



**Department of Anesthesia
Techniques**



Recognition and management of the seriously ill patient

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The aims of assessment of seriously ill patient

- 1) Identify the physiological abnormalities.
- 2) Identify the most appropriate way to correct those abnormalities.
- 3) Diagnose the underlying problem.

- The process involves:

taking a full history

examination

investigation

The difference is due to the **urgency** with which treatment needs to be started .

- There is rarely time to take a full history or carry out a very detailed examination before initiating treatment.

- Tasks that are typically carried out **sequentially** often have to be carried out in parallel with history taking, examination and initial resuscitation often occurring **simultaneously**.
- Often it is necessary to restrict oneself to only the information required to guide the **next treatment decision** and to fill in missing components of history,
- examination and investigation after treatment has been initiated on a "**best guess**" basis.
- The working diagnosis needs to be **repeatedly reassessed** as more information becomes available and on the basis of response to treatment.

1) Initial assessment

The first step in assessing a seriously ill patient is to **estimate how ill the patient is** and how much time is available for assessment and investigation before initiating treatment.

Warning signs of a severely ill patient

Parameter	Values
Blood pressure	Systolic <90 or mean<70mmHg
Heart rate	>150 or <50 bpm
Respiratory rate	>30 or <8 breaths/min
Conscious level	GCS<12
Oliguria	<0.5 ml/kg/h
Sodium	<120 mmol/l or >150 mmol/l
Potassium	<2.5 mmol/l or >6 mmol/l
pH	>7.2
Bicarbonate	<18 mmol/l
Worried nurse	Concerned experienced nurse

- A patient with any of these features should be assessed urgently By an experienced physician

Components of the initial assessment

- Key components of the Initial assessment are assessment of
airway patency
breathing
circulation.

- The **severity of illness** is often judged by assessing the compensatory response to the primary abnormality.

In most cases This compensation involves **activation of the sympathetic nervous system**, and the magnitude of the sympathetic response gives an indication of the severity of illness.

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in the **pre-terminal patient** the compensatory response is exhausted and the patient may be **bradycardiac** and **bradypnic**.

- If the patient is already receiving supportive therapy it is important to note the **intensity of such therapy**.
- **For example** a patient with an arterial oxygen saturation of 92% on 2 L/min of oxygen through a nasal cannula is much less ill than a similar patient with a saturation of 92% on 15 L/min of oxygen.

Assess intensity of support

- **FiO₂** needed to maintain saturation above 90%
- **Intensity of ventilatory support**—PEEP, MV

Dose of vasopressor & inotrope needed to maintain mean arterial pressure above 60 mmHg

- **volume support** to keep adequate urine output
- **blood transfusion** to keep hemoglobin above 8 g/dL
- **sedation** in agitated patients
- **dialysis** support or Worsening biochemistry

Seek help for specific problems

- **Cardiologist**

 - complete heart block

 - acute coronary syndrome

 - cardiogenic shock

 - intra-aortic balloon pump insertion

 - pericardial tamponade

 - massive pulmonary embolism

- **Nephrologist**—dialysis

- **Neurologist**—acute stroke or undiagnosed depressed conscious level

- **Neurosurgeon**—intracranial hemorrhage, head injury, severe cerebral edema

- **Trauma surgeon**—polytrauma, abdominal trauma, thoracic trauma, compartment syndrome

- **Obstetrician**—ruptured ectopic pregnancy, postpartum hemorrhage

construct a working diagnosis and plan for further management

- After initial resuscitation, assessment, investigation, and response, a differential diagnosis should be arrived at Reassess the patient frequently to modify initial plan if needed.

Brief relatives

- After initial resuscitation, assessment, investigation, and response, the family should be briefed about the :
 - ✓ likely diagnosis
 - ✓ treatment plan
 - ✓ approximate prognostication
 - ✓ approximate duration of stay
 - ✓ consent should be taken for any invasive procedures.

Airway

- Assessment of airway patency is vital. **Look, listen and feel** for evidence of airway obstruction.
- **Look** for tachycardia, tachypnea, sweating, use of accessory muscles, drooling (epiglottitis), see-saw thoracoabdominal (paradoxical chest wall) movement and recession.
- Remember that chest movement can occur even in the presence of complete airway obstruction.
- **Listen** for gurgling or stridor (note that stridor may be absent, particularly in severe cases and the presence of a normal oxygen saturation does not exclude a compromised airway).

- **Hypercarbia** and a resulting decrease in conscious level indicate that the compensatory mechanisms are exhausted. Bradycardia indicates impending **cardiorespiratory arrest**.

- **Inspiratory stridor** is a rasping sound heard during inspiration and is a result of obstruction above or involving the larynx

- **Wheeze** is usually heard on expiration as a result of the lower airways collapsing

- **Gurgling** occur when secretion or liquid is present in the upper airways

- **Snoring** occurs during partial occlusion of the oropharynx due to relaxation of the oropharyngeal muscles and tongue

Breathing

✓ Effectiveness of Breathing

✓ Work of Breathing

- Cyanosis, hypoxia ?
- Rate, depth, symmetry of chest movement ?

Use of accessory muscles?

- Palpate chest wall for structural integrity
- Chest injury / flail / pneumothoraces
- O₂ therapy / Assisted ventilation
- Manage injury / pneumothoraces

- **marked tachypnea** is a useful marker of a severely ill patient, regardless of whether the patient has respiratory failure.
- Detection of **cyanosis** is often difficult and tachypnea is usually a more obvious, although non-specific sign of a problem.
- As with airway problems the severity of the problem is often best judged from the magnitude of the compensatory response.
- Pulse oximetry is a useful bedside test investigation, but it should be noted that **significant desaturation** is often a late feature of ventilatory abnormalities.
- Absence of a defect in oxygenation in a breathless patient should also prompt a search for **non-respiratory causes** such as metabolic acidosis and sepsis.

Circulation

- Quick head to toe survey to note and control bleeding
- Skin color, moisture, temperature
- Pulse quality, rate, regularity, volume
- Blood pressure
- Capillary refill (should be < 2 seconds)
- Chest Compressions / Positioning etc.
- Rapid initial assessment of circulatory status should concentrate on **tissue perfusion** and not just blood pressure.
- As a result of compensatory mechanisms, hypotension is a late feature of cardiovascular dysfunction.

- Evidence of **inadequate tissue perfusion** (decreased conscious level, skin mottling, cold peripheries, poor capillary refill, oliguria and metabolic acidosis) indicates a **severely ill patient**, even in the absence of hypotension.
- An indication of the type of shock (cardiogenic, distributive etc.) can be obtained by feeling the pulse and the peripheries and examining the jugular venous pressure.

Conscious state

- A marked reduction in conscious level indicates either that **compensatory homeostatic** mechanisms have been overwhelmed or **severe neurological disease**.
- In either case, the patient is severely ill and requires **urgent supportive therapy**.
- The pupillary response should be checked frequently.

Investigations

- These should not delay initial resuscitation but can be carried out while the patient is being resuscitated.
- Useful screening investigations include :
pulse oximetry, arterial blood gases, electrolytes, renal function tests, complete blood count and clotting.

2) Subsequent assessment

Part or all of this assessment may be carried out before initiating any treatment in less severely ill patients.

History

- Often it is not possible to take a full history from the patient and therefore other sources of information became more important.
- These include **medical, nursing and ambulance staff, relatives, and notes and charts**. As well as revealing the history the notes and charts may give useful information on the rate of deterioration.

In post-operative patients the **operation note** may be particularly helpful.

- The history will reveal whether the patient falls into a group that is difficult to assess.

These include :

1. Young adults
2. Elderly or immunocompromised.
3. Trauma patients

Groups of patients who are difficult to assess

- The history is invaluable in the assessment of physiological reserve.
- An assessment of cardiopulmonary reserve can be obtained from the patient exercise tolerance.
- In assessing exercise tolerance it is Important to enquire about both **distance covered and speed**. For example there is a considerable difference in exercise tolerance between the patient who can walk up one flight of stairs at a normal pace and the patient who takes 5 minutes to walk up one flight of stairs.

Examination

- While the aim of the initial examination is to **detect life threatening physiological abnormalities** and to **determine appropriate supportive therapy**, the focus of subsequent examination is to determine the **underlying cause**, in order to determine the **appropriate definitive therapy**.
- Examination should be repeated frequently to determine the response to therapy and because the clinical signs may change.

Group	Difficulty
Young adults	Compensatory mechanisms in young patients tend to mask signs of severe illness until the illness is very advanced. Significant physiological abnormalities in these patients therefore indicate very severe illness.
Elderly or immunocompromised patients	The inflammatory response may be damped, again hiding signs of severe illness. In addition the physiological reserve of these patients is often severely compromised
Trauma patients	Notoriously difficult to assess due the multitude of possible Injuries and the effect of distracting pain making injuries difficult to localize In these patients a detailed history of the mechanism of Injury provides vital clues to likely injuries.

Investigations

- In addition to the Investigations carried out during the initial assessment,
 - ✓ Liver function tests,
 - ✓ calcium phosphate, magnesium estimation
 - ✓ a chest X-rayare useful screening tests.

Other investigations should be ordered on the basis of the history and clinical findings.

- If advanced radiological imaging is indicated, consideration should be given to ultrasound scanning because of the low risk of adverse effects and because it may obviate the need to transport the patient to the radiology department.

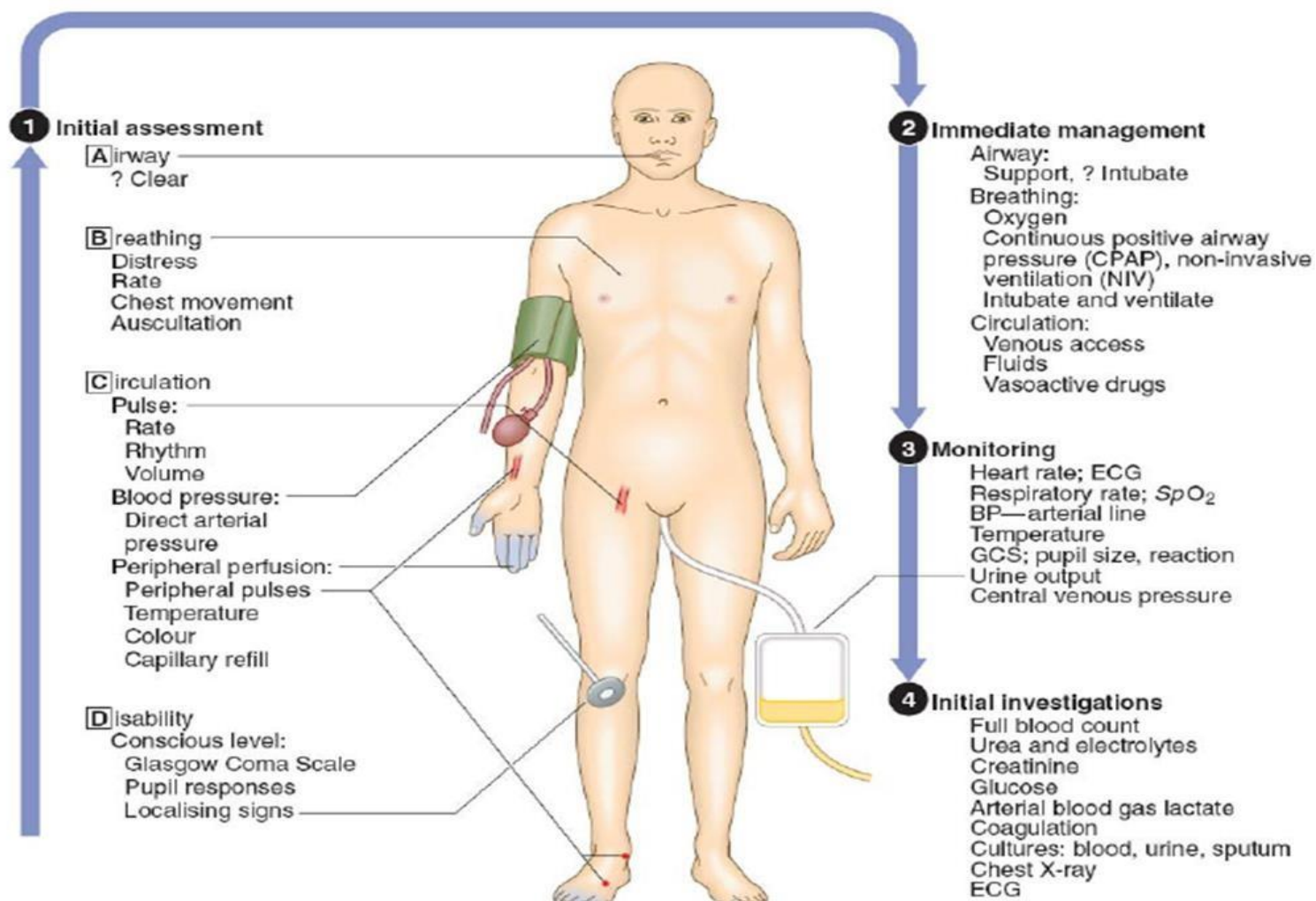
Clinical and laboratory features suggestive of severe illness

System	Feature
Cardiovascular	Tachycardia, hypotension, cold peripheries, skin mottling. Bradycardia may indicate a pre-terminal state.
Respiratory	Tachypnea, recession, use of accessory muscles of respiration, low oxygen saturation. Low respiratory rate may indicate impending respiratory arrest.
Renal	Oliguria
Nervous system	Decreased consciousness, confusion agitation, aggressive behavior
Metabolic	Acidosis, severe electrolyte abnormalities (particularly severe hyperkalemia and severe hyponatremia), severe anemia, thrombocytopenia, coagulopathy, elevated lactate.
Miscellaneous	Sweating

Review

- Following the primary assessment, initiation of emergency treatment and full assessment, a working diagnosis and plan for the subsequent management should be developed.
- This plan should include an ongoing review of the response to treatment, and a consideration of the appropriate placement of the patient, possibly in Intensive Care or another high care area.

CLINICAL EXAMINATION OF THE CRITICALLY ILL PATIENT



ICU admission criteria

- Life support technology is intended to provide temporary support for patients with potentially reversible organ failure and is not a measure to conquer (defeat) death (advanced or terminally ill cases).

System approach

- **Airway**: compromise or impending compromise (e.g. burn).
- **Respiratory failure**: (not responding to conservative treatment).
 - ✓ Type I Respiratory failure (hypoxia).
 - ✓ Type II Respiratory failure (hypercapnia).

Circulatory failure:

- ✓ Hypovolemic shock:
- ✓ Distributive shock: (e.g. septic, most common type in ICU). ✓
- Cardiogenic shock: (usually treated in CCU).
- ✓ Obstructive shock:

• CNS emergency:

- ✓ Severe traumatic brain injury.
- ✓ Encephalitis.
- ✓ Refractory status epilepticus.
- ✓ Brain tumor (post operative).
- ✓ Stroke (post operative or post tPA).
- ✓ Altered LOC (poisoning or toxicity).

- **Endocrine emergency:**

- ✓ Diabetic: (severe DKA, HHS, recurrent hypoglycemia).
- ✓ Adrenal: (adrenal crisis).
- ✓ Thyroid: (thyrotoxicosis and myxedema coma).

- **Visceral and metabolic:**

- ✓ Acute liver failure or acute on chronic liver failure.
- ✓ Acute kidney injury (complicating sepsis or rhabdomyolysis).
- ✓ Severe electrolyte imbalance (requiring close monitoring).

- **Obstetric emergency:** (e.g. eclampsia & its complications).
- **Postoperative cases:**
 - ✓ Major general surgery (e.g. large fluid shift). ✓
Major vascular surgery.
 - ✓ Neurosurgery (brain tumor).
- **Massive blood transfusion.**

ICU Discharge Criteria

- **Stable respiratory status.**
- No or minimal **oxygen support.**
- **Stable hemodynamic parameters.**
- Inotropic support, vasodilators and antiarrhythmic drugs, and intracranial pressure monitoring are no longer required.
- Neurologic stability with control of Seizures. • Close monitoring is no longer required

MCQ TEST

1- Warning signs of a severely ill patient(all true except one)

- a) Systolic blood pressure <90 or Mean <70 mmHg
- b) Heart rate >150 or <50 bpm
- c) Conscious level GCS <12
- d) Urine output 0.5 ml/kg/min
- e) Potassium >6 mmol/l

2- Airway assessment in critically ill patient

- a) Look for tachycardia
- b) Look for tachypnea
- c) Look for sweating
- d) use of accessory muscles.
- e) All the above

3- Which one is true regarding chest sounds

- a) Inspiratory stridor is a rasping sound is a result of obstruction above or involving the larynx
- b) Wheeze is usually heard on expiration as a result of the lower airways collapsing
- c) Gurgling occur when secretion or liquid is present in the upper airways
- d) Snoring occurs during partial occlusion of the oropharynx.
- e) Crepitation is usually normal sound.

4- Tachypnea in critically ill patient(all true except one)

- a) marked tachypnea is a useful marker of a severely ill patient
- b) tachypnea is usually a more obvious than cyanosis.
- c) It is a sign of compensatory mechanism
- d) Could be caused by metabolic acidosis
- e) Not caused by sepsis.

5- Evidence of inadequate tissue perfusion(all true except one)

- a) decreased conscious level
- b) Skin mottling
- c) hot peripheries
- d) capillary refill more than 5 second
- e) Oliguria

6- Which one is false regarding difficult assessing of this patient

- a) In young adults compensatory mechanism is mask sign
- b) In Elderly patient the inflammatory response is inhibited
- c) Immunocompromised also difficult to assess
- d) Trauma patients difficult due to pain and multiple injury
- e) Female more difficult than male

7- Clinical and laboratory features suggestive of severe illness(all true except one)

- a) High lactate level
- b) Tachypnea
- c) Oliguria
- d) Agitation
- e) Sweating

8- All the following are ICU admission criteria except one

- a) adrenal crisis
- b) sever hyperkalemia
- c) diabetic ketoacidosis
- d) blood transfusion
- e) eclampsia

9- discharge criteria from ICU(all true except one)

- a) Stable respiratory status.
- b) No or minimal oxygen support.
- c) Stable hemodynamic parameters.
- d) Inotropic support is longer required.
- e) Neurologic stability with control of Seizures.