


Clinical Assessment of the Critically Ill

An Algorithmic Approach to Improve Provider Confidence and Patient Care




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Objectives




- Explain the importance of early identification of patients at risk for life-threatening illness or injury and the importance of early intervention.
- Recognize the early signs of symptoms of critical illness.
- Discuss an algorithmic approach to the initial assessment and early treatment of the critically ill patient.

Case Example




- A 54-year-old diabetic woman with cholelithiasis and recurrent episodes of pancreatitis undergoes a laparoscopic cholecystectomy.
- On the third post-op day, she develops shortness of breath.
- A rapid response is called.
 - What history is important to obtain?
 - Which aspects of the physical exam would you concentrate on?
 - Which investigations would you order?



http://www.michigan.gov/images/mdck/0401603_191025_7.jpg

Background

- Importance of Early Identification of Critical Illness




Onset of Acute Illness, Intervention, and Cardiopulmonary Arrest

- Hillman, et. al. Duration of life-threatening antecedents prior intensive care admission. Intensive Care Med (2002) 28:1629-1634
- Studied physiological criteria of 551 patients admitted to the ICU.
 - 90 from the general ward
 - 239 from the OR
 - 222 from the ED



Onset of Acute Illness, Intervention, and Cardiopulmonary Arrest

- Compared to OR and ER admissions, patients from the general wards:
 - Were sicker upon admission to the ICU.
 - Severity of illness scales
 - APACHE II
 - SAPS
 - Had worse outcomes
 - More commonly showed serious antecedents within the 12 – 48 hours prior to admission (72% of the time)



Recognizing the Patient at Risk

- Profound life-threatening illness is easy to recognize
- Early identification more difficult.
 - Young versus elderly
 - Previously healthy versus debilitated
- Some problems are abrupt
 - Sudden cardiac death

Images from the American Heart Association



Recognizing the Patient at Risk

- Most of the time there is a balance between cardiopulmonary reserve and severity of acute disease

By Elizabeth Fugitt, 26 November 2009, 18:27 GMT
 A woman who died two days after giving birth could have been spared if her husband had been treated earlier, a coroner has concluded.

Janice Palmer died from an infection after giving birth in June last year.

Elizabeth Fugitt received a verdict of natural causes after a five-day hearing in which a coroner identified a number of mistakes in not taking the alarm.

Ms Fugitt said: "Had my husband been admitted [to hospital], it is likely that death would not have occurred."

Ms Palmer, 34, was discharged from Kingston Hospital in south-west London after giving birth despite an abnormal temperature.

West London Coroner's Court said: "It would have been better if this patient spent four days at home as her condition had not been increasing pain."

Ms Palmer was admitted to hospital with a fever and a high white cell count. Medical staff at the time did not see her doctor face-to-face that she was called to hospital suffering septicaemia - she died from a cardiac arrest.

In her report, the coroner stated Ms Fugitt had died on the morning of her doctor's visit and diagnosed the infection's onset but did not formally identify septicaemia as the cause.

'No and expectation'

She told the court that despite the failure of nearby Queen's Hospital to read the warning signs - a fever and a high white cell count - her husband had not had a GP, who accepted that there had been a "full examination".


Speaking after the hearing Ms Palmer's husband Ben said he was shocked and surprised by the ruling.

"My wife lost her life... at a time that should have been filled with joy and expectation."

"Her life has been shattered by a tragedy that I believe





EARLY SIGNS AND SYMPTOMS OF CRITICAL ILLNESS



Recognizing the Patient at Risk


- Patient with limited reserve are more likely to be susceptible to severe illness and experience greater degrees of organ system impairment.



http://www.aafp.org/online/11901248/1318_00_1.jpg

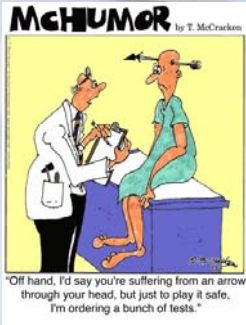



Assessing Severity of Illness



Recognizing the Patient at Risk


- Assessment
 - Background health
 - Current disease process
 - Current physiological condition






Assessing Severity

- How sick is the patient?
 - Acute illness causes predictable changes in physiology and a limited range of clinical signs
 - e.g., Bacterial Infection
 - Fever
 - Delirium
 - Shaking chills
 - Tachypnea
 - ...
 - Most important step is to recognize these changes in initiate monitoring to quantify severity of illness




Assessing Severity

- Common observations create a High Index of Suspicion
 - Confusion
 - Irritability
 - Impaired consciousness
 - Sense of impending doom
 - Dyspnea
 - Pallor
 - Diaphoresis
 - Cool extremities
- Physiologic Monitoring should ensue
 - Helps quantify severity of illness
 - Track trends / rates of deterioration
 - Directs attention to those aspects of physiology most urgently needing treatment.




Assessing Severity

- Once you have a high index of suspicion
 - Monitor vital signs frequently
 - HR, RR, BP, SpO₂, Temp, urinary output
 - Monitoring helps
 - Quantify severity of illness
 - Track rate of deterioration/improvement




Assessing Severity

- Goal of this stage of assessment
 - Recognize the problem exists
 - Maintain physiological stability
 - Pursue the cause and initiate treatment

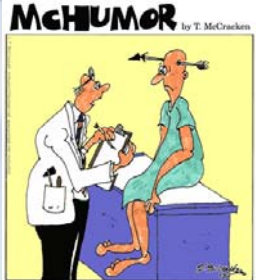


Making a Diagnosis




Making a Diagnosis

- Accurate diagnosis secondary to treatment of life-threatening physiological abnormalities
 - "What physiological problem needs to be corrected now to prevent further deterioration of the patient's condition?"
 - Supplemental oxygen
 - IV fluids
 - ...




"Off hand, I'd say you're suffering from an arrow through your head, but just to play it safe, I'm ordering a bunch of tests."




Assessing Severity


- General principles
 - Take an accurate targeted history
 - Perform a targeted physical exam
 - Organize laboratory investigations
- Good clinical skills and a disciplined approach are required in circumstances that may be frightening to others.



http://www.emsresponder.com/article/photos/1235513030955_33-1.jpg

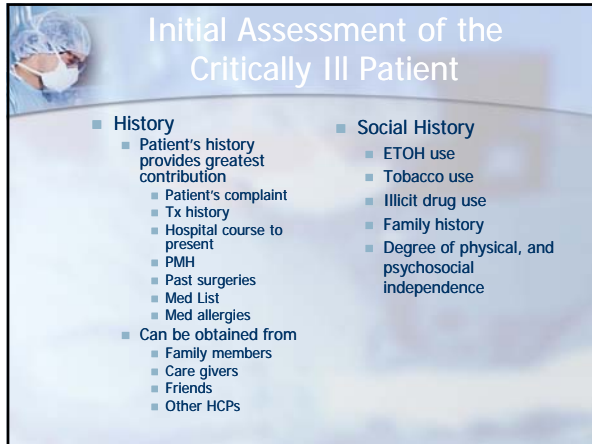


Initial Assessment of the Critically Ill Patient



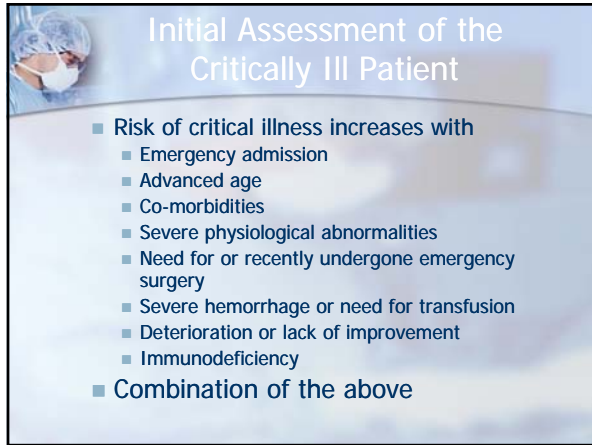
Initial Assessment of the Critically Ill Patient

- Critical illness is associated with
 - Low C.O.
 - Respiratory compromise
 - Depressed level of consciousness
- Specific symptoms will be associated with underlying condition



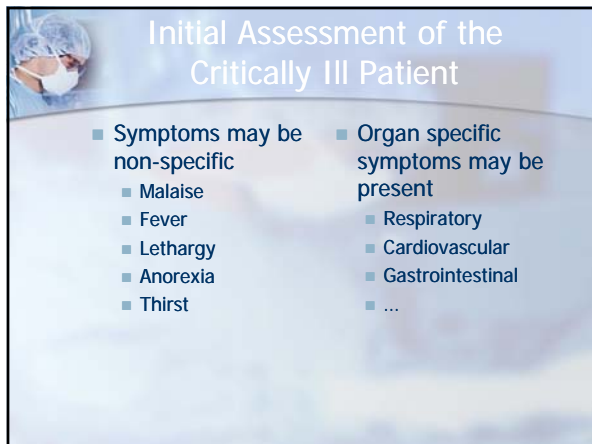
Initial Assessment of the Critically Ill Patient

- **History**
 - Patient's history provides greatest contribution
 - Patient's complaint
 - Tx history
 - Hospital course to present
 - PMH
 - Past surgeries
 - Med List
 - Med allergies
 - Can be obtained from
 - Family members
 - Care givers
 - Friends
 - Other HCPs
- **Social History**
 - ETOH use
 - Tobacco use
 - Illicit drug use
 - Family history
 - Degree of physical, and psychosocial independence




Initial Assessment of the Critically Ill Patient

- **Risk of critical illness increases with**
 - Emergency admission
 - Advanced age
 - Co-morbidities
 - Severe physiological abnormalities
 - Need for or recently undergone emergency surgery
 - Severe hemorrhage or need for transfusion
 - Deterioration or lack of improvement
 - Immunodeficiency
- **Combination of the above**




Initial Assessment of the Critically Ill Patient

- **Symptoms may be non-specific**
 - Malaise
 - Fever
 - Lethargy
 - Anorexia
 - Thirst
- **Organ specific symptoms may be present**
 - Respiratory
 - Cardiovascular
 - Gastrointestinal
 - ...




Initial Assessment of the Critically Ill Patient

- Distinguishing chronic disease from acute problems is important
 - Chronic disease is difficult to impossible to reverse and may be rate limiting




Examination (Physical and Otherwise)




Examination

- Look, Listen, and Feel
 - Initial examination must be brief, directed, and concentrated on the following
 - Airway
 - Breathing
 - Circulation
 - and Level of consciousness
 - As treatment proceeds a more detailed secondary survey should be conducted
 - Refine preliminary diagnosis
 - Assess response to initial treatment




Assessment of Airway

- **Causes of Obstruction**
 - Direct trauma, blood, vomitus, foreign body, CNS depression, infection, inflammation, laryngospasm
- **Look for**
 - Cyanosis, altered breathing rate and pattern, use of accessory muscles, tracheal tug, altered level of consciousness
- **Listen for**
 - Noisy breathing (grunting, stridor, wheezing, gurgling); silence (complete obstruction)
- **Feel for**
 - Decreased or absent flow




Assessment of Breathing

- **Causes of inadequate breathing or oxygenation**
 - Depressed respiratory drive
 - CNS depression
 - Decreased respiratory effort
 - muscle weakness, nerve/spinal damage, deconditioning, chest wall abnormalities, pain.
 - Pulmonary disorders
 - pneumothorax, aspiration, PE, CHF, flail chest, etc.)
- **Look for**
 - Cyanosis, altered breathing rate and pattern, use of accessory muscles, tracheal tug, altered level of consciousness, O₂ SAT
- **Listen for**
 - Dyspnea, inability to talk, noisy breathing, breath sounds
- **Feel for**
 - Chest symmetry, position of trachea, crepitus, abdominal distension




Assessment of Circulation

- **Causes of Inadequate Perfusion**
 - Primary (Directly involving the heart)
 - Ischemia, arrhythmias, valvular disorders, cardiomyopathy, pericardial tamponade
 - Secondary (pathology originating elsewhere)
 - Drugs, Hypoxia, electrolyte disturbances, dehydration, sepsis, acute blood loss, anemia
- **Look for**
 - Reduced peripheral perfusion (pallor, coolness), hemorrhage (obvious vs. concealed), altered level of consciousness, dyspnea, decrease urine output, JVD
- **Listen for**
 - Adventitious heart sounds
- **Feel for**
 - Central vs. peripheral pulses (assess rate, quality, regularity, symmetry)



Examination

- Hypotension
 - Late sign of cardiovascular disturbance
 - Signals failure of compensatory mechanisms
- Central and peripheral pulses
 - Rate, regularity, volume, symmetry
- Observe
 - Pallor, cyanosis, diaphoresis, jaundice, erythema, flushing



Examination

- Skin
 - Moist/Dry
 - Thin
 - Edematous
 - Bruised
 - Rash (Petechiae, hives, ...)
- Eyes
 - Abnormal pupils
 - Jaundice
- Abdomen
 - rigidity
 - Distension
 - Rebound tenderness
 - Abnormal bowel sounds
- Intrauterine or ectopic pregnancy must be considered in all women of child bearing age.
- Glasgow coma score



Chart Review and Documentation



Chart Review and Documentation

- Critically ill patients have abnormal physiology that must be documented and tracked.
- Physiological monitoring is only useful when accurate and interpreted by trained providers.
 - Values and trends

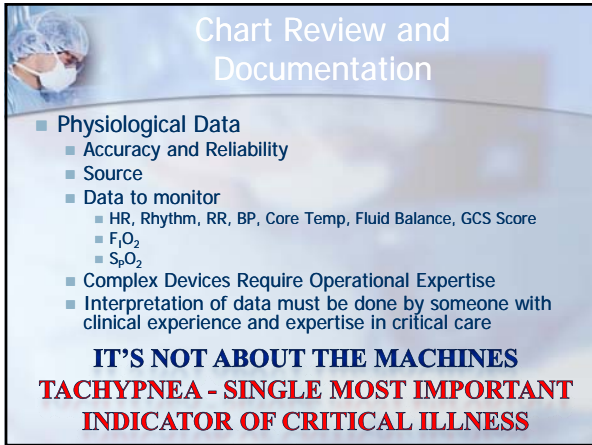


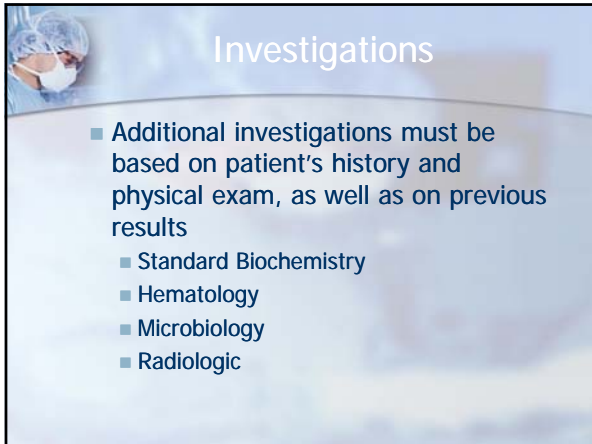
Chart Review and Documentation

- Physiological Data
 - Accuracy and Reliability
 - Source
 - Data to monitor
 - HR, Rhythm, RR, BP, Core Temp, Fluid Balance, GCS Score
 - F_iO₂
 - S_rO₂
 - Complex Devices Require Operational Expertise
 - Interpretation of data must be done by someone with clinical experience and expertise in critical care

IT'S NOT ABOUT THE MACHINES
TACHYPNEA - SINGLE MOST IMPORTANT INDICATOR OF CRITICAL ILLNESS

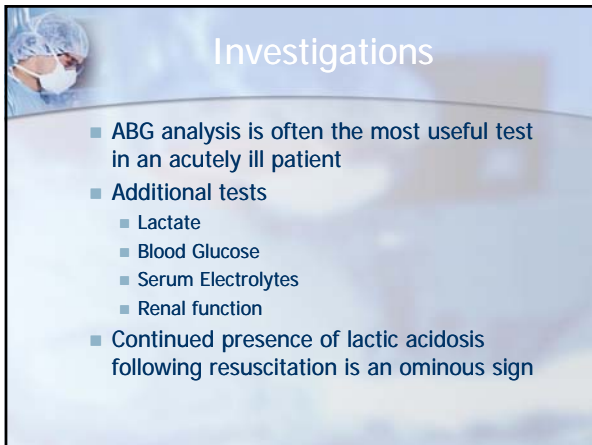


Investigations



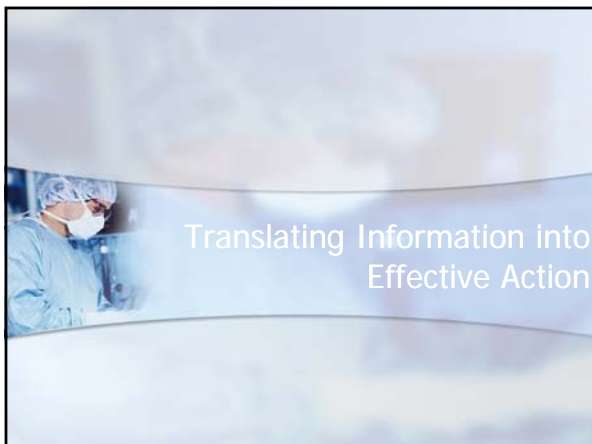
Investigations

- Additional investigations must be based on patient's history and physical exam, as well as on previous results
 - Standard Biochemistry
 - Hematology
 - Microbiology
 - Radiologic




Investigations

- ABG analysis is often the most useful test in an acutely ill patient
- Additional tests
 - Lactate
 - Blood Glucose
 - Serum Electrolytes
 - Renal function
- Continued presence of lactic acidosis following resuscitation is an ominous sign




Translating Information into Effective Action



Translating Information into Effective Action

- Always follow basic principles
 - Airway
 - Breathing
 - Circulation
- Early interventions should proceed regardless of the situation



Translating Information into Effective Action

- More experience help must be obtained if patient's condition is deteriorating and/or there is uncertainty about the diagnosis or treatment.



A primary and secondary approach is recommended

FRAMEWORK FOR ASSESSMENT OF THE CRITICALLY ILL PATIENT



Phase I – Initial Contact

First Minutes

- **Primary Survey**
 - **What is the Physiological Problem**
 - History
 - Witnesses, healthcare personnel, relatives
 - Main Symptoms
 - Trauma?
 - Operative?
 - Medications and/or Toxins
 - Examination
 - Look, Listen, Feel
 - Breathing and Oxygen
 - Circulation
 - Level of Consciousness
 - Chart review, documentation
 - HR & Rhythm
 - BP
 - RR, Pulse Ox
 - Level of consciousness
 - Investigations
 - ABG
 - Blood Glucose
 - Treatment
 - Ensure Airway and Oxygen
 - Obtain venous access
 - Assess response to immediate resuscitation
 - Call for more experienced advice and assistance



Phase II – Subsequent Review

- **Secondary Survey**
 - **What is the Underlying Cause**
 - History – More Detail
 - Present Complaint
 - FH, PMH, Chronic disease, surgery
 - Hospital Course of Stay
 - Psychosocial / physical dep.
 - Medications and/or Toxins (Allergies)
 - Ethical/Legal Issues, CODE STATUS
 - Systems Review
 - Examination
 - Respiratory System
 - Cardiovascular System
 - Abdomen/GI
 - CNS & Musculoskeletal
 - Endocrine & Hematological
 - Chart review, documentation
 - Examine medical records
 - Differential Diagnosis
 - Document current events
 - Level of consciousness
 - Investigations
 - Lab tests
 - Radiology
 - Electrocardiogram
 - Microbiology
 - Treatment
 - Refine Tx, assess response, review trends
 - Call for more experienced advice and assistance



SBAR Communication

- **Situation:** *What is happening with the patient?*
- **Background:** *What is the clinical background or context?*
- **Assessment:** *What do I think is the problem?*
- **Recommendations/Interventions:** *What do I think the patient needs?*



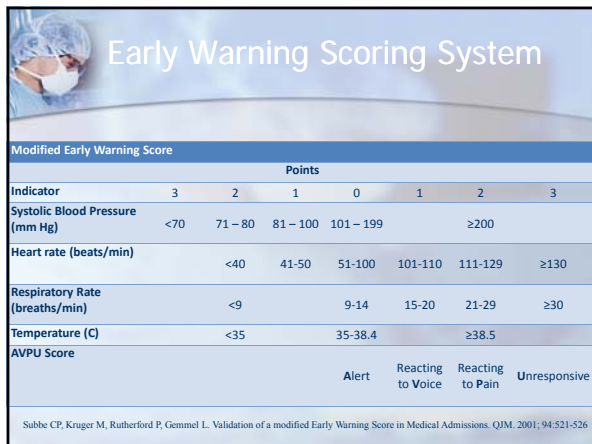
Medical Emergency Teams

- Also known as Rapid Response Teams
 - Target, identify and intervene for patients BEFORE they arrest
 - Provides staff with an additional resource if they believe their patient is compromised
 - Team members: MD, RN, RT
 - Equipment



Why call a RR?

- Should have protocols and event triggering criteria established
 - Most common are: hypoxemia, hypotension, altered mental status
 - Physiologic criteria
 - Organ-specific criteria
 - Event trigger
 - Family concern – new code H
 - Worried



Early Warning Scoring System

Modified Early Warning Score							
	Points						
Indicator	3	2	1	0	1	2	3
Systolic Blood Pressure (mm Hg)	<70	71 – 80	81 – 100	101 – 199			≥200
Heart rate (beats/min)		<40	41-50	51-100	101-110	111-129	≥130
Respiratory Rate (breaths/min)		<9		9-14	15-20	21-29	≥30
Temperature (C)		<35		35-38.4			≥38.5
AVPU Score				Alert	Reacting to Voice	Reacting to Pain	Unresponsive

Subbe CP, Kruger M, Rutherford P, Gemmel L. Validation of a modified Early Warning Score in Medical Admissions. QJM. 2001; 94:521-526

Case

What score would you give him?

- 65 y.o. male with acute renal failure, admitted 2 days ago, had first dialysis yesterday, found unresponsive by floor
Scores of 5 or greater
Predictive for increased mortality and increased admission to ICU
- Vitals: BP 100/60, HR 100, RR 12, SpO2 90% on 2L NC
- No temperature recorded since 2300 last night
- Only responds to painful stimuli

Total ≈8

MET Education

- Need frequent mock codes
- Frequent in-services for team members and other hospital staff


Suboptimal care prior to admission to a critical care unit can lead to increased mortality and an avoidable death

outcomes

- Correct any processes that need fixing


Our Original Patient

- A 54-year-old diabetic woman with cholelithiasis and recurrent episodes of pancreatitis undergoes a laparoscopic cholecystectomy.
- On the third post-op day, she develops shortness of breath.
- The surgeon asks you to see the patient.
 - What history is important to obtain?
 - Which aspects of the physical exam would you concentrate on?
 - Which investigations would you order?



Key Points

- Early identification of a patient at risk is essential for preventing or minimizing critical illness
- Clinical manifestations of impending critical illness are often non-specific
- Resuscitation and physiological stabilization will often precede definitive diagnosis and treatment of the underlying cause.
- A detailed history is essential
- Clinical and laboratory monitoring of a patient's response to treatment is essential



Thank You
