



Case Report

Cost analysis of cordotomy and intrathecal pain pump placement for refractory cancer pain

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Received : 13 January 2020

Accepted : 24 March 2020

Published : 18 April 2020

DOI

10.25259/SNI_15_2020

Quick Response Code:



ABSTRACT

Background: Cancer pain can be debilitating and 10–20% of patients will have refractory pain despite optimal medical management. Here, we present a cost comparison of treating terminal cancer patients with intravenous (IV) narcotics, anterolateral cordotomy, or intrathecal pain pump (ITPP) placement.

Case Description: We evaluated and treated 2 patients with metastatic breast cancer and expected survivals of <1 year. The first patient, a 53-year-old female, had tumor invasion of the right chest wall and had failed oral pain regimens; she was admitted to receive IV Dilaudid as patient-controlled analgesia (PCA). After 7 days of treatment without improvement, she underwent a left-sided C1-2 cordotomy. For her, the cost of the cordotomy was \$18,462 and the expenses for 7 days hospital stay with PCA was \$89,884; the total was \$108,346. The second patient, a 60-year-old female, had severe somatic pain due to invasion by tumor of the left knee cap. She, too, has failed oral therapy and was receiving in-hospital IV Dilaudid PCA. Following 2 days of failed treatment, a morphine ITPP was placed and effectively treated her pain. In patient 2, the cost of the ITPP was \$80,603 and the expenses for 8 days of the hospital stay with PCA came to \$84,785; the total was \$165,389.

Conclusion: The treatment of refractory pain in cancer patients is challenging. It requires invasive procedures such as cordotomy or ITPP. Although procedures may yield comparable pain control, there was a significant cost savings for cordotomy versus ITPP (\$57,043 saved).

Keywords: Cancer, Cost, Neuroablation, Neuromodulation, Opioids, Pain

INTRODUCTION

Cancer-related pain represents a challenge to manage medically, and most patients will require higher and higher doses of opioid analgesics due to receptor downregulation, which puts them at risk of opioid addiction and death.^[6] Utilizing an optimal noninvasive medical treatment, about 30% of patients will have refractory pain, thus requiring invasive pain procedures to achieve partial or complete relief.^[5] Different invasive pain procedural options include anterolateral cordotomy, spinal cord stimulation, and intrathecal pain pump (ITPP).^[2,3] Here, we present a cost analysis of in-hospital intravenous (IV) narcotics, anterolateral cordotomy versus ITPP placement in two terminal cancer patients.

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CASE DESCRIPTION

Case 1

A 53-year-old female with metastatic breast cancer presented with severe pain involving the right chest wall; her n expected survival was <1 year. She had failed oral narcotics and was admitted for 7 days of Dilaudid patient-controlled analgesia (PCA); nevertheless, this left her with a 5/10 residual pain score. She, therefore, underwent a left-sided C1-2 cordotomy which resulted in immediate pain relief. The PCA was weaned over 2 days and she was discharged home in stable condition. The total cost of her care was \$108,346; \$18,462 for the cordotomy, \$89,884 for the hospital stay [Tables 1 and 2].

Case 2

A 60-year-old female with metastatic breast cancer and an expected survival of <1 year presented with severe cancer-related pain involving the left knee cap. She failed oral narcotics and local nerve blocks. She was admitted for Dilaudid PCA, but her residual pain was 7/10 on the VAS, so she underwent ITTP placement. Immediately postoperatively she experienced partial pain relief and the PCA was weaned over 7 days (e.g., to titrate the intrathecal opioids), at which point she was discharged home. The total cost of her care totaled \$165,389; \$80,603 for the ITTP placement procedure (including the implants) and \$84,786 for the hospital stay [Tables 1 and 2].

Table 1: Patient demographics.

Variable	Case 1	Case 2
Age (years)	53	60
Pain type	cancer	cancer
Hospital stay	10 days	10 days
IV opioids used	Dilaudid PCA	Dilaudid PCA
Pain score with PCA alone	5/10	7/10
Pain score at discharge	0/10	0/10

PCA: Patient-controlled analgesia, IV: Intravenous

Table 2: Details of the pain procedures cost.

Service	Cost	
	Case 1	Case 2
ITTP	-	\$80,603 (including cost of implants)
C1-2 cordotomy	\$18,462	-
Hospital stay total (excluding procedure cost)	\$89,884 (10 days)	\$84,786 (10 days)
Hospital stay for IV opioids	\$62,918.8 (7 days)	\$67,828.8 (8 days)
Total	\$108,346	\$165,389

ITTP: Intrathecal pain pump, IV: Intravenous

DISCUSSION

In 1986, the World Health Organization stated the following “to provide relief from pain to the patient’s satisfaction, so that [they] may function effectively and eventually die free from pain” in regard to cancer-related pain.^[8] Yet, multiple reports have shown that a significant percentage of patients with cancer pain is undertreated and suggest that the majority of these patients may benefit from interventional pain procedures.^[4] Percutaneous cervical cordotomy provides immediate and long-lasting relief of unilateral somatic pain in about 90% of patients, with a low complication rate of <5%.^[3] ITTP acts by delivering minute doses of opioids intrathecally, which causes pain relief without the untoward side effects of IV and oral opioids. A recent randomized controlled trial showed that 85.7% of patients randomized to receive a cordotomy experienced >33% reduction in pain intensity (≥ 4 points), while none randomized to palliative care achieved a similar reduction in pain.^[7] Corrado *et al.* found that ITTP resulted in a 4.2-point reduction of the pain score (9.1–4.9 on 10-point pain scale) in two-thirds of their cancer patients, while Brogan *et al.* showed that ITTP achieved cost-effectiveness at 7.6 and 10.7 months versus high and low conventional opioid therapy, respectively.^[1] In this report, the cost of the cordotomy (\$18,462) was 22.9% of the cost of ITTP (\$80,603) and 27% that of in-hospital PCA for ITTP titration.

Cost summary

In a cancer patient with expected survivals of <1 year, cordotomy saved about \$57,053 in total cost versus ITTP. Therefore, for patients with estimated survivals of under 1 year, cordotomy was the most cost-effective versus ITTP in which is a better option in cancer patients with survival estimated at >1 year.

CONCLUSION

There is an obvious need for cost effective and adequate treatment for cancer-related pain. This study documented the lesser costs but comparable efficacy of utilizing cordotomy to treat patients with estimated survivals of <1 year versus the recommendation to consider ITTP for those with >1 year to live.

Declaration of patient consent

Patient’s consent not required as patient’s identity is not disclosed or compromised.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: Aljuboori Z, Burke W, Meyer K, Williams B. Cost analysis of cordotomy and intrathecal pain pump placement for refractory cancer pain. *Surg Neurol Int* 2020;11:72.