University of Pittsburgh School of Medicine

Brain and Blade: The World of Neurosurgery Mini-Elective
Fall 2018

Course Dates:	September 25, October 2, 16, 23, November 13, 20, December 4 Mondays, 6:00-8:00 PM
Maximum Students:	16
Class Year:	MS2
Course Director:	Raymond F. Sekula, Jr., MD, MBA
Contact Information:	Raymond F. Sekula, Jr., MD, MBA sekularf@upmc.edu
Registration:	Betsy Nero, Office of Medical Education betsy@medschool.pitt.edu

Description:
This seven-week course will provide a unique experience in which second-year students will be exposed to the science and practice of neurosurgical procedures concerning the brain, spinal cord, and surrounding associated structures. Students will learn key concepts and procedures from course instructors consisting of both attending neurosurgeons and residents. This setup will provide students with sources of factual and technical expertise, offer opportunities to become familiar with the department, and expose students to different career paths and focuses within neurosurgery.

Offering both didactic sessions and practical sessions, this course will allow students to learn about procedures and disorders that lie within the realm of neurological surgery. Students will attend didactics to learn about neurosurgery via lectures and case presentations, while practical sessions involving cadavers and simulation models will provide hands-on experience. Each week, a different topic will be highlighted. By the end of this course, each student will have practiced lumbar punctures, external ventricular drain placement, and basic planning of a radiosurgery procedure.

Classes in the course will cover neuroradiology, vascular neurosurgery, spinal surgery and lumbar punctures, Gamma Knife radiosurgery, and external ventricular drains. This course will also showcase the exciting neurosurgical research and innovations developed here at UPMC — students will be encouraged to develop and plan potential research projects and will be provided exposure to potential mentors.

Course Objectives:
1) Introduce students to central disciplines of neurological surgery.
2) Sharpen skills in clinical/radiological diagnosis, evaluation, and presentation.
3) Allow practice of simple practical procedures used in neurological surgery.
4) Increase student familiarity with the UPMC department of neurological surgery.
5) Facilitate involvement in research and foster interest in the subspecialty.

Requirements:
Students will be expected to prepare for and attend at least 6/7 sessions. Each student will be required to propose a research question related to neurosurgery and discuss with a faculty member or resident. While the proposal need not be carried through, it should be thought out and well developed with the goal of giving students the chance to interact with neurosurgery faculty/residents and create research opportunities.

Pre-Requisites: None

Office of Medical Education
www.omed.pitt.edu
412.648.8714

COURSE OUTLINE

Brain and Blade: The World of Neurosurgery
Mondays, 6-8 PM
9/25, 10/2, 10/16, 10/23, 11/13, 11/20, 12/4

Location:
Didactic sessions: Gamma Knife conference room, 1st floor UPMC Presbyterian
Practical sessions: Anatomy Lab, 3rd floor Scaife Hall

Course Director(s):
Raymond F. Sekula, Jr., MD, MBA

Participating Faculty: L. Dade Lunsford, MD
Bradley Gross, MD
Brian Jankowitz, MD
Johnathan Engh, MD,
Jack Schumann, PhD
Other staff: Gamma Knife Radiosurgery staff, Michael McDowell, MD and additional neurosurgery residents

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Texts/Required Reading: None except as directed by session instructors.

Session One – September 25, 2017
Course Intro & Neurosurgery/Neuroradiology Coordination
Instructor: Bradley Gross, MD and neurosurgery residents
This first session will be a workshop and lecture. A variety of clinical cases will be reviewed. For each case: first, surgeon's clinical findings and suspicions will be presented; second, radiologist's findings and role will be discussed; and third, surgeon's use of the information to plan angle and method of surgical approach will be covered. Students will reinforce their localization skills and practice presenting radiologic findings in a methodical manner. Emphasis will be placed on angiography and endovascular.

Objectives:
Students will be able to:
1) Recognize and describe features of key neurological imaging modalities such as CT, MRI (T1 vs. T2), FLAIR, DWI/ADC, MRA, CTA, angiography, and myelography.
2) Understand how neurosurgeons interpret and utilize imaging to plan operations.
3) Discuss how neurosurgeons and neuroradiologists work together in clinical practice.

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian
Student Preparation: None

Session Two – October 2, 2017
History and Practice of Stereotactic Radiosurgery
Instructor: L. Dade Lunsford, MD, Gamma Knife Radiosurgery staff
An introduction to the quickly-growing field of stereotactic radiosurgery, presented by UPMC Neurosurgery Program Director L. Dade Lunsford, MD, Lars Leksell Professor and Distinguished Professor of Neurosurgery. Dr. Lunsford brought GKRS to the United States after working with Lars Leksell, the inventor of the technique, in Sweden. This will be a unique opportunity to learn about the specific advantages offered by radiosurgery from a leading world expert in the field. There will be a practical component in which GKRS staff will teach students the radiosurgery planning process using UPMC CME course materials.

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~Session 2 continued
Objectives:
Students will:
1) Learn about the history and development of radiosurgery.
2) Understand the diseases for which GKRS is indicated and its risks vs. benefits.
3) Gain experience in the Gamma Knife planning process with software used by UPMC for its radiosurgery CME courses.

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian
Student Preparation: None

Session Three – October 16, 2017
Practical Workshop: Cerebrovascular Disorders
Instructor: Brian Jankowitz, MD, Michael McDowell, MD, Greg Weiner, MD,
This session will begin with an overview of surgically relevant disorders of vasculature of the nervous system. Normal vascular anatomy, angiography, CTA, and MRA will be reviewed. Students will learn about neurosurgical management of commonly encountered vascular illnesses: aneurysms, AVMs, dural fistulas, and strokes. The practical component will include cervical exposures with demonstration of a carotid endarterectomy as well as exposing the vagal nerve and anterior cervical spine for vagal stimulators and ACDFs, respectively. The students will expose both the Circle of Willis as well as carotid.

Objectives:
Students will be able to:
1) Describe and interpret common vascular imaging studies.
2) Name and describe common surgical approaches for cerebrovascular surgery.
3) Outline technological aspects and specific challenges of cerebrovascular surgery.
4) Expose the Circle of Willis and carotid

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian, and Anatomy Lab, 3rd floor Scaife Hall
Student Preparation: None

Session Four – October 23, 2017
Practical Workshop: Spine Pathology and Spine Surgery
Instructor: Peter Gerszten, MD, Raymond Sekula, MD
This class will cover the anatomy and radiology of the spine, with a neurosurgical slant. Concepts will be illustrated using patient cases: cervical and lumbar disc herniation, stenosis, fractures, etc. Students will learn about common spine neurosurgery techniques, approaches, and assessment. Finally, there will be hands-on practice with spinal instrumentation.

Objectives:
Students will:
1) Review spinal anatomy and radiology, with emphasis on structures encountered during surgical approaches.
2) Become familiar with common spinal pathologies and their respective surgical and non-surgical treatments, including some surgical approaches.
3) Practice with spinal instrumentation for pedicle screw fixation

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian, and Anatomy Lab, 3rd floor Scaife Hall
Student Preparation: None

Session Five – November 13, 2017
Practical Workshop: Extraventricular Drains and Lumbar Punctures
Instructor: Michael McDowell, MD, Nitin Agarwal, MD
Hands-on practice session to insert LPs and extraventricular drains. Learn about Kocher's point, proper insertion trajectory, indications, complications, and management. Cadavers will be used to provide realistic conditions for EVDs and LPs.
Objectives:
Students will:
1) Learn and understand indications, common complications, and risks of a few common procedures in neurosurgery.
2) Practice placing lumbar punctures and extraventricular drains.
Location: Anatomy Lab, 3rd floor Scaife Hall
Student Preparation: Review Youtube videos on insertion of EVDs and lumbar puncture technique

Session Six – November 20, 2017
Practical Workshop: Explore Brain Anatomy with Emphasis on Brain Tumors
Instructor: Johnathan Engh, MD, W. Christopher Newman, MD
The Neuroendoport is a small, clear tube that allows surgeons to access deep-seated brain tumors through a smaller opening than would be used in traditional surgery. This session will involve lecture, demonstrations and practice with the endoport.

Objectives:
Students will:
1) Learn about the indications for treatment with the endoport
2) Practice with endoport/endoscopic simulations

Location: Anatomy Lab, 3rd floor Scaife Hall
Student Preparation: none

Session Seven – December 4, 2017
Practical Workshop: Peripheral Nerve Disorders
Instructor: Daniel Wecht, MD, MSc, Michael McDowell, MD
Carpal tunnel syndrome is a common condition that causes pain, numbness, and a tingling sensation in the hands and fingers. It is caused by compression of the median nerve by the carpal tunnel in the wrist. This session will include both lecture and practical components. In addition to carpal tunnel decompression, students will practice peroneal nerve decompressions.

Objectives: Students will:
1) Learn about the indications, aims and potential benefits for surgery
2) Practice performing both decompressions
3) Review brachial plexus anatomy

Location: Anatomy Lab, 3rd floor Scaife Hall
Student Preparation: none