Simple Outpatient Postoperative Analgesia Using an Orbital Catheter After Enucleation

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Objective: To evaluate an indwelling orbital catheter, placed at enucleation, for repeatable delivery of local anesthetic on an outpatient basis.

Methods: A retrospective, noncomparative, case series medical record review was performed of patients undergoing enucleation and receiving an indwelling orbital pain-control catheter at surgery by us from January 1, 1998, through December 31, 2001. Medical records were reviewed for hospitalization status postoperatively. Medical records of those patients treated on an outpatient basis were reviewed for patient and family comments about ease of use of the pain-control catheter and the degree of pain control and for any complications associated with catheter use. The main outcome measures included documented patient and family comments and physician medical record notes about catheter use and complications.

Results: Of the 85 patients, 67 were treated on an outpatient basis. The other 18 patients required a postoperative hospital admission for unassociated medical problems. Of the 67 patients, 58 (87%) reported using the catheter at home at least once. Of these 58 patients, 10 reported mild discomfort with catheter use, but in no case did the patient discontinue catheter use because of discomfort. All patients using the catheter reported pain relief lasting from 1½ to 4 hours. No postoperative complications associated with catheter placement were observed.

Conclusion: The orbital pain-control catheter allows a caregiver to easily and repeatedly deliver local anesthetic to the operative site following enucleation, resulting in effective postoperative analgesia while the patient recovers at home.


PAIN IS THE MOST COMMON reason for an unplanned hospital admission after ambulatory surgery and, thus, effective outpatient surgery requires adequate postoperative pain control.1 Enucleation can result in severe postoperative pain, requiring either outpatient oral narcotics or inpatient analgesia. Uncontrolled pain can lead to nausea, vomiting, crying, and generalized restlessness, all resulting in an increased risk of postoperative hemorrhage. Enucleation is most often performed under general anesthesia. A postoperative retrobulbar injection of local anesthetic provides effective, but temporary, relief. An orbital epidural catheter attached to a computerized ambulatory patient-controlled analgesia (PCA) bupivacaine hydrochloride pump has been described for patients undergoing orbital implantation, allowing improved postoperative pain control on an outpatient basis.2 This catheter decreased postoperative pain and was safe. We have developed a simplified indwelling orbital catheter, placed during enucleation for the delivery of local anesthetics without the use of a PCA pump, to assist in postoperative pain control. This study evaluates the use of this pain-control catheter on an outpatient basis by patients undergoing enucleation.

METHODS

The Johns Hopkins University School of Medicine Joint Committee on Clinical Investigation exempted the study from review, believing it qualified for exemption 4 under Department of Health and Human Services regulations 45CFR46.101(b). The medical records of 85 consecutive patients undergoing enucleation by us (S.L.M. and N.T.I.) from January 1, 1998, through December 31, 2001, were studied retrospectively. All 85 patients received an orbital pain-control catheter during enucleation. The catheter was prepared by removing the butterfly needle from a commercially available 20-cm precapped intravenous catheter (Figure 1). A 4-0 nylon suture was tied around the catheter 2 to 3 cm from the cut end. After removal of the globe, the needle on the nylon suture was passed from inside the
orbit out through the skin (Figure 2). The cut end of the catheter was positioned in the posterior orbit under direct visualization (Figure 3). The catheter was temporarily secured in place until completion of the surgery by hanging a clamp from the suture to apply tension. The remaining steps of the enucleation were performed as usual. The conjunctiva was closed, with the catheter exiting laterally (Figure 4). The capped end of the catheter was taped to the anterior surface of the patch, and the suture was cut at the skin (Figure 5). Patients treated on an outpatient basis were sent home with two 10-mL syringes of a 50:50 mixture of 0.75% bupivacaine hydrochloride and 4% lidocaine hydrochloride. Before discharge, the caregiver was given a demonstration of the use of the catheter by the operating surgeons (S.L.M. and N.T.I.), as well as written instructions for catheter use. The caregivers were instructed to slowly inject up to 2 mL of the anesthetic every 4 hours as needed for pain. The patients were also given a prescription for a combination of acetaminophen, 500 mg, and oxycodone hydrochloride, 5 mg. Patients returned in 2 to 3 days for patch and catheter removal. The temporary nylon fixation suture is removed as the catheter is removed.

RESULTS

Of the 85 patients undergoing enucleation during the 3-year study period, 67 were treated on an outpatient basis. Eighteen patients were admitted postoperatively for medical conditions unrelated to pain control, including hypotension, hypoxia, hemoptysis, and hypokalemia. Of the 67 outpatients, 34 were male and 33 were female. The
mean patient age was 51 years (range, 2-91 years). Patients underwent enucleation for blindness and pain (n=51), uveal melanoma (n=24), a ruptured globe (n=7), and endophthalmitis (n=3). Sixty-one patients received high-density porous polyethylene implants (MEDPOR; Porex Surgical, Inc, Newnan, Ga) (20-mm sphere, 28 patients; 18-mm sphere, 1 patient; 16-mm sphere, 1 patient; 20-mm MCOI, 25 patients; and 5-mL COI, 6 patients). Six patients received 20-mm plastic spherical implants.

Of the 67 outpatients, 58 (87%) reported using the pain-control catheter at home at least once. Of the 9 patients who did not use the catheter, 7 reported having no postoperative pain requiring catheter use. One patient did not use the catheter because there was no one “qualified to administer the anesthetic” in his nursing home. One patient was a 2-year-old child whose parent requested that the catheter be taped over because she was afraid her son would dislodge it. No patient or caregiver reported any difficulty associated with catheter use. All patients who used the catheter reported relief of pain lasting from 1½ to 4 hours. Thirteen patients reported using all 10 doses of anesthetic, and 4 of these patients specifically wanted access to more doses during the 3-day postoperative period.

Of the 58 patients, 10 (17%) reported mild discomfort with catheter use, ranging from “feeling funny” to “slight burning.” No patients discontinued catheter use secondary to discomfort. Of the 5 patients who reported postoperative nausea, only 1 specifically associated the nausea with catheter use. This patient also continued to use the catheter, despite the nausea, because of the pain relief. No complications, including postoperative infection, retrobulbar hemorrhage, or toxic adverse effects of bupivacaine, were observed. No problems were encountered in removing the catheter.

**COMMENT**

More than 60% of all types of surgical procedures are performed in an ambulatory setting, and this percentage is certainly higher for the field of ophthalmology. Inadequate postoperative pain relief can result in crying and restlessness, leading to hematoma formation, increased pain, delayed wound healing, and prolonged recovery. In addition, poor control of postoperative pain can precipitate or increase the duration of the hospital stay, increase health care costs, and reduce patient satisfaction. While opioid analgesics are the mainstay of pain control in the early postoperative period, their use can be associated with nausea, vomiting, sedation, ileus, and respiratory depression. Multimodal analgesia, using a combination of oral agents and a local anesthetic, is recognized as a superior postoperative analgesia vs any modality alone. Local anesthetic techniques can decrease the level of postoperative pain and reduce the requirement for opioids. Specifically, wound infiltration of local anesthetics can provide effective postoperative analgesia.

Enucleation is often performed under general anesthesia and can result in significant postoperative pain. While a retrobulbar injection of local anesthetic can provide effective relief of pain postoperatively, the relief is only temporary. A safe and simple local analgesic delivery system is needed to provide cost-effective pain relief after outpatient enucleation. We developed a pain-control catheter, placed during enucleation under direct visualization, that allows a patient’s caregiver to administer a local anesthetic at home as needed for pain control after enucleation. We found that the catheter provided relief from postoperative pain in all patients who used it, with 17% reporting mild discomfort on injection of the local anesthetic, which did not limit catheter use. We did not observe any other complication from catheter placement or use. A larger multicenter trial could be performed to further document the safety of this approach.

While indwelling retrobulbar catheters for the delivery of medication are not novel to ophthalmology or enucleation, the use of such a catheter to provide postoperative pain control after ambulatory surgery is a recent innovation. The first description of a retrobulbar catheter left in place for 2 to 3 days following enucleation was by Scheie in 1956. Several reports describe the patient use of retrobulbar catheters for repeated injections of local anesthetics to control intraoperative and postoperative pain associated with intraocular surgery and enucleation. Lincoff and colleagues described a retained retrobulbar catheter for the administration of medication for macular degeneration, requiring patients to return for injections 6 days a week. None of these reports describe home use of an indwelling orbital catheter.

Loss of an eye can require significant emotional adjustment, and postoperative recovery in a comfortable environment surrounded by a familiar support structure is ideal. Fezza et al described a significant improvement in postoperative pain control following enucleation, allowing the patient to recover at home. In their study, an epidural catheter was placed in the lateral orbital space, transcathaneously, on completion of the surgery. The catheter was connected to a bupivacaine PCA pump delivering a continuous infusion on an outpatient basis and allowing the patient to administer boluses of bupivacaine as needed. A home health care nurse visited daily to check the functioning of the pump. Of the patients in the study, 88.2% reported complete or partial pain relief, with only 11.8% reporting severe pain without relief from the orbital pump. The low complication rate included 1 retrobulbar hemorrhage on placement of the catheter and 4 catheters that had to be removed, replaced, or repositioned because of obstruction. No toxic adverse effects from bupivacaine were observed.

Our pain-control catheter has several advantages over that described by Fezza et al. First, our catheter is placed under direct visualization during the enucleation after removal of the eye. This essentially eliminates the risk of retrobulbar hemorrhage from catheter placement and ensures that the catheter is not in the intravascular space, minimizing the risk of toxic effects from bupivacaine. Second, our catheter lumen is larger than that of the epidural catheter used by Fezza et al, and we had no cases of catheter obstruction. One potential disadvantage of a larger catheter lumen is the potential rapidity with which the local anesthetic can be delivered. All caregivers were instructed on the importance of a slow injection, but the
potential for rapid tissue expansion may explain the mild discomfort on anesthetic injection experienced by some patients in our study. All of our patients reported pain relief, in contrast to those using the catheter described by Fezza et al, for which 12% of patients reported severe pain without relief from the pump. A third advantage of our catheter is the reduced cost and simplicity. No PCA pump or home health care nursing visits were required. All caregivers found the catheter simple and easy to use with minimal instruction.

A significant difference between the PCA pump–linked catheter and our simplified catheter is the use of continuous infusion. Continuous infusion of bupivacaine has the potential advantage of providing continuous uninterrupted analgesia and minimizes the discomfort of boluses. However, continuous infusion also runs the risk of treating patients without pain, and we found that 10% (7/67) of our patients did not use the pain-control catheter even once because of lack of postoperative pain.

We have placed our pain-control catheter in patients undergoing evisceration through an inferior fornix conjunctival incision for the peribulbar application of lidocaine-bupivacaine, and have found the pain control to be somewhat less effective (unpublished data, 1998-2001). This may be secondary to the increased pain after evisceration compared with enucleation that others have seen. However, it is also quite possible that the retrobulbar placement of the catheter described by Fezza et al2 may provide better anesthesia during evisceration.

One potential long-term risk of the repeated application of a retrobulbar anesthetic by either catheter is myotoxicity of the anesthetic agent, reducing the motility of the orbital implant. This risk would be difficult to evaluate given the wide range of implant motility following enucleation.

In summary, we have designed an orbital catheter, placed during enucleation and used for the repeated delivery of a local anesthetic. Patients and caregivers have found the catheter easy to use and effective, with minimal adverse effects. We believe our catheter provides a welcome addition to oral narcotic analgesia, allowing enucleation procedures to be performed in an ambulatory setting, as dictated by economic pressure and patient preference.

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REFERENCES