

## The Regional Anesthesia and Acute Pain Management Fellowship at Wake Forest University

### Mission Statement:

*The purpose of a fellowship in RAAPM at Wake Forest University is to produce individuals likely to expand the profile of regional anesthesia practices in the future by preparing them for a careers in RAAPM during a year long fellowship .*

*In addition, the fellowship program will help ensure the ongoing development of regional anesthesia as a defined subspecialty at our home institution.*

*Research activities, the development of educational curricula, and advanced clinical care will be emphasized.*

*The fellowship is specifically designed to enhance, rather than diminish, the clinical exposure of Wake Forest University residents to regional anesthesia and acute pain management.*

*The ideal candidates for this fellowship would have a strong clinical base in regional anesthesia such as one of our own graduating residents. The ideal candidates would be looking to build skills and competency suitable for these individuals to develop a regional anesthesia program at an academic institution.*

Preparation of these goals and objectives have incorporated large sections of both the **Fellowship Guidelines of a Consensus Document from the Directors of Regional Anesthesia Fellowship Programs** and materials from the **Curriculum for the RAAPM Resident Rotation at Wake Forest.**

## **Fellowship Training in Regional Anesthesia @ Wake Forest University:**

- Outline:**
- I. Scope of Training**
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  - III. Institutional Organization**
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### **I. Scope of Training:**

Regional anesthesia fellowship training focuses on the perioperative management of patients receiving neuraxial or peripheral neural blockade for anesthesia or analgesia. Fellowship training is centered on the development of a base of expertise in the practice and theory of regional anesthesiology, operating room management skills as they relate to regional anesthesia, and the individual's own teaching style.

### **II. Duration of Training**

The time required for sub-specialty fellowship training in regional anesthesia is twelve months. Specialized clinical rotations of less than 12 months may be made available in the future but the minimum amount of training necessary to use "fellowship" in the diploma language is one year.

### **III. Institutional Organization:**

A) Two fellows will function in close relationship with our ACGME accredited residency in anesthesiology which provides residents with strong training in regional anesthesia.

B) The fellowship is recognized and approved by our institutional division of Medical Education as appropriate for a non-ACGME fellowship.

C) The fellowship stipend would be supported in part by the fellow's own activities as a staff physician, one day per week, in the General OR.

**IV. Program Director and Faculty:**

A) The Director of the fellowship training program is an ABA Board-Certified anesthesiologist who has completed a fellowship in regional anesthesia.

B) All faculty are Board-Certified or eligible in Anesthesiology. The number of faculty dedicated to the fellow's regional anesthesia training is five to seven.

**V. Resources:**

A) Equipment: Suitable equipment for the performance of a wide variety of regional anesthetic techniques is available. Such equipment include nerve simulators, neuraxial and peripheral block supplies, catheter systems, ultrasound, and the basic requirements for conducting general anesthesia, according to the ASA standards.

B) Appropriate support services including, but are not limited to, anesthesia technical and pharmacy support available as needed by the program.

C) A departmental library dedicated to anesthesiology with literature specific to the practice of regional anesthesia is maintained. Regional anesthesia teaching material and models purchased for the purpose of regional anesthesia education are available separately in the RAAPM area as well.

D) Ultrasound guidance, nerve stimulator catheter placement, ambulatory management of peripheral nerve catheters are all part of routine care at WFU.

**VI. Goals and Objectives of the Educational Program:**

A) Academic activities (the production of clinical research and the development of training tools) will account for a large portion effort of the fellow.

B) The existing and well- developed clinical program of resident education will serve as the cornerstone of fellowship training in regional anesthesia.

C) Fellowship training (in distinction to resident training) will be specifically geared toward the use of regional anesthesia in order to improve OR management and efficiency, and to enhance the recovery of surgical patients.

D) The fellow will expand his or her level of clinical expertise in approaches and techniques by supervising residents under the direct guidance of faculty as part of routine clinical care and clinical research studies.

E) During fellowship the fellow will develop a more thorough knowledge of the application, indications, contraindications, and complications of the approaches and techniques listed below as one of the goals and objectives of fellowship training.

**Goals:**

Over the course of the year long residency, the fellow will enhance his or her cognitive, psychomotor, and affective skills to safely and effectively administer regional anesthesia as a consultant in anesthesiology. Upon completion of the fellowship the fellow will be expected to perform at the level of consultant with an emphasis on continuous peripheral nerve blockade, paravertebral blockade, and thoracic epidural anesthesia. The fellow will be responsible for decisions related to case and block selection to facilitate the smooth flow of OR cases and to enhance patient recovery. The fellow will be expected to have the skills needed to establish regional anesthesia as the primary component of his or her future practice in anesthesiology.

**Objectives:** The fellow will be able to:

- I. Debate the advantages/disadvantages of regional vs. general anesthesia for various procedures and patients in regard to patient recovery, patient outcome, operating room efficiency, and cost of care.
- II. Local Anesthetics - Knowledge Base
  - A. Discuss the pharmacokinetics of local anesthetics: absorption, distribution, metabolism, and excretion.
  - B. Discuss the site and mechanism of action of local anesthetics.
  - C. Discuss the chemical structure of amino-amides and amino-esters.
  - D. Describe the concept of minimum effective concentration of local anesthetic (Cm.)
  - E. Discuss effective concentrations, toxic dosage, influence of site of injection, and vasoconstrictor use in regard to clinical practice.
  - F. Compare attributes of various local anesthetics: motor vs. sensory blocking discrimination and relative toxicity.
  - G. Discuss lipid solubility, protein binding, pKa and their influence on onset, potency, and duration of block.
- III. Neuraxial Narcotics - Knowledge Base
  - A. Discuss available drugs, effective dose, and duration of action.

- B. Describe the indications/contraindications for the use of neuraxial narcotics for acute pain management.
- C. Describe the mechanism of action of neuraxial narcotics.
- D. Differentiate intrathecal vs. epidural administration relative to dose, effect and side effects.
- E. Differentiate between hydrophilic and hydrophobic drugs to include advantages/disadvantages.
- A. Discuss the incidence of complications and side effects, monitoring, prevention and therapy.

#### IV. Spinal Anesthesia - Knowledge Base

- A. Discuss the cardiovascular and pulmonary physiologic effects of spinal anesthesia.
- B. Discuss local anesthetics for intrathecal use: agents, dosage, surgical and total duration of action, and adjuvants.
- C. Describe “baricity” of spinal local anesthetic solutions, and the effect on block level.
- D. Describe the indications and contraindications for spinal anesthesia.
- E. Discuss side effects, complications and management: inadequate anesthesia, hypotension, and ventilatory insufficiency.
- F. Define post-dural puncture headache, and describe symptoms, etiology, risk factors and treatment.
- G. Discuss the use of spinal anesthesia in an ambulatory surgery setting.
- H. Explain the relative importance of factors affecting intensity, extent and duration of block such as dose, volume, and baricity of injectate.
- I. Describe differential blockade during neuraxial blockade.
- J. Describe advantages and disadvantages of continuous spinal anesthesia.

Psychomotor Skills: Demonstrate proper spinal anesthesia technique using the midline, paramedian, and continuous spinal approaches successfully and safely.

- V. Epidural Anesthesia (Lumbar, Thoracic, Caudal) - Knowledge Base:
- A. Discuss the physiology of epidural anesthesia.
  - B. Describe the contents of the epidural space.
  - C. Discuss the local anesthetics available for epidural use: agents, dosage, adjuncts, and duration of action.
  - D. Differentiate between spinal and epidural anesthesia with regards to reliability, latency, duration, and segmental limitations.
  - D. Describe the indications and contraindications for epidural anesthesia.
  - E. Discuss side effects, complications and management: inadequate anesthesia, hypotension, total spinal, accidental dural puncture, systemic toxicity, and the use of appropriate test dosing to minimize some of these complications.
  - F. Describe the volume-segment relationship and the effect of patient age, pregnancy, position, and site of injection on resultant block.
  - G. Discuss combined spinal-epidural anesthesia as distinguished from lumbar epidural anesthesia, including advantages/disadvantages, dose requirements, complications, indications and contraindications.
  - H. Discuss caudal epidural and thoracic epidural anesthesia as distinguished from lumbar epidural anesthesia, including advantages/disadvantages, dose requirements, complications, indications and contraindications.

Psychomotor Skills: Demonstrate proper technique using the midline and paramedian lumbar approach, thoracic epidural anesthesia, and caudal anesthesia successfully and safely.

- VI. Upper Extremity Nerve Block - Knowledge Base
- A. Describe the anatomy of the brachial plexus in relation to sensory and motor innervation.
  - B. Discuss local anesthetics for brachial plexus block: agents, dosage, duration of action, and adjuvants.

- C. Discuss side effects, complications, and management: inadequate anesthesia, systemic toxicity, blockade of adjacent neural structures (phrenic, sympathetic chain and neuraxis), post-operative neuropathy.
- D. Describe the various approaches to brachial plexus blockade, along with the indications/contraindications, advantages/disadvantages, and complications specific to each.
- E. Describe peripheral nerve block in the upper extremity of the median, ulnar and radial nerves, with indications, contraindications, and complications.
- F. Discuss the use and advantages/disadvantages specific to various nerve localizing techniques including transarterial, perivascular, nerve stimulator and paresthesia-seeking techniques.
- G. Discuss the use and advantages/disadvantages specific to continuous brachial plexus anesthesia.

Psychomotor Skills: Demonstrate proper technique for an adequate number of interscalene, supraclavicular, infraclavicular, and axillary blocks successfully and safely. Demonstrate proper technique in continuous peripheral nerve blockade of the brachial plexus successfully and safely.

#### VII. Lower Extremity Nerve Block - Knowledge Base

- A. Describe anatomy of the lower extremity: sciatic, femoral, lateral femoral cutaneous, obturator nerves in relation to sensory and motor innervation.
- B. Discuss local anesthetics for lower extremity block: agents, dosage, duration of action, and adjuvants.
- C. Describe the various approaches to lower extremity blockade, along with the indications/contraindications, advantages/disadvantages, and complications specific to each.
- D. Discuss side effects, complications, and management of lower extremity blockade: inadequate analgesia, systemic toxicity, blockade of adjacent neural structures, and post-operative neuropathy.
- E. Differentiate individual blockade of the femoral, lateral femoral cutaneous, and obturator nerves from the anterior and posterior approaches to the lumbar plexus.
- F. Differentiate individual blockade of the tibial and peroneal nerves from the classic and popliteal approaches to the sciatic nerve.

Psychomotor Skills: Demonstrate proper technique for sciatic, femoral, lumbar plexus, popliteal, and ankle blockade successfully and safely. Demonstrate proper technique in continuous peripheral nerve blockade of the sciatic and lumbar plexus successfully and safely.

VIII. Truncal Blockade - Knowledge Base

- A. Discuss the anatomy of intercostal and paravertebral blockade.
- B. Discuss local anesthetics for intercostal and paravertebral blockade: agents, dosage, and duration of action.
- C. Discuss the indications and contraindications for intercostal and paravertebral blockade.
- D. Discuss the side effects, complications, and management: inadequate anesthesia, systemic toxicity, and pneumothorax.
- E. Discuss interpleural analgesia: its potential mechanism of action and limitations.

Psychomotor Skills:

Demonstrate proper technique for an adequate number of intercostal and paravertebral blocks successfully and safely.

IX. Intravenous Regional Anesthesia - Knowledge Base

- A. Discuss the mechanism of action of IVRA.
- B. Discuss agents for IVRA: local anesthetic choice, dosage, and use of adjuvants.
- C. Describe the indications and contraindications, advantages and disadvantages of IVRA.
- D. Discuss the complications and management: systemic toxicity, inadequate anesthesia, and phlebitis.

Psychomotor Skills: Demonstrate proper use of double tourniquet and exsanguination technique for an adequate number of IVRA's successfully and safely.

X. Acute Pain- Knowledge Base

- A. Discuss the pharmacokinetics of opioid analgesics: bioavailability, absorption, distribution, metabolism, and excretion.
- B. Discuss the site and mechanism of action of opioids.
- F. Discuss the differences of chemical structure of the various opioids.
- D. Describe the concept of multimodal analgesia and its impact on functional restoration after surgery.
- E. Discuss the pharmacology of NSAIDs and COX-2 inhibitors in specific.

**Psychomotor Skills:** Demonstrate the ability to lead acute pain rounds with attending supervision, while managing patients on the level of a consultant. Management will include and emphasis on multi-modal analgesic techniques such as neuraxial and peripheral nerve catheters, local anesthetics and narcotic infusions, and non-narcotic analgesic adjuvants. Indications, contraindications, side effects, potential complications, and daily management of patients on the acute pain service will be stressed.

#### XI. Competency in Techniques and Approaches:

##### **Basic Techniques and Approaches:**

- Superficial cervical plexus block
- Axillary brachial plexus block
- Intravenous regional anesthesia (Bier block) Wrist Block
- Digital nerve block
- Intercostobrachial nerve block
- Saphenous nerve block
- Ankle block
- Spinal anesthesia
- Lumbar epidural anesthesia
- Combined spinal-epidural anesthesia
- Femoral nerve block

##### **Intermediate Techniques and Approaches:**

- Deep cervical plexus block
- Interscalene block
- Supraclavicular block
- Infraclavicular block
- Sciatic nerve block: posterior approaches
- Lumbar plexus block
- Genitofemoral nerve block
- Popliteal block
- Suprascapular nerve block
- Intercostal nerve block
- Thoracic epidural anesthesia

##### **Advanced Techniques and Approaches:**

- Continuous interscalene block
- Continuous infraclavicular block
- Continuous axillary block
- Thoraco-lumbar paravertebral block: single or continuous
- Combined lumbar plexus/sciatic block
- Continuous femoral nerve block
- Sciatic nerve block: anterior approaches
- Obturator nerve block
- Continuous sciatic nerve block
- Continuous popliteal block: all approaches

#### XI. Competency in Concepts and Principles:

- Demonstrate rational selection of regional anesthesia for specific clinical situations
- Demonstrate effective anxiolysis of patients by both pharmacological and interpersonal techniques

- Demonstrate cost-effective management decision
  - Demonstrate ability to rescue failed regional anesthesia techniques
  - Demonstrate effective management of isolated peripheral nerve and central neuraxial blocks with respect to the physiologic consequences both intraoperatively and postoperatively
  - Demonstrate successful use of a peripheral nerve stimulator for neuronal blocks
- Demonstrate effective management of regional anesthesia in critically ill patients
- Demonstrate knowledge of practice management principles as they relate to regional anesthesia

## VII. Scholarly Activities

### A) Academic Presentations:

- i) The fellow will present once during the second half of the fellowship year at Anesthesia Grand Rounds covering a topic or case relevant to regional anesthesia patient care.
- ii) The fellow will deliver once a Monday Lecture including a literature review relevant to regional anesthesia.
- iii) The fellow will participate and direct portions of all the fresh cadaver anatomy labs organized for anesthesia residents as part of their established curriculum.
- iv) Opportunities to present at hospital training in-service didactic sessions, grand rounds for other departments, and industry and regional meetings will be made available.
- v) The fellow will be a presenter at the 2006 American Society of Regional Anesthesia Meeting.

### B) Development of Teaching Materials

- i) The fellow will be expected to prepare web-based teaching resources including the resident handbook, curriculum document, and self study and testing materials.
- ii) The fellow will prepare informal didactic handouts and literature reviews with the residents.

### C) Academic Publications:

- i) The fellow will be expected to participate in clinical research.

- ii) The fellow's research goal will be the publication of one or more clinical studies during the year.
- iii) The RAAPM faculty will be committed to mentoring the fellow in the production of research, co-author papers as appropriate, and prepare projects with IRB approval prior to the start of the fellowship year.
- iv) The fellow will have opportunities to co-author case reports, reviews, and book chapters during fellowship.
- v) The fellow will 'guest review' manuscript for the faculty who search has editors of peer reviewed journals.

D) Bedside Teaching.

- i) The fellow will have the opportunity to learn teaching techniques by instructing residents at the bedside in the Regional Anesthesia Area under the supervision of faculty.
- ii) The fellow will have the opportunity to learn teaching techniques on the APS under the supervision of faculty.
- iii) The fellow will be expected to participate in the education of residents and student nurse anesthetists as part of the fellow's one-day per week clinical commitment in the general OR.

**VIII) Consultant Skills:**

A) Communication Skills: The fellow will possess communication skills sufficient to solicit and impart information. The fellow will be able to clearly delineate options available to the patient regarding regional anesthesia as well as the risks and benefits in a manner that is understandable to the patient.

B) Collaboration Skills: The fellow will be able to work in a team environment, communicating and cooperating with surgeons, nurses, pharmacist, physical therapists and all members of the perioperative team. By the end of the fellowship, the fellow will be able to:

- appreciate the roles of other members of the team
- 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 utilize the multidisciplinary team skills, such as a plan for facilitated recovery.

C) Operating Room Management Skills: The fellow will be able to effectively balance the need for operating room efficiency with a high quality of patient care in the setting of a residency teaching program. The fellow will

effectively choose surgeons, patients, techniques and approaches to achieve the best balance possible in order to use regional anesthesia to improve recovery.

**IX.) Evaluation:**

A) As per ACGME Residency Guidelines, the attending faculty will be evaluated by the fellows twice annually.

B) Written web-based evaluations of fellows by all faculty with whom they have worked shall occur quarterly. Knowledge, psychomotor skills, and interpersonal skills as related to regional anesthesia will be evaluated and reported to the clinical competence committee. The results of these evaluations shall be recorded and reviewed with the fellows by the program director no less often than every six months.