

Interventional Treatments of Cancer Pain



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KEYWORDS

- Cancer pain • Intrathecal drug delivery • Vertebroplasty • Kyphoplasty • Neurolysis
- Celiac plexus • Superior hypogastric plexus • Ganglion impar

KEY POINTS

- Intrathecal drug delivery should be considered for patients with cancer experiencing opioid-related side effects or pain refractory to opioid dose escalation.
- In cancer patients with painful vertebral compression fractures that have failed to improve with conservative treatment, vertebral augmentation is a safe and minimally invasive technique that improves both pain and function.
- Neurolysis of the celiac plexus, superior hypogastric plexus, or ganglion impar is indicated in patients with cancer with visceral upper abdominal, lower abdominal, or perineal pain, respectively.
- Radiofrequency ablation and cryoablation are safe and effective techniques for the management of isolated painful bony metastases.

INTRODUCTION

Pain is a ubiquitous experience for patients with cancer, affecting more than 90% of patients during their treatment. In greater than half of all patients with advanced cancer it remains at least moderately severe. Cancer-related pain is associated with reduced ability to tolerate treatment, depression, and diminished quality of life and is demoralizing to patients and caregivers.¹ Although the use of opioids for cancer pain remains a mainstay in accordance with the World Health Organization's analgesic ladder, this approach does not produce adequate pain control in an estimated 20% to 30% of patients.^{2,3}

Interventional techniques have been proposed as the "fourth step" in the analgesic ladder, appropriate for patients in whom pain is refractory to systemic opioids.⁴ In addition there is growing recognition of the role of interventional procedures early in the course of cancer-related pain to avoid unnecessary suffering and morbidity.⁵

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However, interventional procedures remain underutilized in clinical practice because of unfamiliarity with these procedures and lack of qualified interventional pain specialists.⁶ This article reviews interventional treatments for cancer pain, including technique, indications, complications, and outcomes.

INTRATHECAL DRUG DELIVERY

Intrathecal drug delivery (IDD) entails the administration of drugs, typically opioids with or without adjunct medications, directly to the cerebrospinal fluid and to the central nervous system receptor sites via a subarachnoid catheter. The analgesic agent is delivered from an implanted device or, less commonly, an external pump. Because IDD allows the drug to largely bypass the systemic circulation, it results in minimal systemic side effects, yet superior analgesia, at a fraction of the comparable systemic dose. Furthermore, IDD allows for direct access to central nervous system receptors, bypassing issues of drug absorption from the gastrointestinal tract and first pass metabolism, permitting analgesic efficacy of drugs that would be otherwise toxic, such as local anesthetics and novel peptides like ziconotide.

Indications

- Cancer-related pain refractory to systemic opioids despite dose escalation
- Dose-limiting opioid side effects
- Inability of patients with cancer-related pain to safely use systemic opioids; for example, patients with severe medical comorbidities, a history of opioid addiction or active drug use.

Pharmacologic Options

Opioids are the most commonly used medications in IDD; however, multiple other medications have been used safely and effectively. **Table 1** summarizes the mechanism, indications, and adverse effects of these agents.

Methods of Intrathecal Drug Delivery

Percutaneous catheter

The simplest delivery system involves a catheter inserted into the intrathecal space percutaneously and then connected to an external infusion pump. Advantages of percutaneous catheters include ease of insertion or removal, ability to titrate medications quickly, and ability for providers who are not pain specialists to manage symptoms in the home. Disadvantages include limited longevity (days to weeks), infectious risk, catheter disconnections, interference with patient mobility, and need to frequently change the medication solution in the external pump.

Presently, in the United States, there are no products specifically approved for percutaneous intrathecal use, though an epidural catheter can easily be used for this purpose.

Implanted drug delivery systems

In this method of IDD, a small electronic pump is placed subcutaneously in the anterior abdominal wall and connected to a catheter that is tunneled subcutaneously around the abdomen and inserted into the intrathecal space in the lumbar spine (**Fig. 1**). The pump has a reservoir that can be refilled percutaneously using a port that is accessed by a needle through the skin. The advantages of IDD systems (IDDS) include low maintenance, less infectious risk, lack of interference with patient mobility, and durability of the system. Disadvantages include the need for surgical procedure and general anesthesia, access to an experienced pain provider for pump placement

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