tr>
<tr>
<td>6 months</td>
<td>25</td>
<td>49.8 (23.2)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>1 year</td>
<td>20</td>
<td>43.2 (24.3)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>2 years</td>
<td>20</td>
<td>58.5 (24.6)</td>
<td>&lt;0.002</td>
</tr>
</tbody>
</table>

**Chronic Illness Problem Inventory (CIPI)**

<table>
<thead>
<tr>
<th></th>
<th>No. patients</th>
<th>Mean (SD)</th>
<th>p-value (change from baseline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>30</td>
<td>29.6 (9.5)</td>
<td>--</td>
</tr>
<tr>
<td>6 months</td>
<td>25</td>
<td>25.6 (11.5)</td>
<td>0.04</td>
</tr>
<tr>
<td>1 year</td>
<td>20</td>
<td>24.3 (11.6)</td>
<td>0.02</td>
</tr>
<tr>
<td>2 years</td>
<td>20</td>
<td>27.3 (13.2)</td>
<td>0.20</td>
</tr>
</tbody>
</table>

* 65-item questionnaire that measures problems related to physical limitations, psychosocial functioning and health care behaviors among the chronically ill.

**Use of systemic medication**

Baseline: 28/30 (93%) of patients were taking systemic narcotics

2 years: 6/20 (30%) of the patients remaining in the study were taking oral narcotics in addition to intrathecal morphine.

**Adverse effects**

**Device-related:**

- There were no instances of infection or perioperative complications requiring surgical intervention.
- 2 patients reported subdural puncture headache that resolved without intervention.
- 5 patients reported 7 device-related complications that necessitated 5 repeat operations; these included migration from the intrathecal space (n=2), obstruction (n=1), and cerebrospinal fluid tracking along catheter with seroma formation (n=2).
• 2 patients experienced pump malfunction; this was resolved with surgical replacement of the pump.

Drug-related

Complications were common near the initiation of therapy, but mainly resolved with standard medication management during the first 3 months. Complications reported at least once during follow-up include:

- Constipation (31%)
- Lethargy (14%)
- Pruritus (14%)
- Diaphoresis (10%)
- Mental status change (10%)
- Urinary hesitancy (3%)
- Peripheral edema (3%)

7 patients developed some tolerance to morphine during follow-up. Tolerance was defined as an intrathecal morphine dose >25 mg/day or administration of an alternate narcotic due to inadequate pain control by morphine in the absence of disease progression or system malfunction.

Authors’ Conclusions

“Continuous intrathecal morphine can be a safe, effective therapy for the management of severe, non-malignant pain among a carefully selected patient population and can result in long-term improvement in several areas of daily function.”

Reviewer’s Conclusions

There was a significant reduction in self-reported pain and problems associated with chronic illness among the 20 out of 30 patients available for follow-up at the end of 1 and 2 years. This was a small study and there was no comparison group.