

Neuro-Oncology Core Curriculum

Neuro-oncology is a subspecialty that involves the neurological, medical, surgical, and oncologic management of patients with primary or metastatic central and peripheral nervous system neoplasms, and any other disorders or complications affecting the nervous system, that result directly or indirectly from nervous system or systemic neoplasms or from related treatment

I. CORE CONTENT

A. Management of Adult Primary Nervous System Tumors

Knowledge of advanced principles of management of primary nervous system tumors in adult neuro-oncology patients. This training must include the following:

1. Proper application of diagnostic methods in adult neuro-oncology, including the clinical history and examination, as well as laboratory, neuroimaging, neuropathologic and other neurodiagnostic procedures in the evaluation of such patients
2. Indications for standard and experimental surgical, radiation, and medical therapies for primary CNS tumors
3. Comprehensive training and experience with the use of medical neuro-oncologic therapeutics, including appropriate chemotherapy, targeted and novel therapies, and therapy for commonly associated medical complications in neuro-oncology patients or as they apply to adult neuro-oncology

B. Management of Pediatric Primary Nervous System Tumors

Knowledge of advanced principles of management of primary and metastatic nervous system tumors in pediatric neuro-oncology patients:

1. Proper application of diagnostic methods in pediatric neuro-oncology, including clinical history and examination, laboratory, neuroimaging, neuropathologic and other neurodiagnostic procedures in the evaluation of such patients
2. Indications for standard and experimental surgical, radiation, and medical therapies for primary CNS tumors
3. Comprehensive training and experience with the use of medical neuro-oncologic therapeutics, including appropriate chemotherapy, targeted and novel therapies, and therapy for commonly associated medical complications in neuro-oncology patients or as they apply to pediatric neuro-oncology.
4. Specialized modifications of diagnostic evaluations and treatments, which are necessary due to the age of the patient (newborns, infants, young or older children)

C. Treatment of Metastatic Cancer to the Nervous System

1. Brain and spinal cord metastases
2. Base of skull metastases
3. Leptomeningeal metastases
4. Epidural metastases and spinal cord compression
5. Plexus and peripheral nerve metastases

D. Systemic Cancer-Related Neurologic Disorders

1. Adverse events and reactions to surgical, medical, and radiation treatment of neuro-oncology patients
2. Toxic, nutritional and metabolic encephalopathy
3. CNS and systemic infections
4. Cerebrovascular disease

5. Seizures
6. Increased intracranial pressure
7. Deep venous thromboembolism
8. Neutropenia, thrombocytopenia, anemia and related complications
9. Use of blood products and growth factor support
10. Neuro-oncologic complications of bone marrow transplantation
11. Paraneoplastic syndromes
12. Pain and headache management
13. Palliative and end-of-life care

II. CORE CURRICULUM

A. Program Content

The subject matter upon which the program is based is summarized in the Core Content above. Neuro-Oncology is a discipline with foundations in both neurosciences and medical oncology. The scope of this subspecialty includes: the diagnosis and clinical management of primary and metastatic central and peripheral nervous system neoplasms; the neurologic complications of cancer and related systemic disorders; the neurologic complications of surgical, radiation and medical oncologic therapy; and supportive and terminal care management of Neuro-Oncology patients.

Proper management of Neuro-Oncology patients requires training and experience in at least two essential disciplines, which together define Neuro-Oncology as a unique subspecialty. Training in neurology or neurosurgery is required to properly assess and manage the neurologic component of the patient's disease. Training in Medical Neuro-Oncologic Therapeutics is required to establish competency in the use of chemotherapy and related medical treatments and supportive measures.

B. Goals

The overall goals of the educational program are:

1. To provide supervised training, with increasing responsibility, in the inpatient and outpatient practice of Neuro-Oncology. This training will include principles of diagnosis and management of primary and secondary central and peripheral nervous system neoplasms, neurologic complications of cancer and related disorders, side effects of related treatments, and related supportive care measures.
2. To provide supervised training in aspects of clinical and/or basic research in Neuro-Oncology.
3. To develop independence and evidence of competence of the Neuro-Oncology trainees.
4. To provide training in the technical aspects and procedures related to Neuro-Oncology, including administration of chemotherapy, other anti-neoplastic therapy, and related specialized procedures.
5. To develop, in the trainee, skills and a familiarity with the process of clinical trial development and conduct; academic presentations and/or publications; federal and private grant submissions; and independent research.
6. To provide guidelines and counsel with regards to the transition to an independent career as a competent Neuro-oncologist. Upon completion of training, trainees will be able to participate in the academic life of their institution, and in the national and international community of Neuro-oncologists.

C. Objectives

Advanced training programs in Neuro-Oncology will have specific purposes and goals (adapted from the Accreditation Council for Graduate Medical Education (ACGME) Core Competencies). The Program Director, via direct observation and performance evaluations, will assess competence in the following areas:

1. Patient Care:
 - i. Provide patient care that is compassionate, appropriate and effective for the promotion of health, prevention of illness, treatment of disease, and care at the end of life.
 - i. Gather accurate, essential information from all sources, including medical interviews, physical examinations, medical records and diagnostic/therapeutic procedures.
 - ii. Make informed recommendations about preventive, diagnostic and therapeutic options and interventions that are based upon sound clinical judgment, scientific evidence, and patient preference.
 - iii. Develop, negotiate and implement effective patient management plans and integrate patient care.
 - iv. Perform the diagnostic and therapeutic procedures considered essential to the practice of Neuro-Oncology with competency.
2. Medical Knowledge:

Demonstrate knowledge of established and evolving biomedical and clinical sciences, and apply knowledge to patient care and the education of others. Trainees must:

 - i. Apply an open-minded, analytical approach to acquisition of new knowledge.
 - ii. Access and critically evaluate current medical information and scientific evidence, including evidence-based practice guidelines pertaining to Neuro-Oncology
 - iii. Develop a clinically applicable knowledge of the basic and clinical sciences that underlie the practice of Neuro-Oncology.
 - iv. Apply this knowledge to clinical problem solving, clinical decision-making, and critical thinking.
3. Practice-Based Learning and Improvement:

Neuro-Oncology Trainees are expected to be able to use scientific evidence and methods to investigate, evaluate and improve patient care practices. Trainees must be able to:

 - i. Identify areas for improvement and implement strategies to enhance knowledge, skills, attitudes and processes of care.
 - ii. Analyze and evaluate practice experiences and implement strategies to continually improve the quality of patient practice.
 - iii. Develop and maintain a willingness to learn from experience to improve the system or processes of care.
 - iv. Use information technology or other available methodologies to access and manage information, support patient care decisions, and enhance both patient and physician education.
 - v. Gain information and experience from ongoing educational conferences, e.g. multidisciplinary patient conferences, neuropathology and neuroradiology conferences, and journal clubs.
4. Interpersonal and Communication Skills:

Neuro-Oncology trainees are expected to demonstrate interpersonal and communication skills that enable them to establish and maintain professional relationships with patients, families, and other members of the health care team. Trainees must be able to:

 - i. Provide effective and professional consultation to other physicians and health care professionals, and sustain therapeutic and ethically sound professional relationships with patients, their families and colleagues.
 - ii. Use effective listening, nonverbal, questioning, and narrative skills to communicate with patients and families.
 - iii. Interact with consultants in a respectful, appropriate manner.
 - iv. Maintain comprehensive, timely, and legible medical records.
5. Professionalism:

Neuro-Oncology trainees are expected to demonstrate behaviors that reflect a commitment to continuous professional development, ethical practice methods, an understanding and sensitivity to diversity and a responsible attitude toward their patients, their profession, and society.

- i. Demonstrate respect, compassion, integrity and altruism in relationships with patients, families, and colleagues.
 - ii. Adhere to principles of confidentiality, scientific/academic integrity, and informed consent.
 - iii. Recognize and identify deficiencies in peer performance.
6. Systems-Based Practice:

Neuro-Oncology trainees are expected to demonstrate both an understanding of the contexts and systems in which neuro-oncologic care is provided, and the ability to apply this knowledge to improve and optimize patient care. Trainees must be able to:

 - i. Understand, access and utilize the resources, providers and systems necessary to provide optimal care.
 - ii. Understand the limitations and opportunities inherent in various practice types and delivery systems, and develop strategies to optimize care for the individual patient.
 - iii. Apply evidence-based, cost-conscious strategies to prevention, diagnosis and disease management.
 - iv. Collaborate with other members of the health care team to assist patients in dealing effectively with complex systems and to improve systematic processes of care.
7. Methods of Training to be Used
 - i. The educational experience will be provided in the form of a post-residency fellowship or equivalent training experience, to be conducted at a participating member institution, qualified and in compliance with the NO Program Requirements.
 - ii. The educational experience will be outlined in the form of a curriculum meeting the minimum standards and requirements specified in the NO Program Requirements.
 - iii. The education of trainees, skills and assessment of program success, trainee evaluation, and outcome assessments will be conducted by qualified Program Director(s) and designated faculty as described in NO Program Requirements.
 - iv. All educational components of the traineeship must be directly or indirectly related to the program goals and objectives.
 - v. Trainees must be informed of the necessary requirements of the UCNS.
8. Methods of Evaluation

The overall success of the program must be documented, and records must include:

 - i. List of trainees completing the programs
 - ii. Record of trainee academic presentations, abstracts, and publications related to work performed during the training period.
 - iii. It is also recommended that the following be documented:
 - The first professional employment position or activity of the trainee immediately following completion of the training program
 - A yearly tabulation of total and accepted applicants.
 - Subsequent academic employment positions, honors, or other pertinent indicators of recognition received by trainees following the training program experience.
9. Methods of Feedback
 - i. Evaluation of the program strengths and weaknesses, based on commentary received from trainees, faculty, and directors. The Program Director, or his/her designee, should perform this analysis at least yearly.
 - ii. A summary of the evaluation should be made available to the program faculty and Program Director. The faculty and Program Director should discuss potential plans for improvement on at least an annual basis, which should be documented.
 - iii. Reasonable efforts should be made to incorporate constructive improvements when logistically possible in the subsequent years of the training program.

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