



University
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School
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Brain and Blade: The World of Neurosurgery

Mini-Elective

Fall 2019

Course Dates: Mondays, 5-7 or 6-8 PM - *One Wed session
Dates: 9/30, 10/07, 10/14, 10/21, 11/11, 11/18, 11/20*, 11/25, 12/02

Maximum Students: 16

Class Year: MS-2

Course Directors: Raymond F. Sekula, Jr., MD, MBA and

Contact Information: Raymond F. Sekula, Jr., MD, MBA
(sekularf@upmc.edu)

Registration: Betsy Nero (betsy.nero@pitt.edu)

Description:

This eight-week course will provide a unique experience in which second-year students will be exposed to the world of invasive procedures concerning the brain, spinal cord, and surrounding associated structures: neurological surgery. 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 present different paths to practicing 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 even virtual 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.

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 7/8 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

COURSE OUTLINE

Brain and Blade: The World of Neurosurgery

Mondays, 5-7 PM or 6-8 PM (TBD)

09/30, 10/07, 10/14, 10/21, 11/11, 11/18, 11/25, 12/02, 12/11

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, neurosurgery residents

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

Session One – Practical Workshop: Course Intro and Lumbar Punctures

Instructor: Raymond Sekula, MD

09/30/19

Hands-on practice session to insert. Learn about proper insertion trajectory, indications, complications, and management. Models will be used to provide realistic conditions for 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

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian

Student Preparation: Review Youtube videos on lumbar puncture technique

Session Two – History and Practice of Stereotactic Radiosurgery

Instructor: L. Dade Lunsford, MD, Gamma Knife Radiosurgery staff

10/07/2019

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.

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 – Carotid Endarterectomy

Instructor: Robert Friedlander, MD

10/14/19

This session will begin with an overview of surgically relevant disorders of the vasculature of the nervous system. The practical component will include exposure of the carotid as well as practice of a carotid endarterectomy.

Objectives: Students will:

- 1) Learn about common vascular imaging studies
- 2) Outline technological aspects and specific challenges of a carotid endarterectomy
- 3) Expose the carotid

Location: Anatomy Lab, 3rd floor Scaife Hall

Student Preparation: None

Session Four- Hemicraniectomies and EVDs

Instructor: Bradley Gross, MD and neurosurgery residents

10/21/19

Hands-on practice session to insert extraventricular drains. Learn about Kocher's point, proper insertion trajectory, indications, complications, and management. Cadavers will be used to provide realistic conditions for EVDs.

Objectives: Students will be able to:

- 1) Learn and understand indications, common complications, and risks of a few common procedures in neurosurgery.
- 2) Practice placing extraventricular drains

Location: Anatomy Lab, 3rd floor Scaife Hall

Student Preparation: None

Session Five – ACDFs and posterior fusions

Instructor: Peter Gerszten, MD

11/11/19

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 Six – Endoscopic Endonasal Approach (EEA)

Instructor: Georgios Zenonos, MD

11/18/19

This session will be a workshop and lecture. 8-10 cases that involve the endoscopic endonasal approach will be presented with videos of cases. The surgeons will discuss the relevant anatomy involved with this method of surgical approach.

Objectives: Students will:

- 1) Learn about endoscopic endonasal skull base and pituitary surgery
- 2) Apply neuroanatomy concepts to these surgical techniques

Location: Gamma Knife Conference Room, 1st floor UPMC Presbyterian

Student Preparation: none

Session Seven- Practical Workshop: Temporal Lobectomies

Instructor: Taylor Abel, MD

***11/20/19—WEDNESDAY SESSION**

Temporal lobectomies involve removal of the temporal lobe of the brain, used as a treatment option for epilepsy resistant to anticonvulsant medications. Students will practice on the cadavers to simulate a realistic condition.

Objectives: Students will:

- 1) Learn the indications and benefits of this surgery
- 2) Review anatomy of the temporal lobe and surrounding structures
- 3) Practice performing this procedure

Location: Anatomy Lab, 3rd floor Scaife Hall

Student Preparation: none

Session Eight – Practical Workshop: Chiari Decompressions

Instructor: Stephanie Greene, MD

11/25/19

This session will include both lecture and practical components to gain understanding of Chiari malformations, a common condition in the realm of pediatric neurosurgery. Treatment for Chiari I malformations in children is a decompressive procedure of the posterior fossa to allow release of pressure on the brainstem and improved CSF flow at the foramen magnum. Posterior fossa decompression classically involves suboccipital craniectomy, cervical laminectomy at the level of the tonsillar herniation, and a Y-shaped dural opening from the tonsillar herniation to the foramen magnum.

Objectives: Students will:

- 1) Learn about the four total pathologies under the umbrella of "Chiari malformations"
- 2) Practice performing decompressions with duraplasty.

Location: Anatomy Lab, 3rd floor Scaife Hall

Student Preparation: none

Session Nine – Practical Workshop: Peripheral Nerve Disorders

Instructor: Daniel Wecht, MD, MSc,

12/02/19

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. 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 this decompression
- 3) Review brachial plexus anatomy

Location: Anatomy Lab, 3rd floor Scaife Hall

Student Preparation: none