Sending Patients Home after Regional Anesthesia Procedures

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This article addresses outpatient management strategies for single-injection and continuous peripheral nerve blocks (CPNB).

Single-Injection Nerve Blocks
Regional anesthesia employing peripheral nerve blocks, when used as the sole anesthetic technique, provides superior pain relief and a lower incidence of side effects leading to faster and higher quality recovery compared to general anesthesia (1,2). In a large prospective observational study, Dr. Klein and colleagues presented a series of 1791 patients discharged on the day of surgery after undergoing long-acting peripheral nerve blocks with ropivacaine (3). Based on their findings, the incidence of complications either in the hospital or at home was very low, and patients’ satisfaction with pain relief was very high despite the need to utilize oral opioids after nerve block resolution. Despite the reported benefits of peripheral nerve blocks, the application of these techniques is not universal. In a survey of the Society for Ambulatory Anesthesia, anesthesiologists that responded reported a high rate of nerve block performance, but techniques were limited to a select few (interscalene, axillary, and ankle blocks); and willingness to discharge outpatients with long-acting lower extremity nerve blocks was less common than with upper extremity blocks (4).

Should we be concerned about lower extremity blocks? No and yes. Although the safety of these techniques is well-established, complications are always possible. The presence of numb extremity may lead to awkward positioning by the patient discharged home which may cause stretch or compression injury of superficial peripheral nerves such as the common peroneal nerve. Patients may physically injure an insensate extremity and delay detection until the nerve block resolves. Patients who undergo lower extremity nerve blocks, and therefore not limited by pain, may attempt to bear weight on the affected extremity against physician orders leading to falls. A subset of these patients is particularly concerning: those who undergo distal lower extremity (e.g. ankle or foot) with peripheral nerve block anesthesia. Often, a femoral nerve or lumbar plexus block is performed for tourniquet coverage, yet patients are discharged home with only an ankle splint and without knee protection. While hypothetical, a patient could twist his/her knee getting in or out of a car without proper quadriceps muscle control. As always, the decision to perform a nerve block technique should be preceded by a careful cost-benefit analysis and thorough discussion with the patient and surgeon.

How do we prevent injury and ensure safety at home? Patients who undergo upper extremity blocks should be discharged with a protective sling. Similarly, patients with femoral nerve or lumbar plexus blocks and persistent quadriiceps weakness at the time of discharge should be sent home with a knee immobilizer, crutches, and written and verbal instructions not to bear weight on the affected extremity. At our institution, all patients who undergo peripheral nerve blockade receive a follow-up phone call the next day to assess block resolution or persistent symptoms, current level of pain and adequacy of pain relief, and overall satisfaction with postoperative recovery.
Continuous Peripheral Nerve Blocks
The decision to send a patient home with a portable perineural infusion should be made very
carefully. Obviously, not every patient is a good candidate for regional anesthesia, and not every
patient eligible for regional anesthesia is a good candidate for outpatient CPNB. When provided
on an outpatient basis to select patients, CPNB techniques have demonstrated analgesic benefits
for moderately-painful extremity surgeries based on the results of randomized, placebo-
controlled investigations (5-7). Furthermore, patients with local anesthetic perineural infusions
at home suffer fewer side effects including sleep disturbances (5-7). The use of CPNB facilitates
same-day discharge after many types of extremity surgery which would have required at least
overnight admission for pain control only a few years ago. Even for patients who undergo knee
or shoulder replacement surgery, CPNB analgesia decreases the time to achieve discharge
criteria and may be continued outside of the hospital setting for patients eligible for ambulatory
recovery (8,9).

Do CPNB patients need home nursing? No. While ideal, home nursing visits for ambulatory
CPNB patients do not seem to be necessary in our experience. A survey of patients who
underwent CPNB at home revealed that once-daily telephone follow-up by a health care provider
is the preferred amount of contact, and 98% of patients are comfortable removing their own
CPNB catheters at home (10). Only 4% would have liked a provider to remove his/her catheter
while 43% would have been comfortable going home with only written instructions and no
person-to-person contact (10). A consistent complaint among those patients surveyed was
leakage from the catheter site (31%)(10), which is also reflected in our clinical practice and
should be explained in written instructions to patients discharged home with CPNB.

How do you manage CPNB patients at home? As our institutional protocol, we send CPNB
patients home with specific written instructions for their portable infusion device as well as
provide a demonstration of the device function for the patient preoperatively. We prefer that
each patient with an ambulatory CPNB be discharged with a caretaker. Also included in the
instruction sheet are expected CPNB issues (i.e. leakage and breakthrough pain) and contact
information for the Regional Anesthesia Service which is available 24 hours a day, 7 days a
week. Patients must have someone they can call should questions arise at home, just as they
would in the hospital.

Routine telephone follow-up by a health care provider is performed on a daily basis until CPNB
catheter removal, and each contact is documented on a designated form (Figure 1) (11). We
typically offer each patient the opportunity to remove the catheter during the follow-up phone
call when the infusion device reservoir is near exhaustion in order to provide real-time guidance
if necessary. Otherwise, patients may elect to remove his/her catheter independently and page
the Regional Anesthesia Service provider only if there are issues. Disposal of infusion devices
should be handled in the manner recommended by the manufacturer. Of note, daily management
of CPNB catheters is included in the initial placement charge.
What should you put in the pump? The optimal infusate and duration of perineural infusion are still not yet established. Many surgeons will ask, “Can’t you just numb the sensory nerves and spare the motor nerves?” Unfortunately, our commercially-available local anesthetics do not demonstrate that kind of selectivity or convenience, which makes managing perineural infusions a bit of a balancing act. Most published studies employ ropivacaine and bupivacaine in various concentrations. In a study of hand grip strength during and after continuous interscalene block comparing ropivacaine 0.2% to bupivacaine 0.15%, subjects who received ropivacaine demonstrated better preservation of motor function at all time points and fewer paresthesias in the fingers (12). Other studies comparing equipotent dosages of levobupivacaine and ropivacaine for CPNB have failed to demonstrate a difference in motor block (13,14).

Which regimen is most appropriate for CPNB? Regardless of the local anesthetic infusate selected, the optimal regimen for perineural infusion should include a basal rate plus a patient-controlled bolus feature. Studies comparing basal-only, basal-bolus, and bolus-only regimens for perineural infusions of 0.2% ropivacaine demonstrated the optimal combination of analgesia, duration of infusion, and patient satisfaction for the basal-bolus regimen when using infusion devices with fixed reservoir capacity (15,16). Our infusion protocols are presented in Table 1. Although these are standard starting regimens at our institution, we will occasionally adjust settings to maximize analgesia and minimize motor block for the individual patient. As a routine, we run lower basal infusion rates for femoral nerve and lumbar plexus catheters to minimize the likelihood of quadriceps weakness.

How long should catheters be left in place? In the outpatient studies mentioned above, subjects were instructed to remove their catheters at home on the 3rd postoperative day (15,16). However, the optimal duration of perineural infusion has not been determined. In a large multi-center prospective study of inpatient CPNB involving 8 institutions in France and Belgium and 1,416 patients, median infusion duration was 56 hours with a range from 2-7 days (17). Longer
durations of infusion are possible when managed carefully on the inpatient ward. At Walter Reed Army Medical Center, the group of regional anesthesia specialists led by Dr. Buckenmaier has reported an inpatient series of 361 CPNB catheters with a mean infusion duration of 9 days (range 1-34 days) and only 7 catheter-related infections (1.9%) limited to the insertion site with resolution following catheter removal (18). Given the lack of available evidence to formulate guidelines for infusion duration on an ambulatory basis, we prefer to maintain our outpatient CPNB catheters for 2-3 days similar to our research protocols.

In summary, regional anesthesia including CPNB offers many benefits for the surgical outpatient with few drawbacks, but patients should be selected carefully. Successful management of CPNB catheters at home should include detailed written instructions, daily telephone follow-up, and contact information for a healthcare provider familiar with these techniques and available 24/7.

References: