Case Report

Successful Management of Opioid-refractory Pelvic Cancer Pain Using Continuous Local Anesthetic Infusion via a Tunneled Epidural

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Abstract

Opioid refractory pelvic cancer pain is common and difficult to manage, which often results in analgesic polypharmacy and escalating opioid doses, alongside the use of interventional techniques. However, up-titration of opioids often results in systemic side effects, and interventional procedures have limitations in their duration of action, efficacy, and risk of nerve damage. Therefore, intrathecal pumps have been utilized as a more permanent option for pain management. Their ability to deliver localized therapy using a variety of pharmacological agents makes it an attractive option for cancer pain management. However, they are limited by a need for careful titration, pump volume constraints, and risks of severe side effects. These limitations can be mitigated by targeting the epidural space instead, and we propose the use of a tunneled epidural catheter technique for continuous local anesthetic infusion in opioid-refractory pelvic and abdominal cancer pain. In this case report, we describe a patient with pelvic and abdominal cancer pain due to stage IV sigmoid adenocarcinoma with widespread metastases, who received adequate pain management from a continuous local anesthetic infusion through a tunneled lumbar epidural catheter. Throughout this patient’s hospital admission, their opioid requirements remained the same, and their pain remained well controlled on review in the community one month after discharge. This case demonstrated that epidural catheters with local anesthetic as the sole neuraxial analgesic agent over a short duration could potentially provide preventive analgesia. This case highlights that a local anesthetic tunneled epidural, without addition of neuraxial opioids, is an effective alternative to intrathecal pumps in managing complex cancer pain and has potential for preventive analgesia.

Keywords: anesthesia, epidural catheter, local anesthetic, pain management, tunneled epidural
1 INTRODUCTION

Pelvic and abdominal cancer pain is difficult to manage, frequently being associated with significant reduction in quality of life[3]. Pain syndromes that may be experienced include a combination of radiculopathy from nerve root invasion, inflammatory and bony pain from tissue invasion, and tenesmus with rectal pain from distension[3]. Due to the complex nature of this pain, including nociceptive and neuropathic elements, there is usually analgesic polypharmacy with a consequential escalation of opioids[3]. Up-titration of opioids is limited by systemic side-effects including respiratory depression, sedation, and constipation[4]. Intervventional targets that have been explored include the hypogastric plexus, ganglion impar, pudendal nerve, transforaminal nerve roots and the caudal-epidural space[5]. However, these procedures are limited by their efficacy, duration of action, as well as the risk of nerve injury and potential denervation pain from neurolysis[6,7].

Intrathecal pumps have been used as a more permanent pain management option in these patients, as these are implantable devices with the ability to provide localized therapy through the delivery of medications to the intrathecal space[8]. Opioids have been the mainstay of intrathecal therapy due to the pharmacological benefit of access to the blood brain barrier and the opioid receptors in the central nervous system[9]. This may be advantageous in those with opioid tolerance and opioid-related side-effects. Along with opioids in intrathecal pumps, the adjunct medications commonly used include ziconotide, a N-type calcium voltage channel blocker, and clonidine, an alpha-2 adrenergic receptor agonist[10]. However, they are limited by a need for careful titration and pump volume constraints[10]. Ziconotide has been suggested as monotherapy in intrathecal pumps, but its availability is limited in different countries and there are concerns with regards to side-effects such as nausea (30%), dizziness (42%), psychosis and suicidal ideation[11].

An alternative to intrathecal opioids and ziconotide are local anesthetic agents such as ropivacaine and bupivacaine, however, there is a narrow therapeutic index with concerns regarding motor blockage, urinary retention, and hypotension. These risks can be mitigated by targeting the epidural space instead, and we propose the use of a tunneled epidural catheter technique for continuous local anesthetic infusion in opioid-refractory pelvic and abdominal cancer pain. This study is unique in demonstrating the efficacy and feasibility of utilizing a tunneled epidural with the sole use of local anesthetic as an alternative to intrathecal pumps in a cancer palliative care patient with the potential to provide preventive analgesia. Although tunneled epidural catheters have been used in cancer pain, they are mainly used during end-of-life care and local anesthetics are often combined with opioids. This case is different in that tunneled epidural was used before end-of-life care and only local anesthetic was given through the epidural catheter.

2 CASE PRESENTATION

A 52-year-old female with stage IV sigmoid adenocarcinoma and metastases to the bladder, pelvis, lung, and liver was admitted to hospital due to increasing cancer-associated pain. Her abdominal and anterior pelvic pain were nociceptive and neuropathic in nature, and she also had radicular pain in the right gluteal region and right upper leg, in addition to right-sided vulvodynia. Computed tomography (CT) imaging showed disease progression, evidenced by increased size of sigmoid mass with infiltration into the urinary bladder and increased size of right pubic ramus osseous metastases. Her pain control regimen included continuous subcutaneous morphine infusion of 50mg over 24h (with breakthrough subcutaneous morphine 15mg twice daily as needed), fentanyl transdermal patch 75mcg per hour, which amounted to 225mg oral morphine equivalent daily dose (oMEPP), oral methadone 5mg twice daily (30mg oMEPP) and pregabalin 150mg nocte. However, she continued to have poor pain control, significantly affecting her quality of life with regards to her function and mobility, therefore requiring hospital admission.

During admission, she received a tunneled lumbar epidural catheter with continuous local anesthetic infusion to manage her pain. An epidural catheter was inserted at the lumbar (L3-L4) level under sterile conditions. A test dose of 5ml of 0.2% ropivacaine was given, with no subsequent motor block or hemodynamic instability. The epidural catheter was then tunneled under the skin, without leaving a skin bridge, secured with DERMABOND™ (Johnson & Johnson, USA) and Ioban™ (3M, USA) dressings. An infusion of 0.2% ropivacaine (2mg/mL) was maintained at a rate of 5mL/h using an infusion pump. A dermatomal assessment performed two hours following the procedure showed adequate block at the level of L3-S2. The patient’s pain was controlled, her Bromage score was 0, and power was normal (5/5) on the Medical Research Council muscle power scale in both left and right lower limbs. The patient’s opioid requirements remained the same, and no further issues were noted over the next four days. The epidural catheter was ceased after five days as the patient was discharged to the community. During her one month follow up, it was reported that her pain remained well controlled and at the time of this review, she was still in the community.

3 DISCUSSION

This case highlighted that pelvic cancer pain managed using epidural catheters, with local anesthetic as the sole neuraxial analgesic agent, over a short duration can provide potentially preventive analgesia. As demonstrated in this patient, a pure local anesthetic epidural infusion of five days was able to manage her escalating cancer pain and allowed
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Table 1. Advantages and Disadvantages of Administering Local Anesthetic via an Epidural Catheter Compared to an Intrathecal Pump

<table>
<thead>
<tr>
<th>advantages</th>
<th>Intrathecal Pump</th>
<th>Disadvantages</th>
<th>Epidural Catheter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less invasive</td>
<td>Provides a more permanent option for patients with requirements for longer term analgesia.</td>
<td>Unable to be used in the ambulatory setting in the community.</td>
<td>Lower risk of infection, especially with tunneling of the catheter.</td>
</tr>
<tr>
<td>Less motor block</td>
<td></td>
<td>Higher systemic absorption and risk of LAST</td>
<td>LA agents given through epidural space have a wider therapeutic index with lower risk of toxicity.</td>
</tr>
<tr>
<td>LA agents given through the epidural space have a lower risk of infection, especially with tunneling of the catheter.</td>
<td></td>
<td>Lower risk of infection, especially with tunneling of the catheter.</td>
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</tr>
</tbody>
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Notes: Abbreviations: LA, Local Anesthetic; LAST, Local Anesthetic systemic toxicity.

This case study illustrates several advantages of epidural catheters over intrathecal pumps for cancer pain that has not reached end-of-life stages. Epidural catheters allow for flexibility in the type of medication administered, in contrast to intrathecal pumps which are more difficult to alter the type or dose of medications. Epidural catheters are also more easily removed compared to intrathecal pumps, which require more invasive procedures. This is especially useful in cancer pain which is dynamic and evolves with the disease process. Patients would therefore benefit from a more readily adaptable system for pain relief. In light of the recent use of intrathecal pumps in cancer pain in the literature, this case study demonstrates the importance of considering epidural catheters as an alternative to intrathecal pumps for cancer pain patients who are not at the end-of-life stages.

This patient had a tunneled epidural technique which has the advantage of reducing risk of catheter dislodgment. Tunneling an epidural reduces dislodgment by up to 50%, which is especially important as the leading cause of late epidural failure is dislodgment. This case also further highlights that tunneling should be done without leaving a skin bridge as it can potentially reduce the risk of infection and can increase the length of time the catheter can be kept in the epidural space. It is postulated that tunneling results in better fixation and less movement between the skin and catheter, therefore reducing bacterial migration along the catheter. This case also shows that securement with DERMABOND™, Ioban™ dressings and suture fixations are beneficial in securing the catheter.

In addition to describing the technical aspects and advantages of epidural catheters, this case shows that there is potential in adapting epidural systems that would allow their use in the community, which would help with cost reduction. Potential modifications that can be made include the use of computerized ambulatory delivery devices (CADD) pumps or elastomeric infusion systems that could be connected to the epidural catheter. This has been done in postoperative pain where elastomeric pumps have been shown to be non-inferior in postoperative epidural analgesia compared to conventional patient controlled epidural analgesia whilst enabling patients to be managed in the community. The use of elastomeric or CADD pumps could be an area of exploration in cancer pain to provide ambulatory continuous epidural analgesia.

4 CONCLUSION

This case demonstrates that a tunneled epidural local anesthetic catheter may be an effective alternative to an intrathecal drug delivery system to provide analgesia for cancer pain as part of a multimodal strategy. This case study is unique in that only a local anesthetic agent was administered via the epidural without a need for addition of neuraxial opioids and analgesia persisted for a prolonged period.

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Patient Consent
Written patient consent was obtained prior to the writing of this report, for publication of this report.

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Conflicts of Interest
The authors declared no conflict of interest.

Author Contribution
Young J was responsible for supervision of the project and reviewing the final draft for submission. Koh A was responsible for writing the original draft. Martis W was responsible for editing and reviewing the final draft for submission. All authors contributed to the manuscript and approved the final version.

Abbreviation List
CADD, Computerized ambulatory delivery devices
CT, Computerized tomography
oMEDD, Oral morphine equivalence daily dose

References

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