INTRODUCTION

The Neuro Anesthesia rotation at the University of Manitoba is intended to build upon the adult tertiary goals and objectives. In order to function safely and effectively in the Neurosurgical environment, the resident must clearly have all of the skills required of a tertiary anesthesiologist in general. These goals and objectives focus on the additional areas of skill and knowledge that relate specifically to Neuro Anesthesia.

GOALS AND OBJECTIVES

The University of Manitoba Training Program for Residents in Anesthesia has been developed in accordance with the guidelines of the Royal College of Physicians and Surgeons of Canada.

The following Rotation Specific Goals and Objectives for Neuro Anesthesia, provide specialty specific emphasis to particular components of the general Program Goals and Objectives.

The resident is also referred to the National Anesthesia Curriculum for a detailed list of expected knowledge.

*All appropriate Program Goals and Objectives also apply to this rotation.*

1. **Medical Expert/Clinical Decision Maker**

By the end of this rotation, the Resident will be able to:

A. Identify the anesthetic implications of the more common central and peripheral nervous system lesions in adult patients, and give a complete rationale based upon the underlying pathophysiology:

1. Cerebrovascular disease including
   a) Aneurysms
   b) A-V malformations
   c) Cerebrovascular occlusive disease
2. Intracranial mass lesions
a) Supratentorial
b) Posterior fossa
c) Increased ICP

3. Head Injury
4. Epilepsy
5. Diseases of the Spine and Cord
   a) Tumours
   b) Fractures and Instability
   c) Trauma

6. Neuroendocrine Disease
7. Minimally Invasive Neurosurgery
8. Non-neurological surgery in the patient with neurological disease
9. Intraoperative MRI in neurosurgical patients including
   a) Indications
   b) Safety precautions
   c) Potential hazards
   d) Anesthetic implications relevant to iMRI

B. Apply an organized method of pre-anesthetic assessment of patients with neurological disease.

C. Identify indications for and correctly interpret angiographic, CT, and MRI data as appropriate

D. Formulate and implement an appropriate plan for perioperative patient management based on understanding of the neurological problem, the surgical procedure, coexisting problems, and patient factors such as anxiety, discomfort, culture, language, ethnicity, age, and gender

E. Apply current techniques in Neuro Anesthesia and give a rationale based upon their impact on pathophysiology.

F. Independently manage anesthetics for the following Neurosurgical procedures:

1. Supine, prone, park-bench and sitting position for craniotomy
2. Lateral and prone positions for lumbar discectomy
3. Lateral, supine, prone and sitting positions for cervical discectomy or fusion
4. Cerebral aneurysm clipping / coiling
5. Carotid endarterectomy
6. Transphenoidal surgery
7. Neuroradiologic procedures
8. Stereotactic biopsy
9. Neurotrauma
10. Unstable cervical spine
11. Use of controlled hypotension
12. Deep brain stimulation
G. Respond to monitoring information, and change in patient, anesthetic, or surgical factors with appropriate and timely management. The resident must specifically be able to recognize and treat neurological emergencies such as:

1. sudden air embolus
2. seizure
3. raised intracranial pressure
4. resuscitation of the critically ill patient
5. intraoperative rupture of intracranial aneurysm
6. postoperative failure to awake

H. Identify the indications for, and correctly apply and interpret the information from high level monitoring equipment and techniques used in Neuro Anesthesia including:

1. arterial catheter
2. CVP
3. pulmonary artery catheter
4. Precordial Doppler
5. end-tidal CO2
6. end-tidal anesthetic vapour
7. processed EEG and bispectral analysis
8. Evoked potentials : SSEP, MEP, BAEP
9. Cerebral oximetry
10. Intracranial pressure monitoring

I. Identify and alleviate impediments to the accurate interpretation of these monitors

J. Identify and manage complications associated with these monitors.

K. Explain the clinical utility and information available from evoked potentials

L. Modify the anesthetic plan in a manner that optimizes the interpretation of evoked potentials, and give a rationale for that plan based on the interactions of anesthesia and evoked potentials

M. Manage the transfer of complicated and potentially critically ill patients to the operating room and back to the intensive care unit.

2. Communicator

By the end of this rotation the Resident will be able to:

A. Establish a therapeutic relationship with neurosurgical patients emphasizing understanding, trust, empathy, and confidentiality

B. Elicit and synthesize relevant information from the patient and/or family, and be able to assess and take into account, the impact of a patient's age, gender,
ethno cultural background, social supports, and emotional influences on neurological illness and perioperative clinical course

C. Demonstrate sensitivity to the possible neuropsychological complications and communication problems of these patients and skill at decreasing their anxiety.

D. Discuss appropriate information with the patient, his/her family to facilitate the optimal management plan for the care of the patient. This should include discussion of anesthetic procedures, options and risk (and surgical risk where appropriate).

3. Collaborator

By the end of this rotation the Resident will be able to:

A. Communicate a succinct assessment and peri-operative anesthetic management plan to Attending Staff.

B. Effectively consult with other physicians and health care professionals and demonstrate appropriate judgment regarding the assessment of neurosurgical anesthetic risk.

C. Coordinate the care of neurosurgical patients with other members of the operating room and perioperative teams, including surgeons, nurses, and allied health staff in the OR, intensive care unit, ward and step-down unit, and in off-site locations such as radiology and iMRI neurosuite.

D. Manage urgent and crisis situations listed above as a team member or leader.

4. Manager

By the end of this rotation the Resident will be able to:

A. Make efficient use of time regarding:
   1. Patient assessment
      1. Operating room equipment set-up
      2. Anesthesia induction
      3. Patient transfer to the post-anesthesia care unit or intensive care
      4. Operating room changeover

B. Generate anesthetic plans that take into account cost-effective use of anesthesia resources such as:
   1. Drug choice
   2. Equipment options
   3. Invasive monitoring

C. Manage decisions regarding patient slating and OR care (elective and emergent), and ICU/PACU/step-down/ward care postoperatively.
D. Manage the assigned room/slate with regard to maintaining the schedule, or changing the schedule in response to emergencies, additional cases etc.

E. Manage after hours scheduling of cases including prioritization and adapting to changes

5. Health Advocate

By the end of this rotation the Resident will be able to:

A. Recognize and explain the relevance of broad health and societal issues with impact on the anesthetic care of the neurosurgery patient. Issues relevant to care include:
   1. Risk factors and demographics which contribute to the development of neurological disease (e.g. alcohol, drugs and risk of neurotrauma)
   2. Lifestyle changes and programs which aid in the prevention of neurological disease
   3. Factors that identify high-risk patients in the preoperative, intraoperative, and postoperative periods (e.g. raised ICP, decreased level of consciousness and aspiration risk)
   4. Joint decision with surgeons re: cerebral protection in temporary clipping

B. Advocate for, and intervene on behalf of patients regarding their care and safety

C. Recognize and act upon individual and systemic threats to safe anesthesia working practices, on behalf of patients and health care personnel

D. Apply CAS and CSA standards to the care of neurosurgical patients.

6. Scholar

By the end of this rotation the Resident will be able to:

A. Maintain a personal continuing education strategy

B. Formulate questions for ongoing appraisal

C. Search and critically appraise current neuroanesthesia literature

D. Apply new knowledge to make care decisions based on appropriate evidence

E. Present case reports, journal club, or rounds with effective style and sound synthesis of pertinent information

F. Teach patients, housestaff, students and other professionals when appropriate
7. Professional

Throughout this rotation, the resident shall:

A. Deliver highest quality care with integrity, honesty, and compassion

B. Demonstrate appropriate interpersonal and professional behavior

C. Practice medicine ethically consistent with the obligations of a physician

D. Practice with consideration of ethical and legal aspects of patient care

E. Recognize personal limits through appropriate consultation (with staff supervisors, other physicians, and other health professionals) and show appropriate respect for those consulted

F. Include the patient in discussions of care management

G. Recognize and mediate potential conflict between staff, patients, families based on socioeconomic, cultural, belief system and other differences to generate a successful outcome to neuro anesthetic care.

CLINICAL RESPONSIBILITIES

DAILY

a) Preoperative assessment: The resident will assess each patient on his/her slate preoperatively at the earliest reasonable opportunity. Inpatients scheduled the night beforehand or earlier must be assessed by the resident the night beforehand at the latest. To that end, the resident will review the slating for the next day at the end of each OR day, to determine his/her responsibilities with respect to preoperative assessment and communication with staff.

b) Anesthetic planning: For each case, the resident will generate an anesthetic plan based upon all of the anesthetic considerations relevant to that case.

c) Communication with Attending staff: It is the responsibility of the resident to ensure that this plan is discussed with and approved by the attending anesthesiologist before proceeding. It is also the responsibility of the resident to contact the attending anesthesiologist on the day prior to the slate. That contact will be used at the mutual discretion of the staff and resident to prepare a teaching plan, review the anesthetic plans, and make any applicable special plans for the conduct of the slate as a whole.

d) Preparation:
   1. The resident shall arrive in the hospital with sufficient time to complete the following and start the first case at the slated time
   2. Check and prepare all necessary equipment for the first case
   3. Make any arrangements that will be required for the efficient conduct of the slate
   4. Assess the first patient and review the assessment and plan with attending anesthesiologist
5. The resident will prepare for each subsequent case with sufficient alacrity to ensure the efficient conduct of the slate.

e) **Administration of Anesthesia:** The resident will implement the anesthetic plan, including modification in response to evolving conditions, from preoperative assessment and optimization through to postoperative disposition, with a degree of autonomy commensurate with the expectations for his/her level of training.

f) **Postoperative Follow-up:** The resident will attend to any postoperative investigation or management that derives from either the initial anesthetic plan or intraoperative events. The resident will follow up on any complications and communicate the results of that follow-up to the attending anesthesiologist. The resident will direct the postoperative management of such complications in concert with the attending anesthesiologist to point of their resolution or delegation to an appropriate health care provider.

### CALL

The resident shall take call as indicated on the call schedule for the clinical site in which s/he is rotating. This call shall conform to the relevant policies on call found in the Residency Program Policy Manual.

### CONSULTS

Residents shall see all Neuro Anesthesia consults with the exception of emergency consults that arrive when the resident is not on duty.

### OTHER RESPONSIBILITIES

### TEACHING

Residents shall participate in the clinical teaching of medical students, junior residents, and paramedical trainees that are slated to work with them.

### ROUNDS

1. Talk/Grand Rounds

Resident will attend *all* talk rounds and Grand rounds that occur at HSC during their rotation with the following exceptions:

   a) Wednesday morning talk rounds or Grand Rounds when Post-Call
   b) Illness

2. Neuro Anesthesia Rounds

   a) The resident will attend all neurosurgical rounds with the same exceptions
   c) The resident will present one Neuro Anesthesia rounds
3. Evaluations

As per the policy in the Residency Program Policy Manual, the resident will receive a daily evaluation. The staff person will receive an e-mail reminder for the daily evaluation. The staff person will complete the electronic daily evaluation form situated on the departments’ website.
LEARNING RESOURCES

During this rotation, the following resources will be available to residents in addition to those available at all times through the University Department:

1. Clinical teaching - The most important learning resource during clinical rotations is the direct teaching that occurs during discussion with staff of the management of actual cases, and topics of interest. The quality of this discussion is enhanced by communication in advance to generate a teaching plan. An outline of topics to be reviewed by the resident during the Neuro Anesthesia rotation will be presented to the resident prior to the rotation.

2. Site Library - each tertiary site has a collection of current textbooks relevant to the pattern of practice of the site

3. Computer access - each tertiary site has computer access within the OR for resident use in accessing literature.

4. Textbook - an electronic version of the textbook Essentials of Neuro Anesthesia and Neuro Intensive Care is available on the Anesthesiology toolkit. The resident should also review the appropriate neurosciences chapters in their major anesthesia textbooks.

5. The University of Manitoba Department of Anesthesia website has an iMRI portal that provides the resident with information relevant to intraoperative MRI during neurosurgical procedures.