



Schulich School of Medicine & Dentistry



Anesthesia and Perioperative Medicine
Western University

**Regional Anesthesia Fellowship
Program Directors – Dr. Kevin Armstrong &
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Clinical Fellowship – Regional Anesthesia

The regional anesthesia fellowship at Western University is intended to prepare the fellow for independent practice as a regional anesthesiologist. Graduates of the fellowship should be competent in all areas of perioperative management of patients receiving neuraxial or peripheral nerve blocks.

- Attaining competence in safely siting common upper and lower limb, truncal and neuraxial blocks.
- Have familiarity and proficiency with both single shot and catheter techniques
- Be able to make a comprehensive perioperative pain management assessment. This would include use of multimodal analgesia, parenteral opioid techniques, appropriate selection of blocks, and use of infusions of lidocaine and ketamine.
- Assessment and management of the opioid dependent patient and those with complex pain management issues.
- Be able to act as a consultant to other hospital staff including anesthesiologists, surgeons, nurses and physiotherapists.
- Troubleshooting continuous peripheral and neuraxial nerve blocks and be facile in their ongoing postoperative management.
- Have detailed knowledge of anatomy relevant to regional anesthesia and analgesia; the ability to impart this knowledge to other staff, residents and medical students
- Safely and efficiently manage a block room, including communication with surgical and nursing staff. Have the knowledge and skills required to establish a new Regional Anesthesiology and Acute Pain Medicine program in his/her future practice and to adopt emerging knowledge and techniques for the acute pain management of patients whom he/she encounters
- Train future generations of generalists and subspecialists in Regional Anesthesiology and Acute Pain Medicine

- Provide leadership in the organization and management of an acute pain medicine service within the hospital setting composed of a variety of specialists to provide comprehensive multimodal acute pain management
- Provide education of patients / family members, surgeons, PACU and floor nurses with regards to management of nerve blocks.
- Provide continuing medical education to anesthesia colleagues.

ELIGIBILITY REQUIREMENTS FOR CANADIAN and FOREIGN MEDICAL GRADUATES

Requirements for Application:

- ✓ Candidates must possess a medical degree from a recognized University
- ✓ International Medical Graduates must be approved by the PGE Office at Western University
- ✓ English Language Requirement: TOEFL-iBT required to achieve an overall score of no less than 100 with a minimum score of 24 in speaking or listening (**IMG only**).
- ✓ **Link to Application Requirements:**
http://www.schulich.uwo.ca/anesthesia/education/fellowship/application_requirements.html

FELLOWSHIP STRUCTURE

- **Duration:** The fellowship training program will be undertaken over twelve consecutive months and includes four weeks of vacation time.
- **Number of fellowship positions:** 2 to 4
- **Location:** Fellowship training will primarily take place at St Joseph's and University Hospitals. Subspecialty training will be roughly divided 50:50 between those two locations, although this is flexible depending on clinical exposure attained.
- **Service commitment:** 100 days per year (subject to change according to department fellowship policies). This service commitment may be in subspecialties unrelated to regional anesthesia. The remainder of the weekdays is subspecialty time. Academic time may be granted depending on the academic productivity of the fellow.
- **Call Commitment:** Fellows will be expected to be available out of hours (evenings, nights and weekends) to troubleshoot blocks, and follow up blocks sited. Coverage will vary dependent on number of fellows. A pager will be provided by the department. On the majority of occasions troubleshooting would be possible via telephone. The fellow would also be expected to run the acute pain service rounds at weekends once in every 4 weeks.
- **Regional technique exposure:** Over 3000 blocks are performed each year, with fellows expected to become competent in performing single shot interscalene, supraclavicular, infraclavicular, axillary, femoral, LFCN and adductor canal blocks, and continuous catheter techniques for interscalene, infraclavicular, femoral and adductor canal blocks. TAP and paravertebral blocks are regularly performed, and single shot and catheter neuraxial techniques widely used.
- The two main sites are St Joseph's hospital and University Hospital. Service commitments may be at either of these sites, and also at Victoria hospital.
- The majority of upper limb surgery occurs St Joseph's hospital, along with the opportunity for some truncal blocks related to breast surgery. University hospital has some upper limb surgery, along with a high volume of lower limb procedures and thoracic/abdominal/pelvic surgery. Both sites have block rooms usually functioning 5 days per week.

RESEARCH

Research is an important and expected component of the fellowship. Fellows are expected to spearhead at least one original research project, including protocol creation, research grant application, ethics approval submission, and participant recruitment. This includes:

- A minimum of one research publication arising from research performed in the department during the fellowship
- Attendance of at least one major conference (CAS, ASRA or ASA). Presentation of an abstract is expected.

EDUCATION

Regional anesthesia specific education will be ongoing throughout the specialty and take the following forms:

- Clinical education. During specialty training days fellows will be working under the direct supervision of an experienced regional anesthetist. Opportunity will be available to hone recognition of sonoanatomy, appropriate block selection, needling skills, single shot and catheter blocks. Follow-up and post-procedure management of nerve blocks will be an important and necessary focus of this component of training.
- Regional journal club. Journal club will be held between 2 and 4 times per month for the duration of the fellowship. Relevant articles will be presented and analyzed. Fellows will be expected to present regularly (at least monthly) at these rounds, and supervise presenting residents.
- Anatomy lab. Anatomy lab will be held between 3 and 6 times per year, and attended by residents and fellows. During these labs the fellows will initially attend as students, and have the opportunity to increase their scanning skills, learn from cadaveric prosections, and correlate sonoanatomy with cadaveric specimens. As the fellowship progresses, fellows will take on the role of teacher and demonstrator for later labs.

RESOURCES

Fellows will have access to the following resources:

- departmental anesthesia library
- The university online resources, providing access to the majority of significant anesthesia journals
- Department librarian assistance

GOALS AND OBJECTIVES

MEDICAL EXPERT

Be able to provide acute pain management and medical consultation for the full spectrum of injuries, medical etiologies, and surgical and other invasive procedures that produce acute pain in the hospital setting

When indicated, safely and effectively perform and troubleshoot a comprehensive range of advanced regional anesthesiology procedures for appropriate indications, in a safe, consistent, and reliable manner, understanding the individual risks and benefits, indications and contraindications of each.

Specific requirements for medical knowledge:

NERVE ANATOMY

- Discuss the anatomy of neurons
- Describe the differences between motor and sensory nerves
- Describe the microanatomy of the nerve cell.

LOCAL ANESTHETICS

- Describe the pharmacology of local anesthetics, including new liposomal formulations with respect to mechanism of action, physicochemical properties, comparative attributes, and appropriate dosing for single injection or continuous infusion
- Determine the selection and dose of local anesthetics as indicated for specific medical conditions
- Compare the dosing, advantages, and disadvantages of local anesthetic adjuvants
- Understand signs, symptoms, and treatment of local anesthetic systemic toxicity or neurotoxicity of local anesthetics
- Neuraxial and Systemic Opioids, Nonsteroidal Anti-inflammatory Medications, and Non-opioid Adjuvants for Analgesia

NEURAXIAL OPIOIDS

- Describe indications/contraindications, mechanism of action, physicochemical properties, effective dosing, and duration of action of neuraxial opioids
- Recognize complications and adverse effects, including related monitoring, prevention, and therapy
- Differentiate intrathecal versus epidural administration relative to dose, effect, and adverse effects

SYSTEMIC OPIOIDS

- Discuss the pharmacokinetics of opioid analgesics: bioavailability, absorption, distribution, metabolism, and excretion
- Discuss the site and mechanism of action of opioids
- Discuss the differences in chemical structure of the various opioids
- Describe the mechanisms, uses, and contraindications for opioid agonists, opioid antagonists, and mixed agents
- Describe challenges of post-procedure analgesic management in the patient with chronic pain and/or opioid-induced hyperalgesia
- Describe how to manage acute or chronic pain in the opioid-tolerant patient

NON-OPIOID ANALGESICS

- Describe the concept of multimodal analgesia and its impact on recovery after surgery
- Differentiate the pharmacology of acetaminophen, nonsteroidal anti-inflammatory drugs, cyclooxygenase 2 inhibitors, N-methyl-D-aspartic acid antagonists, α_2 agonists, and γ -aminobutyric acid–pentanoid agents with respect to optimizing postoperative analgesia

REGIONAL ANESTHESIA TECHNIQUES

NERVE LOCALIZATION TECHNIQUES

- Explain principles, operation, advantages, and limitations of the peripheral nerve stimulator to localize and anesthetize peripheral nerves
- Describe principles of paresthesia-seeking perivascular or transvascular approaches to nerve localization
- Explain principles, operation, advantages, and limitations of ultrasound to localize and anesthetize peripheral nerves

SPINAL ANESTHESIA

- Describe the anatomy of the neuraxis

- Describe the indications, contraindications, adverse effects, complications, and management of spinal anesthesia
- Recognize the cardiovascular and pulmonary physiologic effects of spinal anesthesia
- Describe common mechanisms for failed spinal anesthetics
- Compare local anesthetics for intrathecal use: agents, dosage, surgical and total duration of action, and adjuvants
- Explain the relative importance of factors affecting intensity, extent, and duration of block such as patient position, dose, volume, and baricity of injectate
- Define meningeal puncture headache and describe symptoms, etiology, risk factors, and treatment
- Differentiate advantages and disadvantages of continuous spinal anesthesia

EPIDURAL ANESTHESIA (LUMBAR AND THORACIC)

- Describe the indications, contraindications, adverse effects, complications, and management of epidural anesthesia and analgesia
- Compare the local anesthetics available for epidural use: agents, dosage, adjuvants, and duration of action
- Differentiate between spinal and epidural anesthesia with regard to reliability, latency, duration, and segmental limitations
- Explain the value and techniques of test dosing to minimize certain complications of epidural anesthesia and analgesia
- Interpret the volume-segment relationship and the effect of patient age, pregnancy, position, and site of injection on resultant block
- Differentiate combined spinal-epidural anesthesia from lumbar epidural anesthesia or analgesia, including advantages/disadvantages, dose requirements, complications, indications and contraindications
- Categorize outcome benefits of thoracic epidural analgesia for thoracic and abdominal surgery and thoracic trauma
- Differentiate thoracic epidural anesthesia/analgesia from lumbar epidural anesthesia/analgesia, including advantages/disadvantages, dose requirements, complications, indications and contraindications
- Explain the impact of antithrombotic and thrombolytic medications on neuraxial and peripheral anesthesia/analgesia with specific reference to the American Society of Regional Anesthesia and Pain Medicine guidelines: “Regional Anesthesia in the Patient Receiving Antithrombotic or Thrombolytic Therapy”

UPPER-EXTREMITY NERVE BLOCK

- Describe the anatomy and sonoanatomy of the brachial plexus in relation to sensory and motor innervation

- Compare local anesthetics for brachial plexus block: agents, dose, duration of action, and adjuvants
- Explain the value and techniques of intravascular test dosing to minimize local anesthetic systemic toxicity associated with peripheral nerve block
- Differentiate the various brachial plexus (or terminal nerve) block sites including indications/ contraindications, advantages/disadvantages, complications, and management specific to each
- Contrast the indications and technique for cervical plexus, suprascapular, or intercostobrachial block as unique blocks or supplements to brachial plexus block
- Discuss the technical and nontechnical aspects unique to brachial plexus perineural catheter placement and management

LOWER-EXTREMITY NERVE BLOCK

- Describe anatomy and sonoanatomy of the lower extremity: sciatic, femoral, lateral femoral cutaneous, and obturator nerves, as well as the adductor canal and options for saphenous nerve blockade
- Compare local anesthetics for lower-extremity block: agents, dose, duration of action, and adjuvants
- Explain the value and techniques of intravascular test dosing to minimize local anesthetic systemic toxicity associated with peripheral nerve block
- Differentiate the various approaches to lower-extremity blockade, including indications / contraindications, side effects, complications, and management specific to each
- Discuss the technical and nontechnical aspects unique to lower-extremity perineural catheter placement and management

TRUNCAL BLOCK

- Describe the relevant anatomy for intercostal, paravertebral, ilioinguinal-hypogastric, rectus sheath and transversus abdominis plane blocks
- Compare local anesthetics for truncal blockade: agents, dose, and duration of action
- Summarize the indications, contraindications, side effects, complications, and management of truncal blockade
- Discuss the technical and nontechnical aspects unique to continuous truncal catheter placement and management

INTRAVENOUS REGIONAL ANESTHESIA

- Review the mechanism of action, indications, contraindications, advantages and disadvantages, adverse effects, complications, and management of intravenous regional anesthesia

- Compare agents for intravenous regional anesthesia: local anesthetic choice, dosage, and use of adjuvants

COMPLICATIONS OF REGIONAL ANESTHESIA AND ACUTE PAIN MEDICINE

- Discuss, recognize, and know how to manage complications specific to regional anesthesia and acute pain medicine practice. A partial list of these complications includes:
 - Hemorrhagic complications in the patient receiving antithrombotic or thrombolytic agents
 - Infectious complications of neuraxial and peripheral blockade
 - Neurological complications of regional anesthesia and acute pain medicine
 - Knowledge and basic interpretation of tests recommended after plexus/nerve lesion such as electromyography, nerve conduction studies, somatosensory evoked potentials, and motor evoked potentials
 - Local anesthetic systemic toxicity
 - Opioid-induced respiratory depression
 - Patient Care and Procedural Skills
- Describe rational selection of regional anesthesia and/or postoperative analgesic techniques for specific clinical situations. Such options include regional techniques, multimodal analgesia, and/or opioid and non-opioid pharmacological management.
- Debate the advantages/disadvantages of regional versus general anesthesia for various procedures and patients with regard to patient recovery, patient outcome, and operating room efficiency.
- Recognize and intervene to manage inadequate operative regional anesthetic and postoperative analgesic techniques with supplemental blockade, alternate approaches, and/or pharmacological intervention.

COMMUNICATOR

- Summarize information to the patient and family with respect to the options, alternatives, risks, and benefits of regional anesthesia and/or acute analgesic techniques in a manner that is clear, understandable, and ethical
- Develop effective listening skills and answer questions appropriately in the process of obtaining informed consent.
- Develop communication strategies for coordinating a functioning block room in the peri-operative period.
- Manage information related to efficient and safe flow of patients through the peri-operative course (SDCU- Block room- OR- PACU)

COLLABORATOR

Operate effectively in a team environment and communicate and cooperate with surgeons, residents, nurses, pharmacists, physical therapists, and other members of the perioperative team. This requires the fellow to:

- Recognize the roles of all team members
- Communicate clearly in a collegial manner that facilitates the achievement of care goals
- Help other members of the team to enhance the sharing of important information
- Formulate care plans that use the multidisciplinary team skills, such as a plan for facilitated recovery

Act as a consultant to other anesthesiologists, surgeons, nurses, pharmacists, physical therapists, other medical professionals, operating room managers, hospital administrators, and other allied health providers.

Provide leadership in the organization and management of an acute pain medicine service within the hospital setting composed of a variety of specialists to provide comprehensive multimodal acute pain management

Train future generations of generalists and subspecialists in Regional Anesthesiology and Acute Pain Medicine

Contribute to the mission of the department by facilitating both educational and research activity in the context of regional anesthesia.

LEADER

- Demonstrate the ability to direct the acute pain medicine service with attending supervision. Patient management will include multimodal analgesic techniques such as neuraxial and peripheral nerve catheters, local anesthetic and narcotic infusions, and nonnarcotic analgesic adjuvants.
- Understand the need for perioperative efficiency and high-quality patient care. The fellow will effectively choose surgeons, patients, techniques, and approaches to achieve the best possible use of regional anesthesia and/or analgesia to improve patient outcomes.
- Understand the interaction of the regional anesthesia and acute pain medicine service with other elements of the health care system, including primary surgical and medical teams, and other consultant, nursing, pharmacy, and physical therapy services.
- Demonstrate awareness of health care costs and resource allocation and the impact of their choices on those costs and resources.

HEATH ADVOCATE

- Have the knowledge and skills required to establish a new Regional Anesthesiology program in his/her future practice and to adopt emerging knowledge and techniques for the acute pain management of patients whom he/she encounters.
- Advocate for the patient and the family within the health care system and assist them in understanding and negotiating complexities in that system
- Advocate for the appropriate use of regional anesthesia in the peri-operative setting.

SCHOLAR

- Fellows are required to participate in research as a major activity of the fellowship.
- Regularly present relevant articles at journal club, to other fellows, residents, medical students and staff.
- Prepare resident education lectures and journal reviews for regional anesthesia and/or acute pain medicine subspecialty conferences
- Attend and subsequently teach at the cadaveric workshops
- Develop teaching techniques by instructing residents and/or medical students at the bedside under the supervision of faculty.
- Review and enhance Web-based teaching resources such as resident teaching materials, curriculum documents and self-study and testing materials.
- Evaluate and apply evidence from scientific studies, expert guidelines, and practice pathways to patient's medical conditions.
- Apply information technology to obtain and record patient information, access institutional and national policies and guidelines, and participate in self-education
- Analyze their own practice with respect to patient outcomes (especially success and complications from regional blockade) and compare with available literature

PROFESSIONAL

- Continuously conduct the practice of medicine with integrity, honesty, and accountability
- Demonstrate a commitment to lifelong learning and excellence in practice
- Practice consistent subjugation of self-interest to the good of the patient and the health care needs of society
- Demonstrate a commitment to ethical principles in providing care, obtaining informed consent, and maintaining patient confidentiality

ASSESSMENT

- Mid and end block meeting with fellowship director
- 360 degree appraisal from staff anesthesiologists, residents, medical students, surgeons, nurses (block and PACU nurses); twice yearly
- 3 times yearly (post PEAP, mid fellowship, end fellowship)
- Personal feedback as anatomy lab tutor
- Fellows are required to keep an up to date logbook of procedures performed