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## **Emergency Medicine Clerkship at the Larner College of Medicine Handbook**

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**Emergency Medicine**  
**Clerkship at the Larner**  
**College of Medicine**  
**Handbook**

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Ottawa ankle and foot rule, Canadian C-Spine Rule, Canadian Head CT Rule, Nexus Rule, PECARN Rule, Glasgow Coma Score

**Standard HPI:**

Chief Complaint

Location +/- radiation

Onset/Setting

Duration/Timing

Severity

Quality/Characteristics

Better/Worse

Personal hx of sx/ Family hx of sx

Associated sx

Treatments

Social hx: Alcohol use, drug use, smoking hx, living situation, support system, employment hx

**\*\*ED critical questions:**

Last tetanus shot

Last menstrual period

Alcohol history/ Last drink/ last time used drugs

ROS:

General/Constitutional

HEENT

Cardiac

Respiratory

Gastrointestinal

Heme/Lymph

Skin

Genitourinary

Endocrine

Musculoskeletal

Neurological

Psychiatric

Allergies

**ED Presentation:**

**30 seconds with “Worst First”** differential if patient in acute need of critical care

**or 3-minute presentation if less acute**

Chief Complaint (life/limb threatening or not)

HPI (opening line should include past medical history)

Medications/Allergies

Physical Exam

Summary statement including problem assessment (still use worst first differential)

Plan

\*\*\* Family history, Surgical history, Social history, ROS should be obtained during the interview but included in the presentation ONLY if **pertinent** to the chief complaint

Unlike in Internal medicine or outpatient medicine, in emergency medicine the key is to consider the most life-threatening condition first even if it is less likely. Start with the worst possible diagnosis and work your way down to the least threatening diagnosis. Your plan should be based on ruling out the highest risk conditions.

## Abdominal Complaint:

### **Exam:**

**Inspect** for scars, rashes, striae, irregular contour, pulsations, peristalsis

### **Auscultate:**

-Listen for clicks and gurgles or absence of bowel sounds

-Listen for bruit in systole and diastole (systolic bruit is common) over the aorta and iliac arteries

**Percuss** in all four quadrants

**Palpate** in all four quadrants beginning furthest from site of pain

**Palpate** the spleen and liver

**Palpate** inguinal nodes

Assess for: **Rebound sign, Rovsing's sign, Psoas sign, Obturator sign, Murphy's sign, CVA tenderness.**

**\*\* Beware the elderly patient: SMA ischemia, aortic aneurysms, SBO, appendicitis are all surgical emergencies in the elderly.**

**\*\*Have a low threshold for CT scan in patients >65 years old.**

**\*\* In patients with pain out of proportion to exam, consider bowel ischemia→ get lactate in lab orders.**

<p><b><u>RUQ</u></b>  <b>Biliary colic</b>  <b>Acute cholecystitis</b>  <b>Acute pancreatitis</b>  Perforated duodenal ulcer  Acute hepatitis  Retrocecal Appendix  MI  Right lower lobe pneumonia  Hepatic Abscess  Herpes Zoster</p> <p><b>Next Steps: Ultrasound &amp; Liver</b> Enzyme labs</p>	<p><b><u>LUQ</u></b>  <b>Gastritis</b>  <b>Pancreatitis</b>  MI  Left lower lobe pneumonia  Splenic abscess  Splenic infarct/rupture</p> <p><b>Next Steps: Ultrasound/ CT</b></p>
<p><b><u>RLQ</u></b>  <b>Appendicitis</b>  <b>Enteritis</b>  <b>Ureteral Stone</b>  <b>Cecal diverticulitis</b>  <b>PID</b>  <b>Ovarian Cyst</b>  Ruptured ectopic  Ovarian torsion  Mesenteric adenitis  Meckel's diverticulum  Endometriosis  Mittelschmerz  Leaking aneurysm  Groin hernia</p> <p><b>Next Steps: CT/ Ultrasound</b>  (appendicitis)  Kidneys, Ureters, Bladder (KUB) radiograph  (volvulus)  Pelvic ultrasound (ovarian torsion)  Abdominal ultrasound/ CT (ruptured cyst)  HCG, UA</p>	<p><b><u>LLQ</u></b>  <b>Sigmoid diverticulitis</b>  <b>Enteritis</b>  <b>Ureteral stone</b>  <b>PID</b>  <b>Ovarian Cyst</b>  Ruptured ectopic  Ovarian torsion  Mesenteric adenitis  Meckel's Diverticulum  Endometriosis  Mittelschmerz  Leaking aneurysm  Groin hernia  Psoas abscess</p> <p><b>Next Steps: IV/Oral contrast CT Pelvic ultrasound</b> (ovarian torsion)  Abdominal ultrasound/ CT (ruptured cyst)  HCG, UA</p>



### Chest Pain:

**Evaluate: Airway, Breathing, Circulation (resuscitate as needed)**

#### **Pulmonary Exam:**

**Inspect:** Look for asymmetrical movement of the chest, depressions, or delayed movement

**Percuss:** across all lung fields

**Auscultate:** bilateral lung fields

#### **Cardiac Exam:**

**Auscultate:** Carotid arteries bilaterally, APTM regions of heart

**Palpate:** Carotid arteries, femoral pulses, radial pulses, distal pulses, PMI

**Assess:** Pitting edema, unilateral erythema, pulses

### Chest Pain Differential:

#### **5 Lethal Causes of Chest Pain (besides ACS)**

-Aortic Dissection

-Esophageal Rupture

-Pneumothorax

-Pulmonary Embolism (See appendix for WELLS criteria and PERC Rule)

-Cardiac Tamponade

**Other Causes:** -**Cardiac:** Myocardial infarction/ischemia, Pericarditis

-**Pulmonary:** Pneumonia

- **Gastrointestinal:** Esophagitis, Biliary colic, Cholecystitis, Pancreatitis

- **Other:** Musculoskeletal, Herpes Zoster

### **Next Steps: EARLY POCUS**

**Cardiac:** EKG, cardiac enzymes, Chest x-ray/ CT Angio of chest/TEE, CBC, Type and Cross

**Pulmonary:** Chest x-ray, CT Angio of chest (PE), V/Q scan, DVT ultrasound

**Gastrointestinal:** LFT's, RUQ US

**Cardiac Guidelines:**

**CHADS2-VASc Score** (risk of thromboembolic event)

**C-** Congestive Heart Failure (1)

**H-** Hypertension (1)

**A<sub>2</sub>-**Age ( $\geq 75 = 2$ )

**D-** Diabetes Mellitus (1)

**S<sub>2</sub>-**Stroke/TIA history (2)

**V-** Vascular disease (1)

**A** -Age (65-74= 1)

**Sex Category-** Female (1)

Score:

0 → no treatment or ASA

1 → Warfarin or ASA

2-6 → Warfarin with INR goal of 2-3

Valvular disease → anticoagulation

\*\*ED physicians recommended to start oral anticoagulants on Atrial Fibrillation patients at risk for complications during their ED visit.

**HEART score for Cardiac Events**

History:

- Highly suspicious (2)
- Moderately suspicious (1)
- Slightly suspicious (0)

EKG:

- Significant ST depression (2)
- Nonspecific repolarization disturbance (1)
- Normal (0)

Age:

- $\geq 65$  (2)

- 45-65 (1)
- $\leq 45$  (0)

Risk Factors: hypercholesterolemia, hypertension, diabetes mellitus, cigarette smoking, positive family history, obesity

- $\geq 3$  risk factors or history of atherosclerotic disease (2)
- 1-2 risk factors (1)
- No risk factors (0)

Troponin:

- $\geq 3X$  normal limit (+2)
- 1-3X normal limit (1)
- $\leq$  normal limit (0)

Score: likelihood of having a major adverse cardiac event within six weeks.

Total:

- 0-3  $\rightarrow$  low risk (less than 2% risk of adverse event)
- 4-6 points  $\rightarrow$  risk of cardiac event is 12-16.6% (recommend admission and further workup)
- 7-10  $\rightarrow$  high risk of cardiac event (50-65%) and admission is recommended.

### **HASBLED Score: Prediction for bleeding risk in patients with atrial fibrillation**

**H**-Hypertension

**A**-Abnormal renal or liver function

**S**-Stroke

**B**-Bleeding

**L**-Labile INR

**E**-Elderly (>65)

**Drugs or Alcohol** (Antiplatelet agents or NSAIDS, Alcohol >8 drinks/week)

**Score:**

0-1: Relatively Low Risk- Consider Anticoagulation

2-3: Moderate Risk- Anticoagulation can be considered.

4-5: High Risk- Alternatives to anticoagulation should be considered.

>5: Very High Risk

## EKG Basics: Rule of 4's

### Four Features:

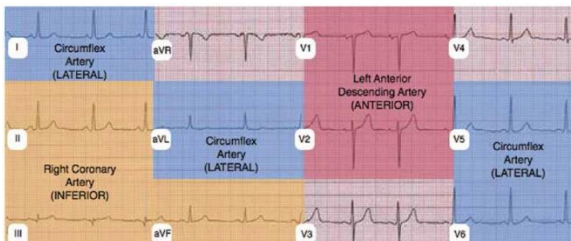
- Rate: 60-100 BPM (lower= Bradycardia, higher= Tachycardia)
- Rhythm: Sinus or not sinus?
- Axis:
- Clinical Picture/ History

### Four Waves:

- P wave (look at lead II)
- QRS complex (look for Q waves in all leads and notice if progression of QRS complex is appropriate in chest leads, check amplitude of QRS complex)
- T wave (look for T waves in all leads, note inversions, concordance/discordance with QRS complex, T wave flattening)
- U wave (absent/ present)

### Four Intervals:

- PR interval: 0.12-0.20 seconds (3-5 small squares)
- QRS width: < 0.12 seconds (3 small squares)
- ST segment (depression, elevation, sloping, flattening)
- QT Interval (> 440 ms in men or >460 ms in women = prolonged)



## Shortness of Breath:

### **Additional HPI questions:**

Assess shortness of breath when doing daily activities (walking up stairs etc.)

History of cardiac workup (EKG, Stress test, angiogram)

History of cardiac symptoms, family cardiac history

Ask about Pulmonary Embolism risk factors (prolonged immobility, recent bone fracture, OCP's, smoking history)

Review previous EKG's and previous Chest X-ray's

### **Physical Exam:**

**Evaluate: Airway, Breathing and Circulation (resuscitate as needed)**

#### **Pulmonary Exam: EARLY POCUS**

**Inspect:** Look for asymmetrical movement of the chest, depressions, or delayed movement

**Percuss:** across all lung fields

**Auscultate:** bilateral lung fields

#### **Cardiac Exam:**

**Auscultate:** Carotid arteries bilaterally, APTM regions of heart

**Palpate:** Carotid arteries, femoral pulses, radial pulses, distal pulses, PMI

**Assess:** Pitting edema in lower extremities, redness or swelling unilaterally in extremities

### **Differential Diagnosis:**

<b><u>Cardiac:</u></b> Arrythmia CHF MI PE	<b><u>Pulmonary:</u></b> Asthma Epiglottitis COPD exacerbation Pneumonia Pleural Effusion Pneumothorax
--	--

	Toxic Inhalation
<b>Trauma:</b> Hemothorax Pneumothorax Pulmonary contusion Near Drowning Aspiration Flail chest	<b>Other:</b> Anemia Angioedema Hyperventilation Hypovolemia Metabolic acidosis with respiratory compensation Sepsis

**Next Steps:**

EKG

Radiology depending on leading diagnosis or to rule out life threatening cause

Early POCUS to differentiate wheezing, Pulmonary Edema, and COPD

Cardiac monitoring and pulse oximetry

Labs depending on leading diagnosis

## **Pulmonary Embolism Approach:**

### **Pulmonary Embolism Rule-Out Criteria (PERC)**

Patients do NOT need pulmonary embolism testing if they do NOT meet any of the below criteria:

- Age  $\geq$  50
- HR  $\geq$  100
- O<sub>2</sub> saturation <95% on room air
- PMH of VTE
- Trauma or surgery in last 4 weeks
- Hemoptysis
- Exogenous Estrogen
- Unilateral leg swelling

### **WELLS Criteria (Risk stratification for Pulmonary Embolism)**

- Symptoms of DVT (3)
- PE as likely or more likely than other diagnosis (3)
- HR >100 BPM (1.5)
- Immobilization for >3 consecutive days, surgery in the previous 4 weeks (1.5)
- Previous DVT or PE (1.5)
- Hemoptysis (1.0)
- Malignancy (1.0)

Score:

0-4= PE unlikely → Check D-Dimer

Score >4 = PE likely → need V/Q Scan or CT Pulmonary Angiography to Dx

## **Rapid Sequence Intubation:**

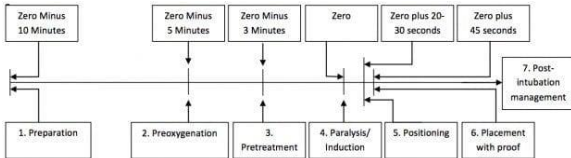
Indications for Intubation:

- Airway protection and patency
- Respiratory failure
- Minimize O<sub>2</sub> consumption and optimize O<sub>2</sub> delivery
- Unresponsive to pain, terminate seizure, neuroprotection

-Temperature control

-Safety (during transport or procedures in setting of psychosis)

Process:



Induction Agents	Neuromuscular Blockade
<ul style="list-style-type: none"><li>-Ketamine</li><li>-Etomidate</li><li>-Fentanyl</li><li>-Midazolam</li><li>-Propofol</li><li>-Thiopental</li></ul>	<ul style="list-style-type: none"><li>-Suxamethonium</li><li>-Rocuronium</li><li>-Vecuronium</li></ul>



## Seizures:

### **Additional HPI questions:**

New seizure or previously diagnoses

Witness to events: incontinence, biting tongue, gaze deviation, recovery duration, involvement of extremities, altered mental status

-Find out home medications

**Physical exam:** Full neuro exam, mental status exam, memory assessment, look for mouth lacerations/trauma

### **Differential:**

Alcohol

Arrhythmia

Drugs

Eclampsia

Febrile seizure (children)

Head trauma

Hypoglycemia

Infection

Intracranial space occupying lesion

Metabolic disturbance

Toxicity

Stroke

Subarachnoid hemorrhage

TIA

Withdrawal

**Next Steps:** Blood glucose, CBC, BMP, blood cultures (febrile), EKG, EEG if concerned about ongoing seizure activity

- **CT/MRI if new onset seizure**

-Levels of home seizure meds (Keppra, Lamictal, Lithium, Depakote)

-Keppra Loading (safe treatment)

## Syncope:

### **Additional HPI questions:**

Prior history of syncopal events

Triggering event (prolonged sun exposure, overheating, overeating, visual stimuli or fright, alcohol)

Prodrome phase: feeling unwell, dizzy, tired, tunnel vision

Seizure activity: incontinence, foaming at mouth, tongue biting, tonic movement (can have benign syncope with twitching), recovery time

Cardiac activity: exertion induced, pallor, sweating, palpitations, chest pain, cardiac history, flushing after event

Physical Exam: Cardiac exam, neuro exam, rectal exam if GI bleed suspected

### **\*\* Vasovagal syncope can be triggered by specific events:**

- Hemorrhage
- Hypotension
- Hyperventilation
- Micturition

**\*\* Carotid sinus syncope: pressure on carotid sinus causing syncope triggered by:**

- Shaving
- Turning head
- Collar tightening

## Differential Diagnosis:

<p><b>Cardiac Causes:</b>          Arrhythmia/Bradycardia/Tachycardia          Prolonged QT          Sick Sinus          Structural abnormality          Aortic Stenosis          Mitral valve prolapse          Cardiac outflow obstruction</p>	<p><b>Metabolic Causes:</b>          Hypoglycemia          Hypothyroid          Hypoxemia</p>
<p><b>Circulatory:</b>          GI Bleed          Hypovolemia          PE          Ruptured ectopic pregnancy          Ruptured aortic aneurysm</p>	<p><b>Neurological:</b>          Hyperventilation          Panic attack          Seizure          Subarachnoid hemorrhage</p>
<p><b>Other:</b>          Drug induced          B-Blockers          Calcium channel blockers          Antidepressants</p>	<p><b>Syncope +Symptoms:</b>          Syncope+ chest/back pain:  <ul style="list-style-type: none"> <li>• PE, MI, Aortic Dissection</li> </ul>         Syncope + Abdominal pain:  <ul style="list-style-type: none"> <li>• GI Bleed</li> <li>• Ruptured Ectopic</li> <li>• Ruptured abdominal aneurysm</li> </ul>         Syncope +Headache:          Subarachnoid hemorrhage</p>

**Next Steps:** EKG (arrhythmias, intervals, Brugada pattern, ARVD), bedside echo, urine pregnancy test (UPT), glucose test

**Red Flags:**

-Exertional Syncope

-Seated Syncope

-Family History of sudden death (HOCM, ARVD)

**San Francisco Rule: prediction tool for patients at high risk of serious outcome:**

**C** – History of congestive heart failure

**H** – Hematocrit < 30%

**E** – Abnormal findings on 12-lead ECG or cardiac monitoring<sup>17</sup> (new changes or non-sinus rhythm)

**S** – History of shortness of breath

**S** – Systolic blood pressure < 90 mm Hg at triage

## Weakness:

### **Additional HPI questions:**

Generalized or localized

Additional symptoms (blurry vision, headache, slurred speech, fever, chest pain)

Weight loss, medication use, social situation (especially for elderly)

### **Physical Exam:**

Cardiac exam

Neurological exam

Ambulate patient/ Orthostatics

### **Differential Diagnosis:**

<b>Cardiac:</b> Arrhythmia Infarction Ischemia	<b>Metabolic:</b> Dehydration Electrolyte Disorders Hypothyroidism Steroid myopathy
<b>Drugs and toxins:</b> Alcoholic myopathy Botulism Carbon monoxide	<b>Neurological:</b> Cerebrovascular accident Multiple sclerosis Myasthenia gravis TIA
<b>Infection:</b> Cellulitis CNS infection Pneumonia Urinary tract	<b>Other:</b> Anemia Myocardial Infarction Vertigo

**Next Steps:** EKG, Urinalysis, Chest x-ray (pneumonia exclusion), Head CT if considering CVA

## Headache:

### **Additional HPI Questions:**

Severity, onset (thunderclap vs. gradual), associated symptoms (AMS, fever, focal)

Response to treatment, treatment attempts

Immunocompromised condition

Drug use or toxin exposure

### **Physical Exam:**

Neuro Exam, mental status assessment

Look for signs of trauma

Palpate for tenderness, arterial tenderness

Visual acuity, pupil reactions, papilledema

Skin exam for rashes, oral cavity, and ears for infection sources

### **Differential Diagnosis:**

Acute glaucoma

Cluster and tension headache

Head injury

Hypertension

Meningitis/encephalitis

Space occupying lesion

Raised ICP

Sinusitis

Stroke

Subarachnoid hemorrhage

Subdural hematoma

Temporal arteritis

### **Next Steps:**

Usually no testing needed for benign migraine, ESR if arteritis suspected

CT scan for AMS, focal deficits, or acute-onset w/Nausea or vomiting

CTA within 6 hours onset for suspected ICP prior to lumbar puncture

### **Headache Red Flags:**

>50 years old

Fever

Focal Neuro changes/ vision changes

### **Altered Mental Status/Neuro Complaint:**

#### **Additional HPI questions:**

Last known normal

History of dementia, baseline function, activities of daily living (if elderly)

Medication use/ access to medications

Seizure history or recent head trauma

Recent travel or infection

#### **Physical Exam:**

CN II-XII (including visual acuity)

Motor System: tone, movement at rest (fasciculations, twitching), strength, pronator drift, ROM in extremities

Reflexes : Biceps, patella, brachioradiales, triceps, Achilles, Babinski

Sensation: Vibration, soft touch, sharp touch

Coordination: Rapid alternating movements, point to point movements (heel to shin, finger to nose), gait (heel, toe, tandem, regular gait), Romberg test



**Differential:**

**\*\*Largely depends on findings and history**

**Coma Differential: AEIOU TIPPS**

**A:** Alcohol

**E:** Epilepsy, Encephalopathy, Electrolytes, Endocrine

**I:** Insulin (hypoglycemic)

**O:** Opiates and toxins

**U:** Uremia/ metabolic causes

**T:** Trauma (head injury), Temperature (hypothermia)

**I:** Infection (meningitis)

**P:** Psychiatric, Porphyria

**P:** Poisons, Psychogenic Coma

**S:** Shock, Stroke, Space occupying lesions, Subarachnoid Hemorrhage


**Next Steps:**

Head CT/MRI if indicated by symptoms, electrolyte panel, thyroid test, BMP, Narcan, POC Glucose

## Mini-Mental State Examination (MMSE)

Patient's Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Instructions:** Score one point for each correct response within each question or activity.

Maximum Score	Patient's Score	Questions
5		"What is the year? Season? Date? Day? Month?"
5		"Where are we now? State? County? Town/city? Hospital? Floor?"
3		The examiner names three unrelated objects clearly and slowly, then the instructor asks the patient to name all three of them. The patient's response is used for scoring. The examiner repeats them until patient learns all of them, if possible.
5		"I would like you to count backward from 100 by sevens." (93, 86, 79, 72, 65, ...) Alternative: "Spell WORLD backwards." (D-L-R-O-W)
3		"Earlier I told you the names of three things. Can you tell me what those were?"
2		Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them.
1		"Repeat the phrase: 'No ifs, ands, or buts.'"
3		"Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the patient a piece of blank paper.)
1		"Please read this and do what it says." (Written instruction is "Close your eyes.")
1		"Make up and write a sentence about anything." (This sentence must contain a noun and a verb.)
1		"Please copy this picture." (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below. All 10 angles must be present and two must intersect.)  
30		TOTAL

**Score:**

≥ 24 normal

19-23 mild impairment

10-18 moderate impairment

≤ 9 severe impairment

## Shock: End organ hypoperfusion

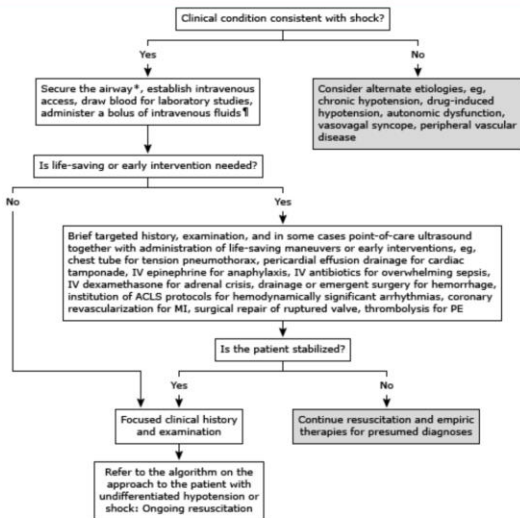
### Classifications:

<p><b><u>Distributive</u></b></p> <ul style="list-style-type: none"><li>- <b><u>Septic</u></b></li><li>- <b><u>SIRS</u></b></li><li>- <b><u>Neurogenic</u></b></li><li>- <b><u>Anaphylactic</u></b></li><li>- <b><u>Drug and toxin-induced</u></b></li><li>- <b><u>Endocrine</u></b> (Addison's, myxedema)</li></ul>	<p><b><u>Obstructive</u></b></p> <ul style="list-style-type: none"><li>- <b><u>Pulmonary Vasculature</u></b> (PE, Pulmonary Hypertension)</li><li>- <b><u>Mechanical</u></b> (<u>Tension pneumothorax</u>, <u>Pericardial tamponade</u>, <u>constrictive pericarditis</u>, <u>restrictive cardiomyopathy</u>)</li></ul>
<p><b><u>Cardiogenic</u></b></p> <ul style="list-style-type: none"><li>- <b><u>Cardiomyopathic</u></b></li><li>- <b><u>Arrhythmic</u></b></li><li>- <b><u>Mechanical</u></b> (aortic or mitral valve insufficiency or acute valvular defects, free wall, or septum deficits)</li></ul>	<p><b><u>Hypovolemic</u></b></p> <ul style="list-style-type: none"><li>- <b><u>Hemorrhagic</u></b></li><li>- <b><u>Non-hemorrhagic</u></b> (fluid loss from 3<sup>rd</sup> spacing, renal loss, skin loss)</li></ul>

### Signs of Shock:

- Hypotension
- Tachycardia
- Oliguria
- Altered mental status
- Tachypnea
- Cool, Clammy, Cyanotic skin
- Metabolic acidosis, hyperlactatemia

### Approach to the patient with undifferentiated hypotension or shock: Initial approach



The shaded boxes indicate the points in the process at which no further action needs to be taken, a diagnosis has been made, or continued resuscitation is required.

**Lab workup:**

- Serum lactate
- Renal Assessment
- LFT's
- Cardiac Enzymes and natriuretic peptides
- CBC and Differential
- Coagulation studies and D-Dimer level
- Blood gas analysis

**Imaging:**

- **FAST Exam (POCUS)**
- **Pulmonary Artery Catheterization**

**Treatment:**

Hemodynamic Support

IV Fluids

Vasopressors

Treat source/ cause of Shock (infection, hemorrhage etc.)

## Sepsis:

Risk of developing sepsis in any patient with an infection or bacteremia

Clinical Presentation: Often nonspecific signs

- Symptoms/ signs of an infection source (cough, abscess etc.)
- Arterial Hypotension
- Temperature  $< 36^{\circ}\text{C}$  or  $>38.3^{\circ}\text{C}$
- HR  $> 90$  BPM
- Tachypnea
- Signs of end-organ perfusion (warm flushed skin  $\rightarrow$  cool, mottled skin, ileus/ absent bowel sounds, AMS, obtundation, oliguria, anuria)

\*\* keep in mind how underlying medical conditions can alter presentation of symptoms as can medications interfering with shock response of body.

Immediate investigations:

- CBC with differential, LFT's, BMP, Coagulation studies, D-Dimer level
- Serum lactate
- Peripheral blood cultures from 2 different sites
- Urinalysis
- Microbiologic cultures from suspected sources
- Arterial Blood Gas
- Imaging of suspected site

### SIRS Criteria:

Temp  $> 38.0$  or  $<36$

HR  $>90$

RR  $>20$

WBC  $>12$  or  $<4$

Lactate

### sofa (quick Sequential Organ Failure Assessment) score

- Respiration rate  $\geq 22$

- Altered mentation
- Systolic Blood pressure  $\leq 100$  mmHg

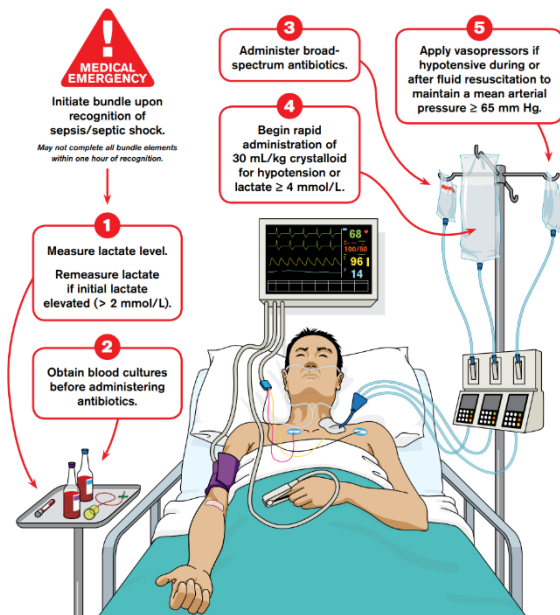
Score  $\geq 2$  associated with poor outcomes

**1 Hour protocol:** Improved mortality and morbidity when initiated within one hour of sepsis recognition

## Hour-1 Bundle

Surviving Sepsis Campaign

### Initial Resuscitation for Sepsis and Septic Shock



Bundle: [SurvivingSepsis.org/Bundle](http://SurvivingSepsis.org/Bundle)

Complete Guidelines: [SurvivingSepsis.org/Guidelines](http://SurvivingSepsis.org/Guidelines)

## NEWS2 (National Early Warning Scale)

### Respiratory Rate

- $\leq 8$  (3)
- 9-11 (1)
- 12-20 (0)
- 21-24 (2)
- $\geq 25$  (3)

### Hypercapnic respiratory failure (yes/no)

### Oxygen requirements

- Room air (0)
- Supplemental O<sub>2</sub> (2)

### Temperature

- $\leq 35.0$  (3)
- 35.1-36.0 (1)
- 36.1-38.0 (0)
- 38.1-39.0 (1)
- $\geq 39.1$  (2)

### Systolic BP

- $\leq 90$  (3)
- 91-100 (2)
- 101-110 (1)
- 111-219 (0)
- $\geq 220$  (3)

### Pulse

- $\leq 40$  (3)
- 41-50 (1)
- 51-90 (0)
- 91-100 (1)
- 111-130 (2)
- $\geq 131$  (3)

### Consciousness

- Alert (0)
- New onset confusion/ disorientation/agitation, responds to voice, responds to pain vs. unresponsive (3)



## Appendix:

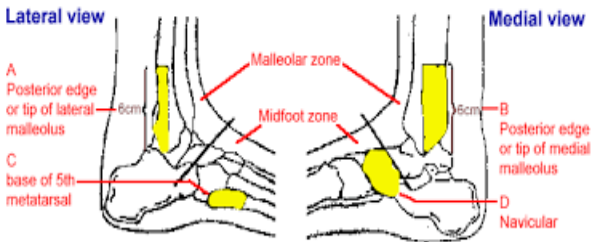
### Orthopedic rules:

Ottawa Ankle Rule: An ankle X-Ray series is only required if there is any pain in the malleolar zone and...

- Bone tenderness at the posterior edge or tip of the lateral malleolus
- **OR** Bone tenderness at the posterior edge or tip of the medial malleolus
- **OR** an inability to bear weight both immediately and in the emergency department for four steps

Ottawa Foot Rule: A foot X-Ray series is only required if there is any pain in the midfoot zone and...

- Bone tenderness at the base of the fifth metatarsal
- **OR** Bone tenderness at the navicular
- **OR** an inability to bear weight both immediately and in the emergency department for four steps



## Head and Neck Injuries: Imaging decision rules

### Canadian C-Spine Rule

- Age  $\geq 65$
- Extremity paresthesia's
- Dangerous mechanism (fall from  $> 3$  ft/5 stairs, axial load injury, high speed MCV/rollover/ejection, bicycle collision, motorized recreational vehicle)

### NEXUS Criteria

- Focal neurologic deficit present
- Midline spinal tenderness present
- Altered level of consciousness present
- Intoxication present
- Distracting injury present

### Canadian Head CT Rule:

Only applies to patients with MINOR head injury with: witnessed LOC, amnesia or witnessed disorientation, an initial GCS score  $>13$  in ED, and injury within 24 hours

High-Risk Criteria (likely to need neurological intervention)

- GCS  $< 15$  at two hours post-injury
- Suspected open or depressed skull fracture
- Any sign of basilar skull fracture (hemotympanum, Raccoon eyes, Battle's sign, CSF otorrhea or rhinorrhea)

Medium Risk Criteria (likely to have brain injury)

- Retrograde amnesia to event  $\geq 30$  minutes

- Dangerous mechanism (pedestrian struck by motor vehicle, ejection from the motor vehicle, fall from > 3 feet or > 5 stairs)

**PECARN Rule for Pediatric Head Trauma (rule out need for head CT)**

- Age < 2
  - GCS < 15, palpable skull fracture, or signs of altered mental status
  - Occipital, parietal or temporal scalp hematoma; History of LOC ≥ 5 sec; Not acting normally per parent or Severe Mechanism of Injury?
- Age ≥ 2
  - GCS < 15, palpable skull fracture, or signs of altered mental status
  - History of LOC or history of vomiting or Severe headache or Severe Mechanism of Injury?

**Glasgow Coma Score:**

**Eye Opening Response**

- Spontaneous--open with blinking at baseline 4 points
- To verbal stimuli, command, speech 3 points
- To pain only (not applied to face) 2 points
- No response 1 point

**Verbal Response**

- Oriented 5 points
- Confused conversation, but able to answer questions 4 points
- Inappropriate words 3 points
- Incomprehensible speech 2 points
- No response 1 point

**Motor Response**

- Obeys commands for movement 6 points
- Purposeful movement to painful stimulus 5 points
- Withdraws in response to pain 4 points

- Flexion in response to pain (decorticate posturing) 3 points
- Extension response in response to pain (decerebrate posturing) 2 points
- No response 1 point

### **Head Injury Classification:**

Severe Head Injury: GCS score  $\leq$  8 (**INTUBATE**)

Moderate Head Injury: GCS score 9 -12

Mild Head Injury: GCS score 13- 15

### **Modified Centor Score for Streptococcal Pharyngitis:**

Age 3-14 (+1)

Age 15-44 (0)

Age >44 (-1)

Exudate or swelling on tonsils (+1)

Tender/ Swollen anterior cervical lymph nodes (+1)

Fever >100°F or 38°C (+1)

Cough (0), Absent (+1)

Score: >4 = 50% chance of Strep → Rapid antigen detection testing, or throat culture can be considered, or empiric antibiotics can be considered

### **Glasgow-Blatchford Risk Score for Upper GI Bleeding**

BUN 18.2-22.4 (2)

BUN 22.5-28 (3)

BUN 28.1-70 (4)

$\geq$ 70.1 (6)

Hgb (men):

12-13 (1)

10-11.9 (3)

$\leq$ 9.9 (6)

Hgb (women):

10-12 (1)

$\leq$ 9.9 (6)

Systolic BP (mmHg):

100-109 (1)

90-99 (2)

<90 (3)

HR >100 bpm (1)

Melena (1)

Syncope (2)

Hepatic diseases (2)

Heart Failure (2)

Score:

0 → Discharge home

>2 → admit to hospital

>10 → admission, increased risk for morbidity

**Next Steps:**

Check ABC's, Type and Cross blood, insert 2 large bore IV's, start IV fluid, start omeprazole, consider NGT to irrigate stomach with room temperature normal saline, consult GI and admit. Emergency EGD if severe hemorrhage

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