

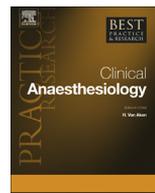


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### Preface

## Recent advances in regional anesthesia and ultrasound techniques



The practice of regional anesthesia (RA) has evolved with time, and it serves as an important adjunct to other analgesic techniques such as parenteral and oral medication administration, as well as noninvasive modalities, and can also be used as the primary anesthetic for a variety of surgical techniques. The use of RA has increased, with the greater focus to reduce opioid use, decrease hospital stays, and improve patient satisfaction with their surgical care.

During the last decade, there has been a significant shift to outpatient and less invasive surgery, with the goals of improved efficiency, surgical and anesthetic risk reduction, and improved patient experience. RA, including both neuraxial and peripheral nerve block techniques, can be performed for not only less complicated outpatient surgeries but also major intra-abdominal and intrathoracic procedures, obstetrics, trauma, chronic pain states, as well as for acute postoperative pain [1,2]. RA also plays an important role in enhanced recovery after surgery protocols as one of the multimodal pain management modalities [3]. All anesthesia practitioners, as well as others who are involved in acute and chronic pain management, need to be familiar with the technology, equipment, indications, and techniques needed to perform a successful nerve block. In addition, trainees need to be provided with many opportunities for learning regional anesthesia, both theoretical and hands-on experience throughout their training. Understanding indications for RA, as well as being able to identify and manage complications arising from RA, is critical, as it will lead to safer care and more widely accepted use [4]. RA can be beneficial to decrease the incidence of side effects of opioids, postsurgical ileus, and respiratory depression and the impact of the surgical stress response. There is also evidence to suggest that the use of RA may improve cancer recurrence and survival, although studies on this topic have been inconsistent [5].

This volume on Recent Advances in Regional Anesthesia and Ultrasound Techniques provides a concise, evidence-based, yet comprehensive, overview for trainees and practitioners to understand the basics of RA techniques, published literature, and the standards of care guidelines. It is important to remember that some of the techniques that are now being practiced and the equipment used were not developed when the majority of practitioners were undergoing training. Specifically, this pertains to the increased use of ultrasound (US) technology and continuous peripheral nerve catheters. We highlight the RA topics described in this volume.

Although airway and oromaxillofacial blocks are well established, regional anesthetic techniques for head and neck surgery may decrease postoperative pain as well as provide the primary anesthetic. This manuscript describes various trigeminal nerve and other head and neck regional blocks, their indications, technique, complications, and benefits, including newer techniques and data.

Patients undergoing cardiac surgery may benefit from regional techniques through careful patient selection and proper application of the indicated technique. This manuscript describes the potential use of neuraxial techniques, sternal blocks, and chest wall blocks. This is a comprehensive overview of their indications, technique, complications, and benefits.

The next few manuscripts describe recent advances in upper and lower extremity blocks. The authors discuss alternatives to the interscalene block (e.g., suprascapular and supraclavicular block) and motor-sparing selective brachial plexus branch blocks for wrist/hand surgery. The manuscripts on lower extremity blocks discuss techniques to perform the saphenous nerve block and the infiltration between popliteal artery and capsule of knee (iPACK) block. Performance of saphenous nerve blocks has been placed at various locations along the adductor canal. The authors discuss advantages and disadvantages of different locations, as well as block of the nerve to the vastus medialis for knee surgery, indications, technique, complications, and benefits. Other discussion revolves around the roles of obturator nerve block, lateral femoral cutaneous nerve block, and quadratus lumborum block in lower extremity procedures. Another manuscript highlights RA in the pediatric setting. This includes blocks of the head/neck region; upper, mid-, and lower abdomen; and lower extremity, including a discussion of outcomes and safety concerns.

There is an increased interest in RA adjuvant drugs to help prolong its effect. Dexamethasone, anti-inflammatory medications, alpha-2 agonists, and other classes have been used to extend the duration of action of local anesthetics, administered perineurally or systemically. The authors describe our present understanding regarding the mechanisms of action, the efficacy of these adjuvants, and the safety profile of using these adjuvants.

There have been significant advancements in the development of next-generation local anesthetics, including novel delivery systems of existing anesthetics, with the goal of prolonging its effect. Research regarding the administration of liposomal bupivacaine is active and promising. The authors discuss the technology regarding liposomal bupivacaine, its efficacy, and safety profile. Other local anesthetic technologies are in the pipeline, including meloxicam/bupivacaine, cyclodextrin, microspheres, and others. The other manuscript addresses the incidence, risk factors, and mechanisms of perioperative nerve injury, with the focus on local anesthetic-induced neurotoxicity. Perioperative nerve injury is a complex phenomenon and can be caused by a number of clinical factors. The manuscript describes our current knowledge, drawing from basic science and clinical research about local anesthetic-induced neurotoxicity.

The popularity of Point-of-Care Ultrasound (POCUS) has increased in the last few years and has been shown to be a useful tool for clinicians in a variety of settings. The manuscript reviews the basics of POCUS and the techniques for US-guided rapid assessment of the abdomen, chest, and the heart. The manuscript describes the value of focused or limited examinations aimed at answering a well-defined clinical question to guide patient management with the intention of improving patient outcomes. Education in POCUS techniques is also key. Another manuscript discusses the use of US for peripheral venous access in a variety of settings and recent evidence to support its use. The presence of smaller, portable US devices will make them more easily available for use in a variety of operating room and nonoperating room settings.

US-guided blocks have been used for chronic pain management for many years. This manuscript describes ultrasonography and its limitations for many types of axial injections and some promise with transforaminal epidurals or selective nerve root blocks. US guidance is effective in preventing soft tissue and vascular injury in stellate ganglion blocks compared with blind techniques. Soft tissue and vascular anomalies can be identified that the fluoroscopic technique will miss. Moreover, US improves accuracy and efficacy in ilioinguinal, iliohypogastric, and genitofemoral blocks for inguinal and testicular pain. The authors also discuss lateral femoral cutaneous nerve injections and injections into the knee, shoulder, and hip joints, which may be more successful when performed using US.

It is important to ensure the safety of RA, which involves proper training, adequate patient monitoring, and the ability to deal with complications when they arise. It is also important to properly inform the patient of the risks before administering a regional anesthetic. This manuscript describes common and rare complications of regional and neuraxial anesthesia, provides an overview of the existing literature, and suggests strategies to prevent patient injury. It will also discuss the blocks and techniques that are more commonly associated with injury and the role of US in preventing injury.

Overall, these manuscripts provide valuable insight into the safe use of RA in clinical practice. As techniques continue to evolve, it is important to continue to learn through various educational opportunities best practice techniques, indications, and potential side effects of RA in clinical practice.

## References

- [1] Brovman EY, Wallace FC, Weaver MJ, et al. Anesthesia type is not associated with postoperative complications in the care of patients with lower extremity traumatic fractures. *Anesth Analg* 2019 Jun 17. <https://doi.org/10.1213/ANE.0000000000004270> [Epub ahead of print].
- [2] Kovacheva VP, Brovman EY, Greenberg P, et al. A contemporary analysis of medicolegal issues in obstetric anesthesia between 2005 and 2015. *Anesth Analg* 2019;128:1199–207.
- [3] Kaye AD, Urman RD, Cornett EM, et al. Enhanced recovery pathways in orthopedic surgery. *J Anaesthesiol Clin Pharmacol* 2019;35:S35–9.
- [4] Huang H, Yao D, Saba R, et al. A contemporary medicolegal claims analysis of injuries related to neuraxial anesthesia between 2007 and 2016. *J Clin Anesth* 2019;57:66–71.
- [5] Meserve JR, Kaye AD, Prabhakar A, et al. The role of analgesics in cancer propagation. *Best Pract Res Clin Anaesthesiol* 2014; 28:139–51.

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