Keywords Critical care/Assessment/Deteriorating patient

This article has been double-blind peer reviewed

In this article...

- The importance of systematic and structured patient assessment
- Use of the airway, breathing, circulation, disability and exposure (ABCDE) approach
- Red flags that indicate deterioration

Essential critical care skills 2: assessing the patient

NT SELF-ASSESSMENT

Test your knowledge. After reading this article go to **nursingtimes.net/NTSACriticalCare** If you score 80% or more, you will receive a certificate that you can use as revalidation evidence.

Key points

Critical care is a complex and multifaceted clinical environment

Comprehensive and careful assessment is vital to monitor for signs of clinical deterioration

Early recognition of deterioration, along with a structured response and appropriate escalation, can reduce patient harm and the risk of adverse events

The airway, breathing, circulation, disability and exposure approach enables life-threatening problems to be prioritised to reduce patient harm

Holistic assessment of patients' physical, psychological and social care needs is essential for ongoing clinical decisions, care and planned discharge

Author Katherine Hill is lead practice educator critical care, Queen Elizabeth University Hospital, Glasgow.

Abstract In this second article of a seven-part series on critical care medicine, we discuss patient assessment. The assessment process must consider the patient's physiological, sociological, psychological and spiritual needs to identify and prioritise problems. One well-established and reliable way is to use the airway, breathing, circulation, disability and exposure (ABCDE) approach. We describe how this can be used to prioritise and manage life-threatening clinical problems and reduce the risk of patient harm.

Citation Hill K (2021) Essential critical care skills 2: assessing the patient. *Nursing Times* [online]; 117: 12, 35-38.

A structured, systematic assessment of a patient who is critically ill is fundamental to good patient care, management and experience. The assessment process must include a comprehensive review of the patient's physiological, sociological, psychological and spiritual needs to identify and prioritise problems (Baid et al, 2016). The airway, breathing, circulation, disability and exposure (ABCDE) approach (Bit.ly/RCUK_ABCDE) is a well-established, reliable assessment tool used in the systematic assessment of critically ill patients to prioritise and treat life-threatening clinical problems. Information from this should be communicated, escalated, and actioned as appropriate (Baid et al, 2016).

Early recognition of a deteriorating patient, together with a structured response and appropriate escalation, can reduce patient harm and the risk of adverse events (Massey et al, 2017). The critical care nurse makes a systematic assessment of the patient on admission, after shift handover and in response to clinical deterioration (Baid et al, 2016). This article – the second in a seven-part series on critical care – will outline how to make a systematic assessment of a patient who is critically ill, using the ABCDE approach.

Airway

Once personal and patient safety is established, an airway assessment is the first stage in the ABCDE systematic approach. This is to assess airway patency, checking for signs of full or partial airway obstruction (Cathala and Moorley, 2020). A patient who can talk in a normal voice and full sentences has an airway that is patent. Box 1 lists causes of airway obstruction.

Physical assessment of an airway involves the 'look, listen and feel' approach. Appropriate infection control measures should be followed to reduce the risk of contamination, for example, when caring for patients with Covid-19. The clinical signs of a partial airway obstruction include:

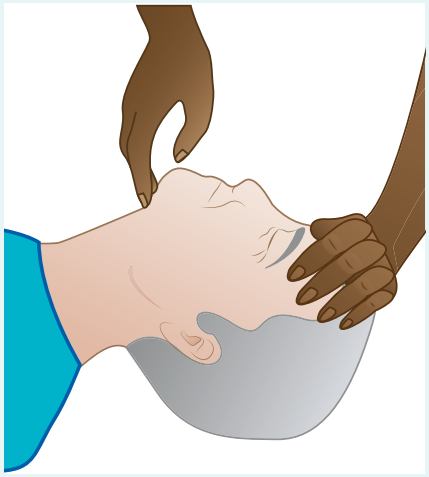
- 'See-saw' respirations, seen as paradoxical chest and abdominal movements;
- Decreased air entry on chest auscultation using a stethoscope;
- Abnormal breath sounds (noisy

Published in association with
British Association of Critical Care Nurses

Box 1. **Causes of airway obstruction**

- Respiratory secretions
- Foreign body, such as food
- Direct trauma
- Pharyngeal swelling due to infection or oedema
- Bronchospasm (spasm of the airways)
- Laryngospasm (spasm of the vocal cords)
- Central nervous system depression due to loss of airway patency and protective reflexes
- Vomit or blood
- Epiglottitis (inflammation and swelling of the epiglottis)
- Blocked tracheostomy or endotracheal tube

Fig 1. **Opening the airway**



1a. Head tilt-chin lift

1b. Jaw thrust

breathing such as a stridor involving a high-pitched sound, wheezing or snoring);
- Use of accessory muscles;
- Inability to speak;
- Altered respiratory effort.

With complete airway obstruction, there is no air entry on chest auscultation or breath sounds at the nose and the mouth (Baid et al, 2016). A complete or partial airway obstruction is a medical emergency and, initially, can be managed using simple airway manoeuvres, such as:

- Head tilt-chin lift or jaw thrust to open the airway (Fig 1);
- Application of high-flow oxygen using a mask with oxygen reservoir;
- Insertion of a simple airway adjunct (such as an oropharyngeal or nasopharyngeal airway) until further help arrives (Bit.ly/RCUK_ABCDE).

In a critical care unit, patients may have an endotracheal or tracheostomy tube in place to maintain their airway and help deliver mechanical ventilation. Positioned in the trachea, endotracheal and tracheostomy tubes are artificial airways that have an inflatable cuff at the end of the tube to create a closed system, which reduces the risk of aspiration or an air leak. The patency of the airway is assessed through:

- Visual assessment of chest movement;
- Chest auscultation with a stethoscope to detect air entry;
- Tracheal suctioning if required;
- Continuous end-tidal carbon dioxide ($EtCO_2$) monitoring;
- Review of mechanical ventilation parameters.

$EtCO_2$ monitoring is a non-invasive method of measuring exhaled carbon dioxide. It is a standard monitoring tool in patients who are mechanically ventilated, as it can detect a misplaced endotracheal and tracheostomy tube, and aid in the monitoring of respiratory function (Kerslake and Kelly, 2017).

As part of the airway assessment, the critical care nurse does several safety checks when caring for a patient with an endotracheal or tracheostomy tube to reduce the risk of patient complication and harm. Tables 1 and 2 list these checks and the reasons for doing them.

Table 1. **Key checks for endotracheal tubes**

Check	Rationale
Endotracheal tube is secured with appropriate tape or securement device	Reduce the risk of dislodgement
Position of endotracheal tube relating to pressure damage at the mouth or lips – the tube can be moved by an experienced critical care practitioner to avoid pressure ulceration	Reduce the risk of pressure damage
Size of endotracheal tube on cuff balloon	Confirm documented information when tube inserted
Endotracheal tube is secured at lip level by looking at the visible numerical scale on the tube at the level of the lips. The position should remain the same unless repositioned by a critical care anaesthetist due to the patient's clinical condition	Reduce the risk of migration or dislodgement
Endotracheal cuff pressure using cuff manometer (aim for 20-30cm H_2O)	Reduce the risk of: ● An air leak if underinflated ● Tracheal pressure damage if overinflated

RED FLAGS: AIRWAY

There are several red flags that should be noted when assessing an airway:

- Reduced or no respiratory effort;
- See-saw respiration;
- Decreased or no breath sounds at the nose and mouth or air entry on auscultation with stethoscope;
- Noisy breathing;
- Inability to speak;
- Inability to advance tracheal suction catheter down the endotracheal or tracheostomy tube.

JENNIFER N.R. SMITH

RED FLAGS: BREATHING

There are several breathing red flags:

- Reduced or increased respiratory rate;
- Use of accessory muscles or look of respiratory distress;
- Cyanosis (blue-ish discolouration);
- Reduced oxygen saturations;
- Nasal flaring;
- Noisy breathing;
- Asymmetrical chest movement.

Breathing

A comprehensive assessment of breathing is undertaken to:

- Diagnose and manage life-threatening conditions;
- Determine the patient's respiratory effort;
- Assess for signs of respiratory distress that can be indicative of many clinical conditions (Bit.ly/RCUK_ABCDE).

A critical care nurse will do a visual assessment of a patient's breathing pattern to assess the respiratory rate, depth, effort and the use of accessory muscles (Thim et al, 2012). Respirations should be effortless, at a rate of 12 to 20 breaths per minute. Lung auscultation using a stethoscope will provide information on air entry and added sounds such as wheeze and respiratory secretions, which will offer a possible explanation of respiratory distress (Cathala and Moorley, 2020).

Audible respiratory secretions, increased respiratory rate, respiratory distress or reduction in oxygen saturations are indications for tracheal suctioning. Suctioning is required in critical care patients with an endotracheal or tracheostomy tube to reduce the risk of secretion retention, airway obstruction, infection, and low oxygen saturations. If the patient has a chest drain, the critical care nurse will review and document chest-drain activity and volume of drainage.

In the critical care unit, continuous oxygen saturations and $EtCO_2$ measurements are monitored as, together, they provide valuable information on oxygenation and ventilation. In addition, arterial blood gases (ABGs) are obtained and analysed as required. This enables experienced critical care practitioners to assess the patient's respiratory function and titrate fraction of inspired oxygen (FiO_2), as well as adjusting the mechanical ventilator mode and settings according to the patient's clinical condition, targeting the parameters agreed and documented by the multidisciplinary team.

Table 2. **Key checks for tracheostomy tubes**

Check	Rationale
Tracheostomy tube is secured with appropriate tape or device	• Reduce the risk of dislodgement
Position of tube, checking the securement device and area around the neck. The device should be appropriately secure	• Reduce the risk of dislodgement • Minimise the risk of pressure damage at the site of tracheostomy tube and around the neck
Size of tracheostomy tube on cuff balloon	• Confirm documented information when tracheostomy tube inserted

Pressure of tracheostomy cuff, if inflated, using cuff manometer (aim for 20-30cm H_2O)	• Reduce risk of:
	  • Air leak if underinflated
	  • Tracheal pressure damage if overinflated

Presence and patency of tracheostomy inner cannula. This cannula can be removed and cleaned. The inner cannula is checked at least every four hours and changed every 12 hours, unless clinically indicated to increase the frequency (eg, in the case of thick respiratory secretions)	• Reduce the risk of tracheostomy blockage
Bedside tracheostomy safety box content	• Ensure provision of emergency equipment at bedside

Circulation

Haemodynamic monitoring is a cornerstone in the management of patients who are critically ill, as they can become very unstable due to hypovolaemia, changes in vasomotor function or cardiac dysfunction. This can result in organ dysfunction, multiorgan failure and death. The level of haemodynamic monitoring in critical care can vary from non-invasive (including continuous three- or five-lead electrocardiogram monitoring, hourly non-invasive blood-pressure monitoring and continuous oxygen saturation monitoring) to more advanced continuous invasive blood pressure and central venous pressure (CVP) monitoring (Huygh et al, 2016).

The critical care nurse will assess circulation using non-invasive methods, including measuring/assessing:

- Heart rate, taking into account factors such as rate depth and regularity;
- Blood pressure and hourly urine output;
- Skin colour and pallor;
- Capillary refill time;
- Peripheral temperature;
- Level of consciousness (Baid et al, 2016).

The following symptoms can indicate poor perfusion and circulatory compromise:

- Change in colour;
- Pale/cool peripheries;
- Fall in blood pressure;
- Decreased urine output;
- Reduced level of consciousness (Thim et al, 2012).

Patients who are critically ill often require invasive methods of monitoring – such as insertion of an arterial line and central venous catheter (CVC) – to obtain a more accurate representation of their haemodynamic status. An arterial line allows for continuous analysis of the patient's blood pressure and the ability to obtain arterial blood sampling. CVP can be monitored through a CVC and guide fluid resuscitation regimes. The critical care nurse will confirm these invasive devices are patent and re-calibrated at least twice per shift to ensure readings are accurate (Pinsky and Payen, 2005).

The medical management of a patient who is critically ill includes therapeutic treatments, such as fluid resuscitation and titration of medications that support blood pressure, which are guided by haemodynamic monitoring to improve patient outcomes. Advanced haemodynamic monitoring, such as continuous cardiac output monitoring, is sometimes used in complex clinical situations and with patients who are not responsive to initial therapeutic treatments (Huygh et al, 2016).

RED FLAGS: CIRCULATION

There are several circulation red flags:

- Cool or pale peripheries;
- Increased or abnormally low heart rate;
- Irregular heart rate;
- Weak, thready pulse;
- Abnormally high or low blood pressure;
- Reduced level of consciousness;
- Prolonged capillary refill time (>2 seconds);
- Reduced urine output (<0.5ml/kg/hr);
- Signs of major haemorrhage (bleeding).

RED FLAGS: DISABILITY

There are several red flags when assessing a critical care patient for disability:

- Reduced level of consciousness;
- Hypoglycaemia;
- Large pupils that are inactive to light;
- Increased level of pain;
- Signs of delirium.

RED FLAGS: EXPOSURE

For exposure, there are several red flags to note:

- Signs of trauma;
- Hard/tender calf muscles;
- Signs of bleeding;
- Increased or decreased central temperature;
- Signs of infection.

Disability

Disability is focused on assessment of neurological status, with close consideration given to causes of reduced consciousness, such as low oxygen saturations, increased carbon-dioxide levels, cerebral hypoperfusion, hypoglycaemia, syncope, sedatives or analgesic medication (Bit.ly/RCUK_ABCDE). The Glasgow Coma Scale (glasgowcomascale.org) enables a detailed evaluation of a patient's level of consciousness, including assessment of pupil size, reaction and limb movements.

Pupils should be of equal size and reactive to light (Bit.ly/RCUK_ABCDE; Cathala and Moorley, 2020). This assessment can be challenging due to several factors associated with critical care, including sedation, analgesia, delirium and critical illness itself. It is further complicated because of the unique features of patients who are critically ill, such as impaired communication, altered mental status, sleep deprivation and mechanical ventilation (Devlin et al, 2018).

Using specific assessment tools, the critical care nurse will undertake assessments of:

- Pain;
- Sedation;
- Delirium.

These are referred to in clinical practice guidelines (Devlin et al, 2018) and can be accessed by searching in MDCalc (mdcalc.com). The Critical Care Pain Observation Tool and Behavioural Pain Scale are validated pain observation tools, which give a robust and consistent approach to pain assessment and management; this is fundamental for the ongoing care of critically ill patients. The Richmond Agitation–Sedation Scale is used to guide the administration of sedative medication and patients are assessed for signs of delirium using a validated tool such as the Confusion Assessment Method for the ICU score.

Exposure

While maintaining the patient's dignity, the critical care nurse will expose and examine the patient to assess for signs of:

- Trauma;
- Wounds;
- Skin rashes;
- Swelling;
- Pressure injuries;
- Signs of infection;
- Bruising;
- Bleeding (Cathala and Moorley, 2020).

This may provide important information about the patient's clinical condition. Body temperature is taken using a thermometer to assess for signs of hypothermia or hyperthermia (Thim et al, 2012).

It is also important to review nutritional requirements, such as enteral nutrition (delivered into the gut to be absorbed the usual way) or total parenteral nutrition (delivered into the blood stream, bypassing the gut) and bowel activity. This is also an opportunity for the critical care nurse to review the medication the patient is receiving, which can include multiple continuous intravenous infusions that require titration according to the patient's dynamic clinical condition – such as, insulin (using the insulin sliding scale to approximate daily requirements), sedation, analgesia and blood-pressure medication.

The critical care nurse will gather additional information from many sources, including nursing and medical notes, investigations, social work, and friends and family, to formulate an accurate holistic assessment of the patient's level of dependency and social-care requirements. This is important for ongoing clinical decisions, management of care and planned discharge (Cathala and Moorley, 2020).

Conclusion

This article has outlined the complexities involved in the management of a critically ill patient. A comprehensive and careful assessment is fundamental to monitor for signs of clinical deterioration. The ABCDE method is a structured approach to assessment that can be used in all clinical situations to enable critical care nurses to prioritise life-threatening problems, initiate key treatment strategies, promote escalation of treatment and reduce patient harm. It is an established tool used by the whole multidisciplinary team, that helps with communication and the improvement of team performance in critical care. **NT**

References

Baid H et al (2016) Systematic assessment. In: *Oxford Handbook of Critical Care Nursing.* Oxford University Press.

Cathala X, Moorley C (2020) Performing an A-G patient assessment: a step-by-step guide. *Nursing Times* [online]; 116: 1, 53-55.

Devlin JW et al (2018) Clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility, and sleep disruption in adult patients in the ICU. *Critical Care Medicine;* 46: 9, e825-e873.

Hugyh J et al (2016) Haemodynamic monitoring in the critically ill: an overview of current cardiac output monitoring methods. *F1000Research*; 5 (F1000 Faculty Rev): 2855.

Kerslake I, Kelly F (2017) Uses of capnography in the critical care unit. *BJA Education;* 17: 5, 178-183.

Massey D et al (2017) What factors influence ward nurses' recognition of and response to patient deterioration? An integrative review of literature. *Nursing Open;* 4: 1, 6-23.

Pinsky MR, Payen D (2005) Functional hemodynamic monitoring. *Critical Care;* 9: 6, 566-572.

Thim T et al (2012) Initial assessment and treatment with the Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach. International Journal of General Medicine; 5: 117-121.

CLINICAL SERIES **Critical care**

Part 1: Introduction	Nov
Part 2: Assessment	Dec
Part 3: Arterial lines	Jan 2022
Part 4: Airway management	Feb
Part 5: Fluid balance	Mar
Part 6: Ventilation	Apr
Part 7: Blood-gas analysis	May