Guidelines for Fellowship Training in Regional Anesthesiology and Acute Pain Medicine
Third Edition, 2014

The Regional Anesthesiology and Acute Pain Medicine Fellowship Directors Group

Abstract: Directors for Regional Anesthesiology and Acute Pain Medicine fellowships develop and maintain guidelines for fellowship training in the subspecialty. The first edition of the guidelines was published in 2005 with a revision published in 2010. This set of guidelines updates the 2010 revision. The guidelines address 3 major topics: organization and resources, the educational program, and the evaluation process.

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PREAMBLE

This is a consensus document that is developed and maintained by Regional Anesthesiology and Acute Pain Medicine fellowship directors and their colleagues (The Group). The Group was formed in 2002 as an international collaboration of fellowship directors (Appendix 1, Supplemental Digital Content 1, http://links.lww.com/AAP/A138) and associate directors interested in advanced Regional Anesthesiology and Acute Pain Medicine training. The Group provides a forum for discussion of issues related to fellowship design and development, administration, and common concerns. Participation is open to all interested individuals, with one *official* member from each institution. The Group meets semiannually—during the American Society of Regional Anesthesia and Pain Medicine spring meeting and during the American Society of Anesthesiologists annual meeting. Members of this group work collaboratively on initiatives to continually improve the fellowship experience and quality of training.

This document was initially created in 2002, approved by The Group in 2003, and published in *Regional Anesthesia and Pain Medicine* in 2005.[1] The Group has agreed that this document will be reviewed every 3 years, being mindful of developments in the science and practice of Regional Anesthesiology and Acute Pain Medicine. This document was reviewed without change in 2006. In 2009, several changes were approved, including reorganization of the document to reflect the Accreditation Council for Graduate Medical Education (ACGME) competencies. The most important changes reflect the adoption of ultrasound guidance as a tool for nerve localization and increased emphasis on knowledge related to complications specific to the subspecialty and stress the intertwinement of acute pain medicine with perioperative anesthetic procedures. Final approval of this document occurred at The Group's October 2010 meeting.[2] This revision was completed with an understanding of the new ACGME milestones, has been reviewed by all participating institutional delegates, and can serve as a guide for future ACGME accreditation of Regional Anesthesiology and Acute Pain Medicine fellowship programs.

Recently, the importance of multimodal acute pain management incorporating regional anesthetic techniques has been recognized as a specialty within Anesthesiology. In addition to the knowledge of acute pain mechanisms and nuances unique to the perioperative setting, regional anesthesia is now considered a specialized technical skill set. In 2014, there are nearly 60 institutions that have listed themselves as having a nonaccredited fellowship program focused on Regional Anesthesiology and Acute Pain Medicine. Therefore, it has become apparent that accreditation of fellowship training in Regional Anesthesiology and Acute Pain Medicine is essential. The Regional Anesthesiology and Acute Pain Medicine fellowship has recently been approved by the ACGME Board of Directors to become the next accredited subspecialty fellowship training program within anesthesiology and is currently in the process of developing program requirements. As such, these guidelines for fellowship training in Regional Anesthesiology and Acute Pain Medicine represent the consensus of peers and at this time are not intended to be absolute program requirements nor should they be construed to define standard of care. As detailed in its mission statement, The Group acknowledges that individual fellowship programs may vary from these guidelines and yet maintain a high level of proficiency and integrity.

Mission Statement

The purpose of this comprehensive set of goals and competency-based objectives is to recommend desired components of subspecialty fellowship training in Regional Anesthesiology and Acute Pain Medicine. Participating fellowship program directors will ensure the ongoing development of Regional Anesthesiology and Acute Pain Medicine as a defined subspecialty. Educational curricula, clinical care, and research activities are emphasized.

Programmatic Goals for Fellowship Training in Regional Anesthesiology and Acute Pain Medicine

Outline

I. Organization and resources
   a. Scope and duration of training
   b. Institutional organization
   c. Program director and faculty
   d. Facilities and resources
II. The education program
   a. Program goals

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b. Medical knowledge
c. Patient care
d. Scholarly activities
e. Practice-based learning
f. Interpersonal and communication skills
g. Professionalism
h. System-based practice

III. The evaluation process

I. ORGANIZATION AND RESOURCES

a. Scope and Duration of Training
   i. *Requirement of Applicant:* Candidates applying for a fellowship program in Regional Anesthesiology and Acute Pain Medicine must have successfully completed an accredited anesthesiology residency program before the start date of the fellowship. Individual programs may also have additional requirements for applicants.
   ii. *Scope of Training:* Regional Anesthesiology and Acute Pain Medicine fellowship training is a subspecialty focused on the management of acute pain including, but not limited to, the complete perioperative management of patients receiving neuraxial or peripheral neural blockade for anesthesia and/or analgesia. Specifically, the scope of this training may include (a) preoperative evaluation and management, (b) intraoperative application (with or without general anesthesia), (c) postoperative application to inpatients and outpatients, (d) perioperative acute pain management of surgical patients, and (e) acute pain management of nonsurgical patients (acute on chronic pain, sickle cell crisis, trauma, etc). Fellowship training should be concerned with the development of expertise in the practice and theory of Regional Anesthesiology and Acute Pain Medicine.
   iii. *Duration of Training*: The time required for subspecialty training in Regional Anesthesiology and Acute Pain Medicine shall be 12 months. Program directors are granted flexibility to tailor the program to meet the individual needs of fellows. Specialized clinical rotations of less than 12 months may be made available to interested clinicians, but the minimum amount of training necessary to use "fellowship" in the diploma language shall be 1 year.

b. Institutional Organization
   i. *Relationship to a Core Program:* Institutions with subspecialty training in Regional Anesthesiology and Acute Pain Medicine must have a direct affiliation with an ACGME-accredited residency in anesthesiology (or similar, eg, Royal College of Physicians and Surgeons of Canada or Royal College of Anaesthetists). If the institution at which the fellowship is based is not the primary institution of an accredited residency, a written agreement linking the two is required. An evaluation protocol consistent with ACGME (or equivalent)-approved standards for residency programs is also a prerequisite.
   ii. *Institutional Policy and Resources*. The fellowship should be recognized and approved by the core Department of Anesthesiology and the institution's Department/Division of Medical Education.

c. Program Director and Faculty
   i. *Program Director:* The fellowship program should have an appointed program director with the authority and accountability for the operation of the program. The director of the fellowship training program must be an American Board of Anesthesiology–certified (or equivalent) anesthesiologist who has completed 1 year of fellowship training in regional anesthesiology and/or acute pain medicine or is a dedicated and skilled practitioner of these disciplines. The program director must also have an academic and/or clinical affiliation with an ACGME (or equivalent)-accredited institution.
   ii. *Faculty:* The majority of the faculty in the training program must be board certified (or equivalent) in anesthesiology. A sufficient number of the faculty in the training program must also demonstrate an expertise in regional anesthesiology and/or acute pain medicine. The number of faculty in a program may vary based on the number of fellows in training; however, programs must have a minimum of 2 regional anesthesiology and/or acute pain medicine faculty.

d. Facilities and Resources
   i. *Equipment:* Suitable equipment for the performance of a wide variety of regional anesthesia/analgesia techniques must be available. Dedicated and acceptable on-call facilities must also be maintained if applicable.
   ii. *Support Services:* Appropriate support services may include, but are not limited to, anesthesia technical support and pharmacy support systems.
   iii. *Library:* A departmental library, or a portion of the institutional library dedicated to anesthesiology, must be maintained with literature specific to the practice of Regional Anesthesiology and Acute Pain Medicine. This will include both online resources as well as printed material.

II. THE EDUCATIONAL PROGRAM

a. Program Goals
   i. Provide direct 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.
   ii. When indicated, safely and effectively perform a comprehensive range of advanced regional anesthesiology procedures for appropriate indications, in a safe, consistent, and reliable manner, understanding the individual risks and benefits of each.
   iii. 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.
   iv. 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.
   v. 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.
   vi. Train future generations of generalists and subspecialists in Regional Anesthesiology and Acute Pain Medicine.

b. Medical Knowledge
   i. Nerve Anatomy
      1. Discuss the anatomy of neurons
      2. Describe the differences between motor and sensory nerves
      3. Describe the microanatomy of the nerve cell
   ii. Local Anesthetics
      1. Describe the pharmacology of local anesthetics, including new liposomal formulations with respect

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to mechanism of action, physicochemical properties, comparative attributes, and appropriate dosing for single injection or continuous infusion
2. Determine the selection and dose of local anesthetics as indicated for specific medical conditions
3. Compare the dosing, advantages, and disadvantages of local anesthetic adjuvants
4. Understand signs, symptoms, and treatment of local anesthetic systemic toxicity[3] or neurotoxicity of local anesthetics

iii. Neuraxial and Systemic Opioids, Nonsteroidal Anti-inflammatory Medications, and Nonopioid Adjuvants for Analgesia
1. Neuraxial Opioids
a. Describe indications/contraindications, mechanism of action, physicochemical properties, effective dosing, and duration of action of neuraxial opioids
b. Recognize complications and adverse effects, including related monitoring, prevention, and therapy[4]
c. Differentiate intrathecal versus epidural administration relative to dose, effect, and adverse effects
2. Systemic Opioids
a. Discuss the pharmacokinetics of opioid analgesics: bioavailability, absorption, distribution, metabolism, and excretion
b. Discuss the site and mechanism of action of opioids
c. Discuss the differences in chemical structure of the various opioids
d. Describe the mechanisms, uses, and contraindications for opioid agonists, opioid antagonists, and mixed agents
e. Describe challenges of postprocedure analgesic management in the patient with chronic pain and/or opioid-induced hyperalgesia
f. Describe how to manage acute or chronic pain in the opioid-tolerant patient
3. Nonopioid Analgesics
a. Describe the concept of multimodal analgesia and its impact on recovery after surgery
b. 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

iv. Regional Anesthesia Techniques
1. Nerve Localization Techniques
a. Explain principles, operation, advantages, and limitations of the peripheral nerve stimulator to localize and anesthetize peripheral nerves
b. Describe principles of paresthesia-seeking perivascular or transvascular approaches to nerve localization
c. Explain principles, operation, advantages, and limitations of ultrasound to localize and anesthetize peripheral nerves[5–7]
2. Spinal Anesthesia
a. Describe the anatomy of the neuraxis
b. Describe the indications, contraindications, adverse effects, complications, and management of spinal anesthesia
c. Recognize the cardiovascular and pulmonary physiologic effects of spinal anesthesia
d. Describe common mechanisms for failed spinal anesthetics
e. Compare local anesthetics for intrathecal use: agents, dosage, surgical and total duration of action, and adjuvants
f. Explain the relative importance of factors affecting intensity, extent, and duration of block such as patient position, dose, volume, and baricity of injectate
g. Define meningeal puncture headache and describe symptoms, etiology, risk factors, and treatment
h. Differentiate advantages and disadvantages of continuous spinal anesthesia
3. Epidural Anesthesia (Lumbar and Thoracic)
a. Describe the indications, contraindications, adverse effects, complications, and management of epidural anesthesia and analgesia
b. Compare the local anesthetics available for epidural use: agents, dosage, adjuvants, and duration of action
c. Differentiate between spinal and epidural anesthesia with regard to reliability, latency, duration, and segmental limitations
d. Explain the value and techniques of test dosing to minimize certain complications of epidural anesthesia and analgesia
e. Interpret the volume-segment relationship and the effect of patient age, pregnancy, position, and site of injection on resultant block
f. Differentiate combined spinal-epidural anesthesia from lumbar epidural anesthesia or analgesia, including advantages/disadvantages, dose requirements, complications, indications and contraindications
g. Categorize outcome benefits of thoracic epidural analgesia for thoracic and abdominal surgery and thoracic trauma
h. Differentiate thoracic epidural anesthesia/analgesia from lumbar epidural anesthesia/analgesia, including advantages/disadvantages, dose requirements, complications, indications and contraindications
i. 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"[8]
4. Upper-Extremity Nerve Block[9]
a. Describe the anatomy and sonoanatomy of the brachial plexus in relation to sensory and motor innervation
b. Compare local anesthetics for brachial plexus block: agents, dose, duration of action, and adjuvants
c. Explain the value and techniques of intravascular test dosing to minimize local anesthetic systemic toxicity associated with peripheral nerve block
d. Differentiate the various brachial plexus (or terminal nerve) block sites including indications/contraindications, advantages/disadvantages, complications, and management specific to each
e. Contrast the indications and technique for cervical plexus, suprascapular, or intercostobrachial block as unique blocks or supplements to brachial plexus block
f. Discuss the technical and nontechnical aspects unique to brachial plexus perineural catheter placement and management

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5. Lower-Extremity Nerve Block[10]
   a. 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
   b. Compare local anesthetics for lower-extremity block: agents, dose, duration of action, and adjuvants
   c. Explain the value and techniques of intravascular test dosing to minimize local anesthetic systemic toxicity associated with peripheral nerve block
   d. Differentiate the various approaches to lower-extremity blockade, including indications/contraindications, side effects, complications, and management specific to each
   e. Discuss the technical and nontechnical aspects unique to lower-extremity perineural catheter placement and management
6. Truncal Block
   a. Describe the relevant anatomy for intercostal, paravertebral, ilioinguinal-hypogastric, rectus sheath and transversus abdominis plane blocks
   b. Compare local anesthetics for truncal blockade: agents, dose, and duration of action
   c. Summarize the indications, contraindications, side effects, complications, and management of truncal blockade
   d. Discuss the technical and nontechnical aspects unique to continuous truncal catheter placement and management
7. Intravenous Regional Anesthesia
   a. Review the mechanism of action, indications, contraindications, advantages and disadvantages, adverse effects, complications, and management of intravenous regional anesthesia
   b. Compare agents for intravenous regional anesthesia: local anesthetic choice, dosage, and use of adjuvants
8. Complications of Regional Anesthesia and Acute Pain Medicine
   a. Discuss, recognize, and know how to manage complications specific to regional anesthesia and acute pain medicine practice. A partial list of these complications includes:
      i. Hemorrhagic complications in the patient receiving antithrombotic or thrombolytic agents[8]
      ii. Infectious complications of neuraxial and peripheral blockade[11]
      iii. Neurological complications of regional anesthesia and acute pain medicine[12]
      iv. Knowledge and basic interpretation of tests recommended after plexus/nerve lesion such as electromyography, nerve conduction studies, somatosensory evoked potentials, and motor evoked potentials
      v. Local anesthetic systemic toxicity[3]
      vi. Opioid-induced respiratory depression[4]

c. Patient Care and Procedural Skills
   i. 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 nonopioid pharmacological management.
   ii. Debate the advantages/disadvantages of regional versus general anesthesia for various procedures and patients with regard to patient recovery, patient outcome, operating room efficiency, and cost of care.
   iii. Recognize and intervene to manage inadequate operative regional anesthetic and postoperative analgesic techniques with supplemental blockade, alternate approaches, and/or pharmacological intervention.
   iv. Demonstrate the knowledge (including an understanding of the applied anatomy) and skills necessary to perform and to effectively teach a wide range of advanced practice block techniques, achieving a high success rate and a low complication rate.
   v. Demonstrate an understanding of how the acute pain medicine service addresses (a) surgical regional anesthetic techniques (as placed by the operating room anesthesiologist), (b) the perioperative use of analgesic techniques by the acute pain medicine service, (c) the perioperative management of acute pain medicine intervention, (d) the provision of acute pain medicine services directed toward the chronic pain patient who is now experiencing acute pain, and (e) the provision of acute pain management to select nonsurgical patients, such as those with sickle cell disease or other conditions known to cause acute pain.
   vi. 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.
   vii. Demonstrate appropriate interpersonal and communication skills to manage patients.

d. Scholarly Activities
   i. Academic Activities
      1. Fellows are encouraged to participate in research as a major activity of the fellowship. To accomplish these objectives, the Regional Anesthesiology and Acute Pain Medicine faculty will mentor the fellow in the preparation of research proposals, research methodology, and authorship guidelines.
   ii. Teaching Activities
      1. Create and present a lecture during departmental or divisional grand rounds or a local/regional/national meeting covering a topic, research, or a case relevant to regional anesthesia or acute pain medicine.
      2. Prepare resident education lectures and journal reviews for regional anesthesia and/or acute pain medicine subspecialty conferences.
      3. Participate and direct cadaver anatomy laboratories if available.
      4. Develop teaching techniques by instructing residents and/or medical students at the bedside under the supervision of faculty.
      5. Review and enhance Web-based teaching resources such as resident teaching materials, curriculum documents, and self-study and testing materials.

e. Practice-Based Learning and Improvement
   i. Evaluate and apply evidence from scientific studies, expert guidelines, and practice pathways to patient's medical conditions.
   ii. Apply information technology to obtain and record patient information, access institutional and national policies and guidelines, and participate in self-education.
   iii. Analyze their own practice with respect to patient outcomes (especially success and complications from regional blockade) and compare with available literature.

f. Interpersonal and Communication Skills
   i. Summarize information to the patient and family with respect to the options, alternatives, risks, and benefits

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of regional anesthesia and/or acute analgesic techniques in a manner that is clear, understandable, and ethical.
ii. Develop effective listening skills and answer questions appropriately in the process of obtaining informed consent.
iii. 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:
1. Recognize the roles of all team members
2. Communicate clearly in a collegial manner that facilitates the achievement of care goals
3. Help other members of the team to enhance the sharing of important information
4. Formulate care plans that use the multidisciplinary team skills, such as a plan for facilitated recovery

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

h. System-Based Practice
i. 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.
ii. 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.
iii. Demonstrate awareness of health care costs and resource allocation and the impact of their choices on those costs and resources.
iv. Advocate for the patient and the family within the health care system and assist them in understanding and negotiating complexities in that system.

III. THE EVALUATION PROCESS

a. The program director is encouraged to appoint a Clinical Competency Committee that should be composed of at least 2 members of the program faculty.
b. The Clinical Competency Committee should review all fellow evaluations semiannually and advise the program director regarding fellow progress, including promotion, remediation, and dismissal.
c. Formative evaluation
i. The faculty must evaluate the fellow performance in a timely manner.
ii. The program should provide objective assessments of competence in patient care and procedural skills, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice.
iii. The program should use multiple evaluators (faculty, peers, patients, self, and other professional staff) and provide the fellow with documented semiannual evaluation of performance with feedback.

d. Summative Evaluation
i. The program director should provide a summative evaluation for each fellow on completion of the program.

e. Faculty Evaluation
i. At least annually, the program should evaluate faculty performance as it relates to the educational program. The evaluations may include a review of the faculty's clinical teaching abilities, commitment to the educational program, clinical knowledge, professionalism, and scholarly activities.

f. Program Evaluation and Improvement
i. The program should appoint a Program Evaluation Committee composed of at least 2 program faculty members and at least 1 fellow.
ii. The Program Evaluation Committee should actively participate in planning, developing, implementing, and evaluating educational activities of the program and reviewing of the program annually using evaluations of faculty, fellows, and others.

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