



University of Illinois, Metropolitan Group Hospitals Residency in General Surgery

Rotation Title: TRAUMA/CRITICAL CARE- ILLINOIS MASONIC MEDICAL CENTER

Level of Training: PGY I, PGY III, PGY IV

Attending in Charge of Rotation: Dr. Richard Fantus

Faculty: Dr. R. Fantus, Dr. M. Mellett, Dr. R. Rico, Dr. Mbekeani, and Dr. Trop.

Rotation Description:

Illinois Masonic Medical Center, located in the near North side, is one of Chicago's Level I Trauma Centers. The trauma service is a busy service that can, at times, be demanding. However, the efforts put forth by the resident will pay off in that the trainee will experience a good mix of blunt and penetrating trauma. The residents will take an active role in running the trauma codes while in the ER. Trauma patients, depending on their acuity, will be admitted to either the General Surgery/Trauma Wards or the Surgical ICU. The patients admitted to the floors are managed by the PGY I residents under close supervision by the in house trauma attendings. The Surgical ICU will be managed by the PGY III and IV residents, again under close supervision by the in house trauma attendings. The Surgical ICU experience will also include a number of Neurosurgical ICU patients. Accordingly, the senior residents will have opportunities to manage these patients, as well. All the intensive care patients are additionally monitored by central electronic surveillance (eSICU) by board certified intensivists.

Conferences will include Bi-monthly Trauma/Critical Care/Neurosurgical ICU morbidity and mortality conference, weekly lectures on topics in critical care, and

weekly lectures on various topics in trauma surgery. Residents are required to play an active role in participating in these lectures and conferences.

Assessment:

Monitoring of the accomplishment of the stated objectives will be performed using the following methods:

1. 360 degree evaluation: End of rotation assessment of resident's performance with respect to the stated objectives by faculty, nurses, fellow residents, medical students and patients.
2. Case Logs: Auditing of operative cases pertinent to the trauma in the Surgical Operative Log.
3. Written Examination: Performance on the annual ABSITE examination section on Trauma and Critical Care.
4. Complete the coursework and testing to obtain basic and advanced cardiac life support and fundamental critical care support certification, ATLS.
5. Technical competency in FAST (focussed assesement sonography in trauma)

Surgical Skills Advancement:

The resident will exhibit surgical performance skills based on the following guidelines:

1. Utilize the simulation lab for improvement and experience with surgical procedures, offering the opportunity for advancement along the skills lab curriculum outlined in the simulation OSAT.
2. By the end of the rotation, have completed (per necessity) the OSAT/OSCA for the following procedures:
 - a. PGY 1: ATLS, ACLS, Orientation boot camp
 - b. PGY 3: FAST, central line placement, ventilator management, percutaneous tracheostomy
 - c. PGY 4: FAST, central line placement, ventilator management, percutaneous tracheostomy, operative dictation

Competency Based Learning Objectives

Patient Care

1. Perform a complete and thorough primary and secondary survey with adjunctive studies with emphasis in elements unique to Trauma and Critical Care Patients.
2. Initiate the laboratory evaluation and any other initial diagnostic studies with an understanding of the tests to be ordered.
3. Make informed decisions about diagnostic and therapeutic interventions on Trauma/Critical Care surgery patients with the guidance of senior residents and faculty.
4. Be proficient in the preoperative preparation of Trauma patients for Trauma surgery and routine postoperative care.
5. Understand basic pathophysiology pertinent to Trauma/Critical Care patients and begin to master the skills necessary for care for the ICU patient under the guidance of the senior residents and faculty members.
6. Understand basic pathophysiology and principles of resuscitation.
7. Understand the basic indications for common radiological and interventional studies used in the care of Trauma patients such as plain chest, CT scans, angiography, etc.
8. Demonstrate the ability to effectively set priorities and coordinate the care of trauma and critical care patients.
9. Physical Examination: Exhibit proficiency in performing a systematic physical exam of the entire body with emphasis on positive findings as well as pertinent negative findings.

Medical Knowledge

Junior and Senior Residents; in the trauma bay

- 1 Strict compliance with ATLS and ACLS guidelines

- 2 Outline the surgical housestaff role on the "code team." Know how the code is run. Be familiar with all aspects of a "code yellow".
- 3 Practical application of neuroanatomy, vascular anatomy, musculoskeletal anatomy and solid organ anatomy for the assessment of traumatic injuries.

Rapid identification of life-threatening conditions:

- 1 Loss of airway
- 2 Respiratory distress
- 3 Shock
- 4 Acute MI
- 5 Dysrhythmias
- 6 PE
- 7 Aortic dissection
- 8 Tension pneumothorax/ hemothorax
- 9 Hypothermia
- 10 Stroke
- 11 Flail chest

Wound care

- 1 Irrigation
- 2 Debridement
- 3 Hemorrhage control
- 4 Suturing techniques and materials
- 5 Indications and types of Tetanus vaccination

Trauma work-up

- 1 FAST
- 2 Standard trauma x-rays
- 3 Specific x-rays (cystourethrogram, IVU)
- 4 CT scans

Indications, complications and ability to perform common procedures

- 1 Airway:
 - Endotracheal intubation
 - Cricothyrotomy
- 2 Breathing:
 - Needle decompression of the chest
 - Thoracostomy tube

- Thoracocentesis
 - ER Thoracotomy
- 3 Circulation:
- Large-bore venous access
 - Peripheral vein cutdown
 - Arterial line
 - Central line
 - Pericardiocentesis
 - PA catheter
 -
- 4 Diagnostic peritoneal lavage (DPL)

Differences between blunt and penetrating trauma

- 1 Treatment algorithms
- Stab wound
 - Gunshot wound

Shock

- 1 Identification and management of the different types of shock
- Cardiogenic
 - Hypovolemic
 - Septic
 - Anaphylactic
 - Neurogenic
 - Adrenal
 - Obstructive (cardiac tamponade, tension pneumothorax, PE)
- 2 Estimation of blood loss
- 3 Fluid resuscitation
- 4 Use of blood products
- 5 Calculation of fluid requirements

Indications for administration of common blood products/derivatives

- 1 PRBC
- 2 FFP
- 3 Platelets
- 4 Cryoprecipitate
- 5 Specific factor concentrates

- 6 DDAVP
- 7 Albumin
- 8 Colloids

Determine the indication, dosage, contraindications, and method of administration of the following medications

- 1 Morphine
- 2 Lidocaine and Procainamide
- 3 Bretylium
- 4 Propranolol
- 5 Atropine
- 6 Isoproterenol
- 7 Verapamil
- 8 Epinephrine and norepinephrine
- 9 Dopamine and dobutamine
- 10 Amrinone
- 11 Calcium
- 12 Cardiac glycosides
- 13 Nitroglycerin and nitroprusside
- 14 Furosemide
- 15 Sodium bicarbonate
- 16 Adenosine

Assess the indications, guidelines, and potential complications of the following cardiovascular drugs

- 1 Dopamine
- 2 Epinephrine
- 3 Dobutamine
- 4 Norepinephrine
- 5 Phenylephrine
- 6 Amrinone

Neurologic

- 1 Approach to the patient with closed head injury
- 2 GCS
- 3 Types of intracranial hemorrhages and their treatments
- 4 Seizure management and prophylaxis
- 5 Indications for intracranial pressure monitoring

- 6 Indications for craniotomy/craniectomy
- 7 Determination of brain death

Interventional Radiology

- 9 Identification of injuries that can be managed with the aid of IR
 - Pelvic fractures
 - Liver lacerations
 - Splenic lacerations

Operative Procedures

- 1 Indications for Exploratory Laparotomy
- 2 Indications for Thoracotomy

Burns

- 1 Estimation of percentage of body surface area involved
- 2 Calculation of fluid requirements (Parkland formula)
- 3 Indications for transfer to burn centers

Junior Resident Inpatient care

Coordinating and facilitating patient care by different providers

- 1 Consultants
- 2 Physical Therapy
- 3 Social Work
- 4 Rehabilitation
- 5 Discharge planning
- 6 Follow-up

Prophylactic measures

- 1 Hand washing
- 2 Universal Precautions
- 3 DVT risk stratification
 - o SCD boots
 - o Heparin
 - o LMWH
 - o IVC filters
- 4 GI prophylaxis
- 5 Incentive Spirometry
- 6 Decubitus ulcer prophylaxis

Pulmonary

- 1 Evaluation of airway patency/protection
- 2 Indications for intubation
- 3 Management of thoracostomy tubes and pleurovacs
- 4 Pulmonary toilet
- 5 Management of tracheostomies

Cardiovascular

- 1 Knowledge of cardiac physiology
 - Preload
 - Afterload
 - Contractility
- 2 Oxygen delivery
- 3 Oxygen consumption
- 4 Indications for blood transfusions
- 5 Coagulopathy
 - Clotting factors
 - Platelets
 - DIC

Mechanism of action, metabolism, indications and complications of common antihypertensive drugs

- 1 Beta-blockers
- 2 Alpha-blockers
- 3 Beta and Alpha blockers
- 4 Calcium channel blockers
- 5 Nitrates
- 6 ACE inhibitors
- 7 Diuretics

Renal

- 1 Acid-base balance
- 2 Correction of acid-base abnormalities
- 3 Calculation of adequate urine output
- 4 Calculation and interpretation of total fluid balance
- 5 Renal failure
- 6 Indications of hemodialysis
- 7 Electrolyte abnormalities and their corrections

8 Approach to the patient with hyponatremia

Gastrointestinal

- 1 Fluid and electrolyte losses
- 2 Type of fluid replacement
- 3 Nutrition
 - Calculation of caloric requirements
 - Calculation of protein requirements
 - Calculation of Nitrogen Balance
 - Enteral vs. parenteral nutrition
 - Types of formulations
 - Laboratory studies to aid the determination of nutritional status (albumin, transferrin, prealbumin)
- 4 Feeding tubes
 - Indications
 - Types
 - Advantages/disadvantages
- 5 Complications of parenteral nutrition
 - Hyperglycemia
 - Liver damage
 - Acalculous cholecystitis

Fever Workup

- 1 Identification of common non-infectious etiologies
- 2 Identification of common infectious etiologies
- 3 The use of Antibiotics
 - Mechanism of action, metabolism, indications and complications of common antibiotics
 - Identify the difference between prophylactic, empiric and specific treatments

Senior Surgical Resident; Intensive Care

Neurologic

Indications for intracranial pressure monitoring

Calculation of CPP

Manipulation of ICP and CPP

Physical vs. pharmacological
Sedatives, Paralytics and anti-epileptic agents
Determination of brain death
Delirium

Pulmonary

Evaluation of airway patency/protection

Indications for intubation

Ventilator management

- Modes of ventilation
- Maneuvers to manipulate oxygenation vs. ventilation

Ventilator weaning

Parameters for extubation

ABG interpretation

Indications for tracheostomies

Diagnosis and treatment of pneumonias, pulmonary edema, non-cardiogenic pulmonary edema, ALI, PE

Identification of conditions that give shunting vs. dead space

Use of bronchodilators

Pulseoximetry

Cardiovascular

1 Mechanism of action, metabolism, indications, complications and dosing of common pressor drugs

- Dopamine
- Norepinephrine
- Phenylephrine
- Dobutamine

2 PA Catheters

- Indications
- Complications
- Advantages/disadvantages
- Limitations
- Parameters measured directly
- Parameters measured indirectly or calculated
- Prediction of hemodynamic changes after manipulation of variables

Central lines and HD monitoring

- Indications

- Sites
 - Complications
 - Infection rates
- 3 Mechanism of action, metabolism, indications and complications of common antihypertensive drugs
- Beta-blockers
 - Alpha-blockers
 - Beta and Alpha blockers
 - Calcium channel blockers
 - Nitrates
 - ACE inhibitors
 - Diuretics

Renal

- Correction of acid-base abnormalities
- Indications of hemodialysis
- Electrolyte abnormalities and their corrections
- Approach to the patient with hyponatremia (DI vs SIADH)

Gastrointestinal

Nutrition

- Calculation of caloric requirements
- Calculation of protein requirements
- Calculation of Nitrogen Balance
- Enteral vs. parenteral nutrition
- Types of formulations
- Laboratory studies to aid the determination of nutritional status (albumin, transferrin, prealbumin)

Feeding tubes

- Indications
- Types
- Advantages/disadvantages

Complications of parenteral nutrition

- Hyperglycemia
- Liver damage
- Acalculous cholecystitis

Fever Workup

The use of Antibiotics

- Mechanism of action, metabolism, indications and complications of common antibiotics
- Identify the difference between prophylactic, empiric and specific treatments

Endocrine

Management of diabetes

- Insulin sliding scales
- Insulin drips

Practice-Based and Lifelong Learning

Through the various resident run conferences and self learning, the trainees must:

- 1 Understand the importance of maintaining a morbidity and mortality log
- 2 Be able to present a morbidity or mortality for the purposes of quality control and lifelong learning
- 3 Be able to synthesize and present a lecture for medical education purposes
- 4 Topic of the day in the computerized life long learning portfolio

Systems Based Practice

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

Residents are expected to:

1. Work effectively in various health care delivery settings and systems relevant to their clinical specialty
2. Coordinate patient care within the health care system relevant to their clinical specialty
3. Incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate
4. Advocate for quality patient care and optimal patient care systems;
5. Work in interprofessional teams to enhance patient safety and improve patient care quality
6. Participate in identifying system errors and implementing potential systems solutions.

Specifically, Residents should be able to:

1. Describe the criteria for predicting preoperatively the patient's need for critical care, including:
 - a. Pre-existing disease states (cardiac, pulmonary, or renal)
 - b. Operation-specific requirements for postoperative intensive care management
2. Review and interpret the relationships of physicians, nurses, and administrators in managing patients assigned to the ICU.
3. Discuss the value of an interdisciplinary approach to health care for the critically ill, elderly surgical patient. Include consideration of these groups/disciplines, working together:
 - a. Hospital administration
 - b. Nursing staff
 - c. Family-friends as caregivers
 - d. Physical therapy
 - e. Pharmacy
 - f. Religion
 - g. Social work
 - h. Surgery
4. Identify new modes of intensive care therapeutics by completing the following

activities:

- a. Predict and analyze the need for a new technology.
 - b. Formulate a plan for the institution of new technologies or therapeutics.
 - c. Critique and revise applicability of new technologies or therapeutics on a cost:benefit ratio.
5. Summarize the following moral and ethical problems encountered in the ICU:
- a. The need for organ donation and the identification of potential donors
 - b. Decisions about whom to resuscitate and to what degree
 - c. Care for the mentally incapacitated or incompetent patient
 - d. Dealing with a difficult family and futility of care
 - e. Identifying and interacting with alternate religious/cultural beliefs

Interpersonal and Communication Skills

1. Demonstrate interpersonal and communication skills that result in the effective exchange of information pertinent to patient care with patients, their families, and health professionals
2. Work effectively as a member or leader of a health care team or other professional
3. Work in a consultative role to other physicians and health professionals; and,
4. Maintain comprehensive, timely, and legible medical records, if applicable.

Professionalism

Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Residents are expected to demonstrate:

1. Compassion, integrity, and respect for others
2. Responsiveness to patient needs that supersedes self-interest
3. Respect for patient privacy and autonomy

4. Accountability to patients, society and the profession
5. Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.

READING MATERIALS:

Educational materials which will function as guides for resident education during this course include but are not limited to:

1. The SCORE General Surgery Resident Curriculum Portal accessed at <https://portal.surgicalcore.org/home>
2. Schwartz's Principles of Surgery
3. Zollinger's Atlas of Surgical Operations
4. The Surgical Core Curriculum accessed via Access Surgery through the University of Illinois-Chicago website

OUTCOMES:

Outcomes for the various goals and procedures in this curriculum will be assessed along the following standards:

1. Superior: the resident exhibits conceptual understanding beyond that which is described in this bulletin, and practice performance which is at a standard for a resident at a more advanced PGY year.
2. Above-Average: the resident has shown understanding and performance that is above what is expected for the rotation.
3. Competent: the resident exhibits conceptual understanding and practice based performance standards that are minimal, for the appropriate PGY year, for advancing towards general surgical practice.
4. In Need of Remediation: the resident has failed to grasp the basic concepts and practices necessary to advance past this rotation for the PGY year, and shows need of repeating or training augmentation.