

Assessment of the Seriously Ill Patient

OBJECTIVES

1. Understand the importance of early identification of patients at risk of life-threatening illness.
2. Recognize early signs of critical illness.
3. Discuss the initial assessment of the critically ill patient.

I. INTRODUCTION

Prevention is better than cure. Early identification of patients at risk of life-threatening illness makes it easier to manage them appropriately and prevent further deterioration. Many clinical problems can be managed with simple but timely measures such as oxygen, intravenous fluids, respiratory therapy interventions, or effective analgesia. Early identification also provides time for investigations and definitive treatment or discussions about resuscitation decisions and treatment options. The longer the interval between onset of an acute illness and appropriate intervention, the more likely it is that the patient's condition will deteriorate, in many instances progressing to cardiopulmonary arrest. Several studies demonstrate that physiological deterioration precedes the majority of cardiopulmonary arrests by many hours, suggesting that prompt treatment during this period could prevent the need for resuscitation. The purpose of this chapter is to describe the general principles involved in recognizing and assessing acutely ill patients.

II. RECOGNIZING THE PATIENT AT RISK

Identifying the fact that a patient is already seriously ill is not usually difficult. However, recognition of this type of patient in the early stages of a disease process may be more challenging. Young and otherwise fit patients can disguise an acute illness better than elderly individuals with impaired cardiopulmonary function. The immunosuppressed or debilitated patient may not mount a vigorous and clinically obvious inflammatory response. Some diseases do not evolve with progressively worsening and easily detectable changes in physiology, but present as an abrupt change of state (e.g., cardiac arrhythmias). In most circumstances, a balance exists between the patient's reserve and the acute disease. Patients with limited reserve are more likely to be susceptible to severe illness and to experience greater degrees of organ-system impairment. Identifying patients at risk therefore involves an assessment of background health and the type of disease, as well as the current acute physiology.

A. Assessing Severity

Answering the question "How sick is this patient?" requires measurement of specific physiological variables. Acute illness generally produces predictable changes in physiology that are associated with a limited range of clinical signs. The most important step is to recognize those signs and to initiate monitoring of physiology in order to quantify the severity of disease and take appropriate action. Sick patients may present with confusion, irritability, or impaired consciousness. They may appear breathless and may demonstrate signs of a sympathetic response, such as pallor, sweating, or cool extremities. Symptoms may be nonspecific (e.g., nausea, faintness), or they may identify a particular organ system

(e.g., localized pain). A high index of suspicion is therefore required to start the measurement of vital signs – pulse rate, blood pressure, respiratory rate, oxygenation, temperature, and urine output (see Chapter 6). Clinical monitoring helps to quantify severity, tracks trends and rate of deterioration, and directs attention to those aspects of physiology that most urgently need treatment. The goal at this stage of assessment is to recognize that a problem exists and to maintain physiological stability while obtaining help.

B. Making a Diagnosis

Making an accurate diagnosis in the acutely ill patient often must take second place to treating life-threatening physiological abnormalities. Time for the leisurely pursuit of a differential diagnosis is not likely to be available. However, an accurate diagnosis is essential for refining treatment options once physiological stability is assured, and the process of stabilization should always be accompanied by the question “what is causing the problem?” The general principles of taking an accurate history, performing a brief, directed clinical examination followed by a “secondary survey,” and organizing laboratory investigations are fundamentally important. Good clinical skills and a disciplined approach in circumstances that may be frightening for inexperienced staff are required to accomplish these tasks.

III. INITIAL ASSESSMENT OF THE CRITICALLY ILL PATIENT

A framework for assessing the acutely ill patient is provided in Table 1-1 and discussed below. Further information on specific issues and more detailed and specific information on treatment can be found in the appropriate chapter of this text.

A. History

The patient’s history provides the greatest contribution to diagnosis. It may be necessary to obtain the current history and information about background health from the family, caregiver, friends or neighbors, and health care providers such as the family practitioner. The risk of critical illness is increased in patients with the following characteristics:

- Newly admitted as emergencies
- Elderly
- Having severe co-existing chronic illness
- Having severe physiological abnormalities
- Requiring or having undergone major surgery, especially as an emergency
- Having a severe hemorrhage or requiring a massive blood transfusion
- Exhibiting deterioration or lack of improvement
- A combination of these problems.

A complete history includes the present complaint, treatment to date, past illnesses and operations, current medications, and allergies. A social and family history, including the degree of physical and psychosocial independence, is essential and often forgotten. The history of the present complaint must include a brief systems review that should be replicated in the examination that follows.

Untreated serious illness is often associated with a low cardiac output, respiratory compromise, and/or a depressed level of consciousness. Generally, specific symptoms will be associated with the underlying

condition. Patients may complain of nonspecific symptoms such as malaise, fever, lethargy, anorexia, or thirst. Organ-specific symptoms may direct attention to the respiratory, cardiovascular, or gastrointestinal systems. Distinguishing acute from chronic disease is important at this point, as chronic conditions may be difficult to reverse and may act as rate-limiting factors during the recovery phase of critical illness.

Table 1-1. Framework for assessing the acutely ill patient

	PHASE I Initial contact – first minutes (Primary survey) “What is the main physiological problem?”	PHASE II Subsequent reviews (Secondary survey) “What is the underlying cause?”
History	<i>Main features of circumstances and environment</i> <ul style="list-style-type: none"> • Witnesses, healthcare personnel, relatives • Main symptoms: pain, dyspnea, faintness • Trauma? • Operative or nonoperative? • Medications/toxins? 	<i>More detailed information</i> <ul style="list-style-type: none"> • Present complaint • Past history, chronic diseases, operations • Psychosocial and physical independence • Medications and allergies • Family history • Ethical or legal issues • Systems review
Examination	<i>Look; Listen; Feel</i> <ul style="list-style-type: none"> • Airway • Breathing and oxygenation • Circulation • Level of consciousness 	<i>Structured review of organ systems</i> <ul style="list-style-type: none"> • Respiratory • Cardiovascular • Abdomen and genitourinary tract • Central nervous, musculoskeletal systems • Endocrine, hematological systems
Chart review, documentation	<i>Essential physiology, vital signs</i> <ul style="list-style-type: none"> • Heart rate, rhythm • Blood pressure • Respiratory rate; pulse oximetry • Level of consciousness 	<i>Case records and note keeping</i> <ul style="list-style-type: none"> • Examine medical records if available • Formulate specific diagnosis • Document current events
Investigations	<ul style="list-style-type: none"> • Blood gas analysis (use venous if arterial access difficult) • Blood glucose 	<ul style="list-style-type: none"> • Laboratory blood tests • Radiology • Electrocardiogram • Microbiology
Treatment	<i>Proceeds in parallel with the above</i> <ul style="list-style-type: none"> • Oxygen • Intravenous access ± fluids • Assess response to immediate resuscitation • CALL FOR MORE EXPERIENCED ADVICE AND ASSISTANCE 	<i>Refine treatment, assess responses, review trends</i> <ul style="list-style-type: none"> • Provide specific organ system support as required • Choose most appropriate site for care • Obtain specialist advice/assistance

B. Examination

Look, listen, and feel. The patient must be fully exposed for a complete examination. The initial examination must be brief and directed and should concentrate on the basic elements – level of consciousness, airway, breathing, and circulation. As treatment proceeds, a secondary and more detailed

survey should be conducted to refine the preliminary diagnosis and assess the response to initial treatment. A full examination must be performed at some point and will be guided by the history and other findings.

In addition to the ABCs, a quick external examination should look for pallor, cyanosis, diaphoresis, jaundice, erythema, or flushing. The skin may be dry, thin, edematous, or bruised. Fingernails may be clubbed or may show splinter hemorrhages. A ruddy complexion and nose may indicate a heavy drinker, and nicotine-stained fingers, a heavy smoker. The eyes may reveal abnormal pupils or signs of hyperlipidemia, anemia, or jaundice. The patient may be alert, agitated, somnolent, asleep, or obtunded.

The airway and respiratory system should be assessed first (Table 1-2). Observe the patient's mouth and chest. There may be obvious signs suggesting airway obstruction, such as vomitus, blood, or a foreign body. The respiratory rate and the pattern and use of accessory muscles of respiration will help to confirm apnea, airway obstruction, and respiratory distress (see Chapter 2). The respiratory rate must be documented. *Tachypnea is the single most important indicator of critical illness.* Although tachypnea may result from pain or anxiety, it may also indicate pulmonary disease, metabolic conditions, or infection. Look for cyanosis, paradoxical respiration, equality and depth of respiration, use of accessory muscles, and tracheal tug. A large increase in the depth of respiration (Kussmaul breathing) may indicate a metabolic acidosis. Periodic breathing (Cheyne-Stokes) usually indicates severe brainstem or cardiac dysfunction. Agitation and confusion may result from hypoxemia, and hypercapnia will usually depress the level of consciousness. Low oxygen saturation can be detected with a pulse oximeter, but this assessment may be unreliable if the patient is hypovolemic or hypotensive. Noisy breathing (e.g., grunting, stridor, wheezing, gurgling) indicates partial airway obstruction. Complete obstruction will result in silence.

Inadequate circulation may result from primary abnormalities of the cardiovascular system or secondary abnormalities caused by metabolic disturbances, infection, etc. (Table 1-3). Pulses, central and peripheral, should be assessed for rate, volume, regularity, and symmetry. *The most common cardiovascular disturbance in the acutely ill patient is hypotension caused by hypovolemia or sepsis, or both.* Peripheral pulses will be weak and thready in a hypovolemic patient or one with a low cardiac output. A bounding pulse suggests a hyperdynamic circulation. An irregularly irregular rhythm usually signifies atrial fibrillation. With ventricular premature beats, a compensatory pause usually follows the premature beat immediately, and the next beat often has a larger pulse volume. Pulsus paradoxus occurs when deep inspiration noticeably decreases the pulse volume; this finding may indicate constrictive pericarditis, cardiac tamponade, or severe asthma. The character and location of the apex beat may suggest left ventricular hypertrophy, heart failure, or mitral or aortic regurgitation. Turbulent flow through a narrow channel, such as a stenotic valve or septal defect, may produce a palpable thrill.

Palpation of the abdomen is an essential part of the examination but is often overlooked. Identify areas of tenderness, masses, and the size and position of the major internal organs. In women of childbearing age, intrauterine or ectopic pregnancy must be considered. The flanks and back must also be examined, provided that the patient can be safely turned onto the side.

The Glasgow Coma Score (GCS) should be recorded during the initial assessment of central nervous system function and assessment of movement in all limbs. Pupillary size and reaction should be documented, and a more detailed assessment of central and peripheral sensory and motor function should be undertaken when time permits.

Table 1-2. Assessment of airway and breathing

<i>AIRWAY</i>	
Causes of obstruction	Blood, vomitus, foreign body, CNS depression, direct trauma, infection, inflammation, and laryngospasm
LOOK for	Cyanosis, altered respiratory pattern and rate, use of accessory muscles, tracheal tug, altered level of consciousness
LISTEN for	Noisy breathing (grunting, stridor, wheezing, gurgling). Complete obstruction results in silence.
FEEL for	Decreased or absent air flow
<i>BREATHING</i>	
Causes of inadequate breathing	
Depressed respiratory drive:	e.g., CNS depression
Decreased respiratory effort:	e.g., muscle weakness, nerve/spinal cord damage, debilitation, chest wall abnormalities, pain
Pulmonary disorders:	e.g., pneumo/hemothorax, aspiration, chronic obstructive pulmonary disease, asthma, pulmonary embolus, lung contusion, acute lung injury, acute respiratory distress syndrome, pulmonary edema
LOOK for	Cyanosis, altered respiratory pattern and rate, equality and depth of respiration, sweating, elevated jugular venous pressure, use of accessory muscles, tracheal tug, altered level of consciousness, oxygen saturation
LISTEN for	Dyspnea, inability to talk, noisy breathing, percussion, auscultation
FEEL for	Symmetry and extent of chest movements, position of trachea, crepitus, abdominal distension

Table 1-3. Assessment of the circulation

Causes of circulatory inadequacy	
	<ul style="list-style-type: none"> • <i>Primary - directly involving the heart</i> Ischemia, conduction defects, valvular disorders, cardiomyopathy • <i>Secondary - pathology originating elsewhere</i> Drugs, hypoxia, electrolyte disturbances, sepsis
LOOK for	Reduced peripheral perfusion (pallor, coolness), hemorrhage (obvious or concealed), altered level of consciousness, dyspnea, decreased urine output
LISTEN for	Additional or altered heart sounds, carotid bruits
FEEL for	Precordial cardiac pulsation, pulses (central and peripheral) assessing rate, quality, regularity, symmetry

C. Chart Review and Documentation

Critically ill patients have abnormal physiology, and this must be documented. The level of monitoring depends on the site of care and the level of expertise of the healthcare provider. Monitoring is not therapeutic, and is only useful when interpreted by trained individuals. The recorded physiological values and their changes over time provide invaluable information. Good, accurate, and frequent charting is an essential part of managing these patients. Be aware that what is recorded on the chart may be misleading. For example, is the temperature peripheral or central? If central, are the site and technique for measurement reliable? An accurate and reproducible central venous pressure (CVP) measurement depends upon patient position and equipment calibration and zeroing. The medication record will give invaluable information about drugs prescribed and administered.

The respiratory rate, heart rate, and GCS are particularly useful. Routine charting should also include the blood pressure, core temperature, and fluid balance. The fluid balance may include loss from a nasogastric tube and drains. An accurate measure of urine output is essential in any critically ill patient and almost always requires an indwelling catheter. The inspired oxygen concentration should be recorded for any patient receiving oxygen, and if the patient is monitored with a pulse oximeter, oxygen saturation should be charted. In high dependency or intensive care settings, there may be recordings of central venous and other cardiac pressures, cardiac output, and mixed venous saturation if central venous and pulmonary artery catheters have been placed. The more complex the monitoring modality, the greater the importance of expert clinical interpretation.

D. Investigations

Additional investigations should be based on the findings of the history and examination. Previous results should be reviewed and appropriate tests ordered. Standard biochemistry, hematology, microbiology, and radiologic tests should be performed as indicated. The single most useful evaluation in an acutely ill patient is an arterial blood gas analysis. From this test, information can be obtained about the arterial tension of oxygen and carbon dioxide (which must be interpreted in relation to administered oxygen and ventilatory status) and hydrogen ion concentration or pH. Often, additional tests such as lactate, blood glucose, serum electrolytes, and renal function can be obtained from the same sample. A venous sample can be used if arterial blood cannot be obtained, as this will provide all of the above information except arterial oxygenation. *The presence of a metabolic acidosis is one of the most important indicators of critical illness.*

E. Translating Information into Effective Action

Table 1-1 provides a framework for action, based on ensuring physiological safety as the first step, and then proceeding to treatment of the underlying cause. The basic principles of resuscitation include ensuring a patent airway, supplemental oxygen, and restoration of circulating volume in the severely ill patient. Establishing venous access allows simultaneous blood sampling for laboratory tests. While performing these assessments and interventions, the context of the clinical presentation should direct attention to likely diagnoses and potential treatments. For example, trauma, the postoperative situation, presence of chronic illness, and age tend to suggest different possible pathologies. The history, examination, and laboratory tests should be directed not only at clarifying the diagnosis, but also at determining the degree of physiological reserve of the patient, in particular limitation of respiratory, cardiac, or renal function. Young and previously fit patients may disguise the external features of critical illness more effectively than the elderly or chronically sick, and an acute deterioration may therefore seem

to occur more abruptly. Thus it is particularly important to assess trends in response to treatment, partly to identify further deterioration, and partly because response or failure of response will help to clarify the diagnosis. More experienced help must be obtained if the patient's condition is deteriorating, and if there is uncertainty about the diagnosis or treatment.

KEY POINTS: ASSESSMENT OF THE CRITICALLY ILL PATIENT

1. Early identification of patients at risk is essential for preventing or minimizing critical illness.
2. The features of impending critical illness are often nonspecific. Tachypnea is one of the most important predictors of risk and signals the need for more detailed monitoring and investigation.
3. Resuscitation and physiological stabilization will often precede definitive diagnosis and treatment of the underlying cause.
4. A detailed history is essential for making an accurate diagnosis, determining the patient's physiological reserve, and establishing the patient's treatment preferences.
5. Clinical and laboratory monitoring of the response to treatment is essential.

SUGGESTED READINGS

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