

The Impact of Regional Anesthesia on Perioperative Outcomes

As a private practice anesthesiologist, I am often asked: “What are the potential benefits of regional anesthesia (RA)?” My standard reply is: “It depends on who’s asking the question.” There are many entities that have a lot to gain from a well-organized regional anesthesia program. They include: the patient, the surgeon, the anesthesia provider, and the facilities.

The Patient

- **Superior analgesia:** Numerous studies and case reports¹⁻⁸ have demonstrated that, when compared to general anesthesia with volatile agents (GAVA) and intravenous opioids for postoperative analgesia, the application of regional anesthetic based techniques resulted in significantly lower pain scores both in the inpatient and outpatient settings. Improved and/ or complete analgesia translates to a whole host of secondary benefits for the patient (see below).
- **Decreased postoperative nausea and vomiting (PONV):** With the use of peripheral nerve blocks (PNB’s) and continuous peripheral nerve catheters (CPNC’s), the need for narcotics and other analgesics is either eliminated or drastically reduced. Therefore, the incidence of side effects related to these medications is minimized. The most commonly encountered side effect of narcotics is PONV. PONV can lead to delayed discharge from the postoperative care unit (PACU), unplanned hospital admissions, decreased patient satisfaction, and increased perioperative costs.

Macario et al⁹ surveyed surgical patients and found that avoidance of PONV was their most important concern and that incisional pain was also worrisome. Interestingly, regional anesthetic techniques address both of these issues.

- **Earlier Discharge:** After outpatient surgeries, the leading causes of increased PACU discharge time are: PONV, postoperative pain, dizziness, drowsiness, cognitive dysfunction, cardiovascular events as well as surgical and anesthetic complications¹⁰. Numerous studies have confirmed that RA does expedite patient discharge both as an outpatient and inpatient. Hadzic et al^{11,12} evaluated the ability of patients to bypass PACU phase 1 who received RA vs. GAVA for both hand
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and knee surgeries, respectively. In both studies, the RA group was 3 times more likely to bypass PACU phase 1. Predictably, in both studies, time to meet discharge criteria and time to discharge were significantly reduced. For example, in the hand surgery patients who received RA, their discharge time was (on average) 100 minutes shorter than that of the GAVA group.

On the inpatient side, Horlocker et al¹³ was able to reduce LOS by 46% in total knee and hip arthroplasty patients by employing RA techniques as part of a multimodal analgesic protocol.

- **Improved Patient Satisfaction:** Many aspects of the perioperative experience impact overall patient satisfaction. Two factors that have a strong negative association with patient satisfaction are moderate to severe postoperative pain and PONV^{14,15}. Wu et al¹⁶ reviewed 18 separate trials that compared patient satisfaction and analgesia with RA techniques vs. that associated with GAVA and systemic narcotics. The application of RA techniques resulted in significantly better measures of patient satisfaction than those seen in the GAVA group. Finally, Klein et al¹⁷ evaluated the satisfaction levels of 1791 patients who received PNB's for outpatient surgeries. 98% of those patients stated that would choose the same anesthetic again.

The Surgeon

- **Improved Outcomes:** Articles in the orthopedic and other surgical literature^{13,18-20} have extolled the benefits of RA techniques and outpatient CPNC infusions. This has led many surgeons to request that their anesthesia providers provide RA services.
 - **Improved Analgesia:** With the placement of peripheral nerve blocks and catheters, the quality of postoperative pain control is vastly improved. This fact translates to less post op phone calls to the surgeon. Along the same lines, anesthesia providers (who place these blocks and catheters) typically take all of the phone calls for pain issues thereby freeing the surgeon to concentrate on true surgical issues.
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- **Earlier Discharge :** Patients who have received RA as noted previously are eligible for discharge earlier not only in the ambulatory but also as inpatients. With effective RA and multimodal analgesia techniques, we are able to perform many surgeries at outpatient centers that would have classically required an inpatient stay²¹⁻²². Obviously, when surgeons don't have to round on as many inpatients, it simplifies their clinical practice. Also, our surgeons have reported to us that the insurance companies have taken notice of their RA patients earlier discharge times and the decreasing numbers of hospital admissions and have rewarded them with preferred provider status.
- **Referrals:** The best advertising is word of mouth. Often, patients equate surgical outcome to pain control and, when they are comfortable in the postoperative setting, they attribute that to a well-performed surgery. Satisfied patients often share their experiences with friends and neighbors.

The Anesthesia Provider

- **Provision of a wider scope of anesthesia services:** The ability to provide RA services not only reduces side effects, as previously noted, but also has been associated with a reduction in mortality²³⁻²⁴. In our practice, we are often able to provide surgical anesthesia with minimal physiologic alterations. This allows us to care for patients that have more advanced disease states and avoid the co-morbidities associated with GAVA²⁵.
 - **Enhanced Revenues /Case:** Although the payor mix and reimbursement amounts may vary throughout the country. RA services are associated with well-established CPT codes. We rarely encounter any increased scrutiny of payments associated with provision of these services. If we do, we provide literature to support the use of RA and its benefits to the patients and their insurance companies.
 - **Stand Out from Competitors:** In hospitals where we aren't the sole anesthesia providers, our group often cites our ability to provide effective postoperative analgesia services as a means to differentiate us from our competitors.
 - **Anticoagulation :** PNB's and CPNC's are considered safe by many authors for placement in patients who have received anticoagulants for DVT prophylaxis.²⁶ And, there is no need to time discontinuation of CPNC's with
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anticoagulant dosing.²⁷ This is in sharp contrast to the considerations necessary for the management of neuraxial (i.e. spinal and epidural) blocks and catheters in the setting of the anticoagulated patient where the risk of a spinal hematoma and paraplegia are significant.²⁸

The Hospital/ Surgery Center

- **Efficiency:** As noted previously, the use of PNB's and CPNC's allow the patient to move through PACU in an expedited manner. In smaller centers, delays in PACU discharge can lead to delays in moving patients from the O.R. to PACU.
- **Costs:** Carroll et al²⁹ detailed the costs of treating PONV in terms of drug, labor, and delays in discharge delays. These authors were able to show \$415 in lost revenue for each patient with PONV. Williams et al also studied the impact of nursing intervention for the treatment of PONV and pain among and found that each nursing intervention was associated with a 27-45 minute delay in discharge.³⁰
- **Referrals/ Marketing:** As noted above, patient is often higher in RA patients versus GAVA patients. Facilities can often market the fact that they offer postoperative analgesia services. Indeed, we have encountered patients in our practice that will choose a surgeon because they operate at a facility where RA services are offered.

Summary: RA offers significant benefits to everyone involved in the delivery of surgical care. The impact of these techniques on improving patient satisfaction, outcomes, and cost savings is well established. There is a shift towards more complex and invasive surgeries being performed in the outpatient setting. In many cases, the utilization of RA and its associated improvement in analgesia and side effect profiles has facilitated this trend.,
