9 Intensive care medicine

Edited by Dr Irfan Chaudry
QI editor Dr Adam Revill

9.1 Delirium assessment and management for critical care

Dr Sudhindra Kulkarni
Lancashire Teaching Hospitals NHS Foundation Trust

Why do this quality improvement project?

The management of delirium is an important and challenging facet of therapy when dealing with critically ill patients. Delirium has been shown to be an independent predictor of increased mortality at six months and longer length of stay in patients who are ventilated in intensive care.[1] It is also associated with increased length of hospital stay and may predispose patients to prolonged neuropsychological disturbances after they leave intensive care.[2,3] These factors contribute to the higher intensive care and hospital costs attributed to patients with delirium.[4]

Background

Delirium has been defined as 'an acute, reversible organic mental syndrome with disorders of attention and cognitive function, increased or decreased psychomotor activity and a disordered sleep-wake cycle'. It is commonly found in the critically ill, with a reported incidence of 15-80%.[1,2,5,6]

Best practice

- Identify the at-risk population; maintain a high index of suspicion for delirium.
- Use a standard sedation policy and a sedation scoring system (locally developed or based on national guidelines).[7]
- Use a delirium screening tool (eg the Confusion Assessment Method for the intensive care unit, CAM-ICU) in all patients throughout their critical care stay, in addition to other routine monitoring such as sedation and pain scores.
- Use of a delirium management bundle.[7]
- Prevention is better than cure. Use non-pharmacological and pharmacological interventions as appropriate.

Suggested data to collect

- Patient characteristics, including pre-morbid health, cognitive function and frailty.
- Compliance to the use of a local policy for the management of pain, agitation and delirium.
- Type of delirium screening tool used and frequency of documentation of the presence or absence of delirium in patient records.
- Evidence that CAM-ICU or other delirium screening tool is performed and recorded at the agreed frequency.
- Documentation of the episodes of delirium in patient records.
- Documentation of actions taken based on the delirium assessment tool results.
- Methods of intervention – pharmacological and non-pharmacological.
- Compliance with the use of the delirium management bundle.
- Sleep quality as measured by a subjective (Richmond Campbell Sleep Questionnaire)[8] or objective (polysomnography) methods.

Quality improvement methodology

- Incidence of delirium as defined by the number of patients who are delirious out of the total patients on the unit at any point in time. This can be reported as run charts as per the data.
- Collected from the screening tool used and documentation in patient notes. This could be reported on a monthly or quarterly basis.
- Number of episodes of delirium in individual patients during their stay on the unit.
- Audit tool for the non-pharmacological and pharmacological methods used to prevent and treat delirium.
- Audit methodology to assess sleep patterns of patients and its impact on the incidence of delirium.
- Audit data with regards to the morbidity and mortality outcomes in patients with delirium; duration of mechanical ventilation; length of stay on ICU; length of stay in the hospital; death.
- Follow-up of patients post-discharge from the unit/hospital: 30 days, 90 days, 6 months, 1 year. Multidisciplinary team and patient groups should discuss impact and measures to reduce the incidence of delirium and improve patient quality of life post-discharge.

Mapping

GPAS 2020: 2.3.20, 2.5.19, 3.3.2, 4.3.23, 5.3.8, 10.9.2, 16.9.4
GPICS 2019: 4.12

References

1. Ely EW et al. Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. JAMA 2004;291:1753–1762.
2. Ely EW et al. The impact of delirium in the intensive care unit on hospital length of stay. Intensive Care Med 2001;27:1892–1900.
3. Jackson JC et al. Six month neuropsychological outcome of medical intensive care patients. Crit Care Med 2003;31:1226–1234.
4. Milbrandt EB et al. Costs associated with delirium in mechanically ventilated patients. Crit Care Med 2004;32:955–962.
5. Cohen IL et al. Management of the agitated intensive care unit patient. Crit Care Med 2002;30(1–2Suppl):S97–S123.
6. Jacobi J et al. Clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill adult. Crit Care Med 2002;30:119–141.
7. National Institute for Health and Care Excellence. Delirium: Prevention, Diagnosis and Management. Clinical Guideline CG103. London: NICE; 2010 (updated 2019) (https://www.nice.org.uk/guidance/cg103).
8. Richards K. Techniques for measurement of sleep in critical care. Focus Crit Care 1987;14:34–40.

9.2 Venous thromboprophylaxis on the critical care unit

Dr James Watts
East Lancashire NHS Teaching Hospitals Trust

Why do this quality improvement project?

Venous thromboembolism (VTE), which includes phenomena such as deep vein thrombosis (DVT) and pulmonary embolus, can affect any branch of the venous system. It is estimated that the incidence of VTE in patients of European origin is similar to that of stroke. VTE is relatively common and is associated with reduced survival and substantial healthcare costs.[1] Thirty per cent of patients who have experienced a VTE can expect to have a recurrence within 10 years. Adjusted mean predicted costs for patients with VTE are approximately 2.5 times higher for hospitalised patients than for those with a diagnosis of active cancer.

It is estimated that up to one in four hospital inpatients judged to be at risk will develop a DVT, with patients on the critical care unit (CCU) being at particular risk. Without appropriate preventative measures, the incidence of VTE can be as high as 50%. Pulmonary embolus is the third most common cause of death in patients after day 1.[1–3] Ensuring that acknowledged preventative measures are effectively and consistently implemented will increase patient safety and improve patient experience by reducing occurrence, morbidity and length of stay, and may also reduce costs and free up resources.

Background

While there may be some degree of hereditary influence on the incidence of VTE, clot formation is generally associated with circumstances that increase blood coagulability, impair blood flow and cause inflammation of the endothelium. Patients who are on the CCU may be at particular risk and may also experience VTE associated with indwelling devices (eg central venous catheter). The National Institute for Health and Care Excellence (NICE) and other authorities have therefore made specific evidence-based recommendations regarding VTE prophylaxis in the CCU population to reduce the risks of VTE formation.[4,5]

Best practice

- All hospital inpatients should undergo a VTE risk assessment on admission and then again on first consultant review or within 24 hours.
- Once classified into high or low risk, patients should receive appropriate prophylaxis, which will include compression stockings, mechanical compression devices and low molecular weight heparin (LMWH). There are separate recommendations related to patients with specific conditions (eg spinal injury, stroke).
- NICE also recommends that patients admitted to CCU undergo a separate VTE/bleeding risk assessment on admission to the unit and at least daily thereafter.[4,5]
- LMWH should be standard prophylaxis for patients admitted to CCU and should be commenced within 24 hours of admission if not contraindicated.[3] Exceptions include, but are not limited to, patients fully anticoagulated by other means, patients with heparin allergy or reactions (heparin-induced thrombocytopenia) and active bleeding. Where exceptions to standard prophylaxis have occurred, the reasons for them should be clearly recorded in the notes to avoid confusion. LMWH prophylaxis should continue for at least seven days. Patients in the last days of life do not require VTE prophylaxis.[4]
- Compression stockings are not recommended for CCU patients because of problems with skin viability and circulation, although other mechanical compression devices may be indicated in some patients if pharmacological prophylaxis is not possible. Mechanical prophylaxis should continue until 'normal mobility' has resumed.

Suggested data to collect

- All inpatients having a VTE assessment completed on admission to hospital and at 24 hours or first consultant review.
- All patients admitted to CCU having a separate VTE/bleeding assessment performed with a daily assessment performed thereafter.

- All patients admitted to CCU are commenced on LMWH prophylaxis or an alternative if LMWH is contraindicated.
- LMWH is prescribed and given within 24 hours of admission unless contraindicated.
- LMWH is continued for at least seven days.
- Platelet count is monitored regularly for heparin-induced thrombocytopenia if LMWH is prescribed (100%).
- If mechanical prophylaxis is deemed to be appropriate, it is started on admission to CCU and continued until normal mobility has been resumed.
- Where there has been an exception to standard prophylaxis, it is recorded clearly in the records.
- If regional anaesthesia has been administered, LMWH dose is timed to minimise the risk of complications such as epidural haematoma in relation to insertion and removal of catheter (100%).
- Patients in the last days of life are not given DVT prophylaxis. Where it is administered, it is reviewed on a daily basis.
- On discharge from critical care, the continued requirement for thromboprophylaxis is assessed, with consideration of continuing risk factors.

Quality improvement methodology

- The hospital should have a mechanism for capturing VTE incidents across its hospitals. Specific quality improvement projects can be tailored to CCU practice using NICE audit tools.[4]
- A simple retrospective analysis of the records of all patients on the CCU during a particular time period will produce repeated snapshots of current practice. Prospective and contemporaneous data collection may identify and address non-compliant practice.
- Exceptions to best practice should be identified and analysed for learning points.
- If educational and practice development events are held, this analysis could be used with plan-do-study-act methodology to see whether compliance with best practice recommendations is improved and maintained. Run charts can clearly demonstrate the effectiveness or otherwise of interventions on compliance.

Mapping

ACSA standards: 1.1.1.3, 1.2.1.4, 1.2.1.6
Curriculum competences: OA_BK_09, POM_BK_09, POM_BK_33, PR_BK_48, 4.1
CPD matrix codes: 1A01, 1A02, 1E05, 2C01, 3Coo (1A03) (2A10) (3A07)
GPAS 2020: 2.5.17
GPICS 2019: 4.12

References

1. Heit JA. Epidemiology of venous thromboembolism. Nat Rev Cardiol 2015;12:464–474.
2. Barker RC, Marval PM Venous thromboembolism: risks and prevention Cont Educ Anaesth Crit Care Pain 2011;11:18–23.
3. Faculty of Intensive Care Medicine and Intensive Care Society. Guidelines for the Provision of Intensive Care Services. Edition 1.1. London: Faculty of Intensive Care Medicine; 2016.
4. National Institute for Health and Care Excellence. Venous Thromboembolism in over 16s: Reducing the Risk of Hospital-acquired Deep Vein Thrombosis or Pulmonary Embolism. NICE Guideline NG89. London: NICE; 2018 (https://www.nice.org.uk/guidance/ng89/chapter/Putting-this-guideline-into-practice).
5. Faculty of Intensive Care Medicine and Intensive Care Society. Guidelines for the Provision of Intensive Care Services. 2nd ed. London: Faculty of Intensive Care Medicine; 2019 (https://www.ficm.ac.uk/standards-research-revalidation/guidelines-provision-intensive-care-services-v2).

9.3 Glycaemic control in critical illness

Dr Saoirse Lyons, Dr Duncan Chambler
Dorset County Hospital NHS Foundation Trust

Why do this quality improvement project?

Hyperglycaemia associated with critical illness is a commonly observed phenomenon in critical care. Diabetes is also one of the most common medical comorbidities in our UK population. We know that critically ill medical and surgical patients who are hyperglycaemic have a higher mortality rate than those who are normoglycaemic.[1,2]

Background

Hyperglycaemia in critical illness (also called stress hyperglycaemia) is a consequence of insulin resistance coupled with increased cortisol, catecholamines, glucagon, growth hormone, gluconeogenesis and glycogenolysis.[3,4] There is a wealth of evidence from many different patient populations which demonstrates that hyperglycaemia is associated with poor clinical outcomes in critically ill patients.

Best practice

Most clinicians accept that prevention of uncontrolled hyperglycaemia is desirable. However, the optimal blood glucose range is controversial and, as yet, there are no current fixed national standards or guidelines. What we do know is that, in mixed adult populations of critically ill medical and surgical patients, hyperglycaemia is associated with poor clinical outcomes,[1,2] yet tight glucose control (4.4-6.1 mmol/l) using intensive insulin therapy is thought to have no mortality benefit and a significant increased frequency of hypoglycaemia.[5] Therefore, an aim of maintaining a more liberal target blood glucose level of 7.5-10 mmol/l is encouraged.[6,7] This range avoids marked hyperglycaemia, while minimising the risks of hypoglycaemia.

Based upon the available evidence, the best practice for general adult intensive care would appear to be that:

- hyperglycaemia is defined as a blood glucose level greater than 10 mmol/l
- the routine use of intravenous fluids containing glucose is minimised
- insulin should be administered when blood glucose levels are persistently elevated (greater than 10 mmol/l for over six hours)
- short-acting insulin should be used and delivered to target blood glucose levels of 7.5–10 mmol/l
- if intravenous insulin therapy is required, the patient must also be receiving some form of carbohydrate intake (either enterally fed, total parenteral nutrition or intravenous dextrose)
- if intravenous insulin is delivered through a peripheral cannula then we recommend running intravenous insulin and dextrose together to prevent inadvertent hypo/hyperglycaemia if a cannula fails
- careful monitoring of blood glucose is essential to achieve glycaemic control while avoiding the potential harmful effects of hypoglycaemia.

Suggested data to collect

- Percentage of critical care patients who have their blood sugars measured and documented at least four times per day.
- Percentage of people in whom a variable rate intravenous insulin infusion is initiated when indicated.
- Percentage of patients who receive hourly monitoring of blood glucose levels once started on intravenous insulin.
- Percentage of time that patients on a variable rate insulin infusion have their blood glucose levels kept between 7.5-10 mmol/l.
- Percentage of patients that are on a variable rate insulin infusion in critical care that have an appropriate documented handover upon transfer to different ward or medical area.
- Percentage of patients that suffer hypoglycaemia less than 4.0 mmol/l while receiving insulin therapy.

Quality improvement methodology

Correct identification and prescribing of variable rate intravenous infusion of insulin in patients with hyperglycaemia

- What is the most reliable point to prescribe variable rate intravenous infusion of insulin (VRIII) and by whom?
- Can the prescription be standardised or preprinted to minimise prescribing errors?
- How can the plan be communicated most accurately throughout their critical care stay?
- How can the plan for termination of VRIII or the switch to another form of insulin be communicated to and carried out accurately by the nursing staff?

Correct monitoring of blood glucose:

- Look at the documented blood glucose levels from admission to discharge from critical care.
- Look for parts where the glucose monitoring is often missed or fails to meet the recommended frequency standard. Are there any patterns? Which members of staff are present at this point? How can they be prompted to measure glucose appropriately?

Compliance with set blood glucose targets

- Was hyperglycaemia correctly identified and managed? Consider adding to checklist of daily goals process. Consider use of measurement and run charts to inform compliance levels with set targets.

Mapping

Curriculum competences: PA_IK_14, PB_IK_10, PB_IK_15, PB_IK_38, NA_IK_20, PA_IS_07, PM_BS_02, PM_IS_02, PM_IS_03
FICM curriculum 2019 competences: 4.1, 4.8, 4.9
CPD matrix codes: 2C03, 2CO4

References

1. Krinsley JS. Association between hyperglycemia and increased hospital mortality in a heterogeneous population of critically ill patients. Mayo Clin Proc 2003;78:1471–1478.
2. Falciglia M et al. Hyperglycemia-related mortality in critically ill patients varies with admission diagnosis. Crit Care Med 2009;37:3001–3009.
3. Saberi F et al. Prevalence, incidence, and clinical resolution of insulin resistance in critically ill patients: an observational study. J Parenter Enteral Nutr 2008;32:227–235.
4. McCowen KC et al. Stress-induced hyperglycemia. Crit Care Clin 2001;17:107–124.
5. van den Berghe G et al. Intensive insulin therapy in critically ill patients. N Engl J Med 2001;345:1359–1367.
6. Griesdale DE et al. Intensive insulin therapy and mortality among critically ill patients: a meta-analysis including NICE-SUGAR study data. CMAJ 2009;180:821–827.
7. NICE-SUGAR Study Investigators. Intensive versus conventional glucose control in critically ill patients with traumatic brain injury. N Engl J Med 2009;360:1283–1297.

9.4 Management of acute respiratory distress syndrome in adults

Dr Emma Jane Smith
London and South East School of Anaesthesia

Why do this quality improvement project?

Acute respiratory distress syndrome (ARDS) is a common, life-threatening condition for which many management strategies have been trialled. Ensuring that those treatment approaches with strongly supportive evidence are applied – and that those now known to be harmful, are avoided – will ensure the best outcomes for patients.

Background

ARDS was first described in 1967, and its modern definition is the result of decades of international collaboration and refinement.[1] It is characterised by acute onset inflammation and bilateral pulmonary infiltrates not fully explained by cardiac failure or fluid overload. It may be a consequence of both pulmonary and non-pulmonary primary pathologies and therefore occurs in a wide patient population. The Berlin criteria enable both diagnosis and classification of severity based on the extent of hypoxaemia (PaO2 : FiO2 ratio); mild, moderate and severe ARDS correspond with a mortality of 27%, 32% and 45%, respectively.[2]

Best practice

ARDS has been the subject of a wide variety of randomised controlled trials, systematic reviews and meta-analyses. The ARDSNet paper of 2000 was the first to demonstrate the significant mortality benefit of low tidal volume ventilation (LTVV) and limitation of plateau airway pressures and this has now long been considered the standard of care.[3]

The Faculty of Intensive Care Medicine (FICM) and Intensive Care Society (ICS) Guideline Development Group has produced specific recommendations for the treatment of adults with ARDS.[4] The Guidelines for the Provision of Intensive Care Services (GPICS) are in alignment with these recommendations.[5]

The FICM/ICS guideline contains a figure dividing ARDS management strategies according to the severity (mild, moderate or severe, as per the Berlin criteria) at which it suggests they are implemented. Patients with any degree of ARDS should be subject to LTVV and a conservative fluid strategy. Moderate ARDS should be managed with higher positive end expiratory pressure, neuromuscular blocking agents for the first 48 hours, and/or prone positioning for at least 12 hours a day. In severe ARDS, referral to a severe respiratory failure centre is recommended if certain criteria are met, for consideration of superspecialist techniques such as extracorporeal membrane oxygenation or extracorporeal carbon dioxide removal. Other treatments studied and not recommended are high-frequency oscillatory ventilation, corticosteroids and inhaled vasodilators.

Suggested data to collect

Standards	Measures
More than 95% of patients must have an accurate height measured on admission, to calculate ideal body weight and appropriate tidal volumes.	■ Measurement of height.
Over 95% of patients with or at risk of ARDS must be ventilated at tidal volumes of up to 6 ml/kg ideal body weight.	■ Tidal volume.
Over 95% of patients with or at risk of ARDS must be ventilated at plateau airway pressures 30 cm H2O or lower.	■ Plateau airway pressures.

Quality improvement methodology

- Consider how to improve consistency of delivery of prescribed tidal volume by incorporation into ventilator care bundle, and daily goals checklist.
- Measure compliance with regular audit and use of run chart.

Mapping

Curriculum competences: (ICM module) 3.8, 4.6, 7.3
CPD matrix codes: 1A01, 1A02, 2A05, 2A12, 2C02, 2C04, 3C00
GPICS 2019 standard: 4.1.2, 4.2

References

1. Ashbaugh D et al. Acute respiratory distress in adults. Lancet 1967;290:319–323.
2. Ferguson ND et al. The Berlin definition of ARDS: an expanded rationale, justification, and supplementary material. Intensive Care Med 2012;38:1573–1582.
3. Pinsky MR. Toward a better ventilation strategy for patients with acute lung injury. Crit Care 2000;4:205–206.
4. Griffiths MJD et al. Guidelines on the management of acute respiratory distress syndrome. BMJ Open Resp Res 2019;6:e000420.
5. Faculty of Intensive Care Medicine, Intensive Care Society. Guidelines for the Provision of Intensive Care Services. 2nd ed. London: Faculty of Intensive Care Medicine; 2019, pp. 120–122 (https://www.ficm.ac.uk/standards-research-revalidation/guidelines-provision-intensive-care-services-v2).

9.5 Monitoring and targeting mean arterial pressure

Dr James McCulloch, Thames Valley School of Anaesthesia
Dr Ian Rechner, Royal Berkshire Hospital

Why do this quality improvement project?

Blood pressure control in the intensive care unit (ICU) and the maintenance of a certain mean arterial pressure (MAP) is one of the main reasons requiring admission to the ICU. In addition, there is increasing evidence in the literature that clinical outcomes are dependent on targeting a certain MAP, although more research is needed.

Background

Shock is a life-threatening condition of circulatory failure that most commonly presents with hypotension. The effects of shock are initially reversible but can rapidly become irreversible, resulting in multiple organ failure and death. If a patient presents with undifferentiated hypotension and is suspected of having shock, it is important the cause is identified and the hypotension managed to prevent multiple organ failure and death.[1]

There are several different clinical situations that require explicit blood pressure targets. In critical care, this includes the septic patient, with and without pre-existing renal impairment, haemorrhagic shock and the patient with a head injury. Current guidelines in the trauma patient are to keep the systolic blood pressure greater than 90 mmHg, but this is in the prehospital setting and prior to control of haemorrhage. In the patient with an isolated head injury and the absence of haemorrhagic shock, a MAP of 80 mmHg or above is recommended.

The largest patient group passing though in the ICU are those patients with septic shock. In the septic patient, the Surviving Sepsis Campaign recommends targeting a MAP of 65 mmHg or above.[2] These recommendations are supported by the SEPSISPAM study, which randomised 776 patients with septic shock to either 80-85 mmHg (high-target group) or 65-70 mmHg (low-target group).[3] There was no difference in mortality at 28 or 90 days between the two groups.[3] Aiming for a higher blood pressure in the critically ill patient is associated with an increased incidence of supraventricular arrhythmias.[4]

Best practice

Standards are set according to the Surviving Sepsis Campaign for the septic patient, where a MAP 65 mmHg or above is recommended,[2] although supplementary fine tuning for individual patients may include surrogate assessment of end-organ perfusion such as determination of a threshold MAP for maintaining urine output.

Standards for traumatic brain injury according to the Brain Trauma Foundation are systolic blood pressure 100 mmHg or above for patients 50-69 years of age or at 110 mmHg or above for patients 15-49 years or over 70 years.[5]

Currently, best evidence recommends:

- Septic patients on inotropes should have a MAP 65 mmHg or above within two hours of admission to ICU.
- Septic patients on inotropes should maintain a MAP of 65-75 mmHg during their stay on ICU.
- Patients should have a recorded targeted MAP in their twice-daily reviews.

Suggested data to collect

- Percentage of patients admitted to ICU with sepsis with a MAP 65 mmHg or above within two hours of admission.
- Percentage of septic patients on inotropes who have achieved the target MAP 65 mmHg or above and 75 mmHg or above on twice-daily ICU reviews for each day of their stay on ICU.
- Percentage of patients with a documented target MAP on twice-daily ICU reviews for each day of their stay on ICU.
- Percentage of patients with traumatic brain injury who achieve a cerebral perfusion pressure of 60-70 mmHg. There should be a documented target MAP in the twice-daily review to achieve this cerebral perfusion pressure.

Quality improvement methodology

Process map the management of blood pressure during a patient's journey from acceptance of referral to discharge from ICU:

- What ICU capacity is available and what happens when demand exceeds capacity?
- Which health care workers are involved with admissions?
- Who sets the MAP target and when?
- Who inserts the appropriate monitoring and are there delays in this process?
- What medication is used to achieve a certain blood pressure and how is this provided, made up and prescribed?
- What measures are in place to ensure that recordings are accurate and reproducible?
- Is further training required in the use of ultrasound, management of central and arterial line?
- Is availability of equipment, such as ultrasound, optimal?
- Is a peripheral vasoconstrictor appropriate if MAP target unlikely to be achieved within two hours?

Run charts may be helpful to visualise progress with compliance over time:

- Are critical care nurses able to adjust inotropes?
- What is the locally agreed policy for confirmation of central line insertion?
- Is a chest x-ray required prior to starting inotropes? Are there delays in achieving this?

Mapping

ASCA standards: 4.2.1.1, 4.5.1.1, 4.1.0.5, 1.1.1.12, 1.3.3.1, 2.1.1.6, 2.2.3.2

FICM curriculum competences: 1.1, 1.4, 1.5, 2.7, 3.3, 3.9, 3.11, 4.3, 4.4, 5.8, 5.10

GPAS 2020: 3.2.22, 3.2.23, 3.3.32, 3.3.8, 5.2.4, 5.2.15, 7.3.13, 7.3.18, 16.2.25, 18.2.3

GPICS 2019: 4.6

References

1. Gaieski DF, Mikkelsen ME. Evaluation of and initial approach to the adult patient with undifferentiated hypotension and shock. UpToDate 2019; September (https://www.uptodate.com/contents/evaluation-of-and-initial-approach-to-the-adult-patient-with-undifferentiated-hypotension-and-shock).
2. Rhodes A et al. Surviving Sepsis Campaign: international guidelines for management of sepsis and septic shock 2016. Intensive Care Med 2017;43:304–377.
3. Asfar P et al. High versus low blood-pressure target in patients with septic shock. N Engl J Med 2014;370:1583–1593.
4. Hylands M et al. A systematic review of vasopressor blood pressure targets in critically ill adults with hypotension. Can J Anesth 2017;64:703–715.
5. Brain Trauma Foundation. Guidelines for the Management of Severe Traumatic Brain Injury. 4th ed. Palo Alto, CA: Brain Trauma Foundation; 2016 (https://braintrauma.org/guidelines/guidelines-for-the-management-of-severe-tbi-4th-ed#/:guideline/15-blood-pressure-thresholds).

9.6 Monitoring of oxygen therapy and physiological targets

Dr Kate Hames, Thames Valley School of Anaesthesia
Dr Ian Rechner, Royal Berkshire Hospital

Why do this quality improvement project?

Oxygen is delivered to many patients within the intensive care unit (ICU), but too much oxygen is associated with poorer outcomes in the acutely unwell patient and this therapy must be carefully monitored. There are outcome data for several patient groups, which have been linked to patient peripheral capillary oxygen saturation (SpO_2) as the main outcome measure as opposed to method of oxygen delivery device.

Background

A systematic review and meta-analysis looking at mortality and morbidity in 16,073 acutely ill adults treated with liberal versus conservative oxygen therapy suggested that SpO_2 greater than 94-96% might be deleterious at 30 days.[1] It is also well established that patients with chronic obstructive pulmonary disease (COPD) should receive oxygen therapy to achieve a SpO_2 target of 88-92%.[2]

Although supplemental oxygen is valuable in many clinical situations, excessive or inappropriate supplemental oxygen can be deleterious. According to human and animal studies, high concentrations of inspired oxygen can cause a spectrum of lung injury, ranging from mild tracheobronchitis to diffuse alveolar damage. The latter is histologically indistinguishable from that observed in the acute respiratory distress syndrome.[3]

Saturation monitoring is a continuous variable and in a 24-hour period, with a heart rate of 70 beats/minute, there will be 100,800 readings. This measurement is subject to artefact and currently, in most clinical practice, there are 24 recorded data points in the ICU, with hourly observations. It is practically easier to set a target SpO_2 as opposed to partial pressure of arterial oxygen (PaO_2), as the former is much easier to measure continuously and a patient's PaO_2 can easily alter within minutes.

Best practice

Currently best evidence recommends:

- If SpO_2 greater than 96%, then wean oxygen to the lowest possible FiO_2 until able to remove.
- If SpO_2 greater than 93%, do not start oxygen therapy.
- All other acutely unwell patients requiring oxygen therapy the target SpO_2 should be greater than 90%.[4]
- In patients with a diagnosis of COPD the target SpO_2 should be 88-92%.

Suggested data to collect

- Percentage of patients with a documented target saturation on twice-daily ICU reviews, for each day of their stay on ICU (standard: 100%).
- Percentage of patients who have achieved the target SpO_2 on twice-daily ICU reviews, for each day of their stay on ICU (standard: 100%).
- The following three standards are best assessed by taking measurements at a set time each day on the ICU. During this chosen time, it is important to ensure there is a good SpO_2 trace.
- Percentage of patients with a SpO_2 of greater than 96% receiving oxygen therapy at the chosen time, each day during their stay on ICU (standard: 0%).
- Percentage of patients with a SpO_2 of greater than 93% commenced on oxygen therapy during the chosen time, on any day during their stay on ICU (standard: 0%).
- Percentage of patients with a diagnosis of COPD on oxygen therapy with a SpO_2 of 88-92%, during the chosen time on any day during their stay on ICU (standard: 100%).

Quality improvement methodology

Correct documentation of target and achieved oxygen saturation

Process map the documentation and daily reviews:

- Are all patients on ICU reviewed twice daily by a consultant intensivist?
- Do all intensivists agree to follow current best practice guidelines for oxygen saturation?
- What is the best point during the review when SpO_2 (target and achieved) can be documented?
- Is there a way of prompting the reviewing intensivist to review this?

Correct oxygen prescribing practice

Process map a patient's journey through ICU, from admission to discharge:

- Who sets the oxygen saturation target on admission to ICU?
- When and why is oxygen therapy changed?
- Is there an oxygen prescribing protocol for all ICU patients? Does it include a flow diagram which is easily interpretable by the bedside healthcare worker?
- Which healthcare workers are involved in titrating oxygen therapy, either in response to various therapies or progress of disease?
- How is SpO_2 recorded? Is it continuous?
- Are alarms set to the correct limits to prompt health care workers to titrate oxygen therapy appropriately?
- What is needed to deliver oxygen therapy, what monitoring is available and methods of recording these. Use run charts to visualise improvements.

Mapping

ACSA standards: 1.1.1.9, 1.4.1.1, 1.4.2.4, 4.1.2.1, 4.2.2.1, 4.2.2.2,
GPICS 2019: 2.7, 3.8, 4.1, 5.1

References

1. Chu DK et al. Mortality and morbidity in acutely ill adults treated with liberal versus conservative oxygen therapy (IOTA): a systematic review and meta-analysis. Lancet 2018;391:1693–1705.
2. O'Driscoll BR et al. BTS guideline for oxygen use in adults in healthcare and emergency settings. Thorax 2017;72:ii1–ii90.
3. Gilbert DL. Oxygen: An overall biological view. In: Gilbert DL (ed), Oxygen and Living Processes. New York, NY: Springer-Verlag; 1981, p. 376.
4. Siemieniuk RAC et al. Oxygen therapy for acutely ill medical patients: a clinical practice guideline. BMJ 2018;363:k4169.

9.7 Renal replacement therapy in critical care

Dr Saoirse Lyons, Dr Duncan Chambler
Dorset County Hospital NHS Foundation Trust

Why do this quality improvement project?

Renal replacement therapy in critically ill patients is a complex, resource-intense therapy with potential harm to patients. It is important that this therapy is delivered safely, effectively and efficiently to the right patients.

Background

Acute kidney injury has been defined by the Kidney Disease: Improving Global Outcomes group.[1] Conventional indications of emergency renal replacement therapy include hyperkalaemia, hyperuraemia, acidaemia, fluid overload and for the removal of small and water soluble toxins.[2] The need for renal replacement therapy in critically ill patients occurs in up to 60% of intensive care admissions and is associated with a mortality rate of 15-60%.[3]

Most commonly, renal replacement therapy is delivered in critical care units by continuous venovenous therapies and can be subdivided according to the modality of solute clearance: convective haemofiltration (CVVH), osmotic dialysis (CVVHD) or a combination of these (CVVHDF).

Intermittent vascular and peritoneal renal replacement therapies are usually administered to stable patients by dedicated renal therapy services and are not covered in this quality improvement project.

Various clinical trials have attempted to provide empirical evidence to guide clinical care with regards to timing of initiation, mode of delivery, dose of therapy, types of extracorporeal circuits and filters and anticoagulation method.

Best practice

Best practice has not been proven by evidence or agreed upon by expert consensus.[3,4] It is difficult to define best practice or standards as equipment from different manufacturers are intended for use in different ways.

Based upon the available evidence, the best practice for general adult intensive care would appear to be:

- initiation of renal replacement therapy according to conventional indications and not earlier (KDIGO stage 2 or 3 for example)
- delivery of renal replacement therapy by CVVH or CVVHD for safety and efficacy
- dose of therapy, defined by the effluent production rate, of approximately 25 ml/kg/hour, as higher doses do not appear to have greater efficacy but will be more costly
- anticoagulation by citrate appears to be more efficacious and cost efficient compared with heparin.

Suggested data to collect

Structure

- Critical care units should have a lead consultant and nurse for renal replacement therapy.
- Critical care units should have a policy to standardise the delivery of renal replacement therapy.
- Percentage of critical care staff that are trained in the management of emergencies associated with renal replacement therapy (target greater than 50%).

Care processes

- Mean filter lifespan (target greater than 30 hours); most brands are licensed for up to 72 hours use.
- Mean downtime (target less than 25%); this is the percentage of time without effective blood circulation through a filter during a period of therapy.
- Mean effluent dose delivered per episode of renal replacement therapy (target 20-30 ml/kg/hour).

Outcomes

- Percentage of patients that require blood transfusion as a consequence of bleeding from the extracorporeal renal replacement therapy circuit (target less than 5%).
- Percentage of patients that have a confirmed deep-vein thrombosis or pulmonary embolism caused by the venous catheter (target less than 5%).
- Percentage of patients with a confirmed catheter-related blood stream infection caused by the venous catheter (target less than 5%).

Quality improvement methodology

- Assessment of the quality indicators relating to structure of care can be achieved through review of department policies and case review. Is the departmental policy being followed? Are renal replacement therapy orders (prescriptions) clear and appropriate?
- Many renal replacement therapy machines will save numerical data that can be interrogated by company representatives. This can provide average filter lifespan, downtime and delivered effluent dose for assessment against care process indicators with very little effort. Excessive downtime can be due to problems with

venous catheters, anticoagulation, blood pump speed, fluid exchange rates and filter type. An iterative process of optimisation through plan-do-study-act cycles can improve each component and overall patient care.

- Continuous surveillance of negative outcome measures can be achieved through incident reporting and investigation. Root cause analysis methodology with chronological details can often identify substandard care and contributory causes for events.[5] A 'five whys' investigation can assist with identifying the modifiable underlying factors, which can be mapped on a Fishbone Kawasaki diagram.[5]

Mapping

Curriculum competence: PC_IK_21
FICM curriculum 2019: 3.4, 4.7
CPD matrix code: 2C04
GPICS 2019: 1.5.12, 4.3

References

1. Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO Clinical Practice Guideline for Acute Kidney Injury. Kidney Int Suppl 2012; 2:1–138.
2. NICE. Acute kidney injury: Prevention, detection and management of acute kidney injury up to the point of renal replacement therapy. Available from: (http://guidance.nice.org.uk/CG169/Guidance/pdf/English). Accessed 15 Aug 2019.
3. Gemmell L et al. Renal replacement therapy in critical care, BJA Educ 2017;17:88–93.
4. Faculty of Intensive Care Medicine, Intensive Care Society. Guidelines for the Provision of Intensive Care Services. 2nd ed. London: FICM/ICS; 2019 (https://www.ficm.ac.uk/standards-research-revalidation/guidelines-provision-intensive-care-services-v2).
5. NHS Improvement. Root cause analysis – using five whys (https://improvement.nhs.uk/resources/root-cause-analysis-using-five-whys).

9.8 Sedation, scoring and management on critical care

Dr Sudhindra Kulkarni
Lancashire Teaching Hospitals NHS Foundation Trust

Why do this quality improvement project?

There has been a shift in the emphasis of sedation practice away from the use of large doses of sedatives to the idea of analgosedation. Over-sedation can contribute to hypotension, venous thrombosis, prolonged ventilation, an increased risk for pneumonia and a prolonged stay in the intensive care unit (ICU), with an increasing burden on staff, bed availability and associated costs.[1,2]

Background

The sedative regimen must be tailored to the individual patient, necessitating a multimodal and multidisciplinary approach and does not simply involve the use of drugs.

Indications for the use of sedative drugs in the ICU include:

- to alleviate pain
- to facilitate the use of an otherwise distressing treatment and minimise discomfort (eg tolerance of endotracheal tubes and ventilation)
- to augment the effectiveness of a treatment (eg inverse ratio ventilation)
- as a treatment in its own right (eg seizure control or management of intracranial pressure)
- to reduce anxiety
- to control agitation
- for amnesia during neuromuscular blockade.

This document is not meant to be a rigid framework but provides information around which clinicians may build their own sedation protocols. It is intended for all groups of ICU patients, including specific patient groups such as those with neurological injury, burns, cardiac and liver conditions.

Best practice[3,4]

- To develop a multidisciplinary, structured approach for managing sedation and analgesia in the ICU.
- Perform patient assessment and optimise the ICU environment.
- Regularly perform and document structured patient evaluation and monitoring.
- All sedated patients should have a daily sedation plan and Richmond Agitation Sedation Score target.
- Select analgesic and sedative medications based upon individualised needs, drug allergies, organ dysfunction(hepatic/renal dysfunction), need for rapid onset and offset of action, anticipated duration of therapy and prior response to therapy.
- Titrate analgesic and sedative drugs to a define target, using the lowest effective dose.
- Implement a structured strategy to avoid accumulation of medications/metabolites: use scheduled interruptions or intermittent dosing of analgesic and sedative drugs.
- Recognise and take steps to ameliorate analgesic and sedative drug withdrawal during de-escalation of therapy.

Suggested data to collect

- Use of sedation guidelines for indications, duration and individualised targets used.
- Type of sedative medications used and their implications.
- Method of sedation scoring system used and its use on a daily basis by the medical and nursing staff.
- Practice and recording of daily sedation hold strategies.

Quality improvement methodology

- Assessment of compliance with sedation guidelines, scoring system and recorded daily sedation hold.
- Audit the use of specific sedation agents with defined target sedation score.
- Sedation hold strategies – compliance and acceptance, education programmes and safety concerns.
- Monitoring compliance with sedation hold in the context of a ventilator care bundle.
- Use of weekly/fortnightly collection of these data, which can be displayed on run charts and interventions and changes can be tracked with this data.
- Impact of following sedation guidelines and sedation holds on morbidity and mortality, particularly reduction in the number of days on mechanical ventilation, length of ICU stay and incidence of delirium.

Mapping

GPICS 2019: 4.1, 4.2, 4.12

References

1. Burns AM et al. The use of sedative agents in critically ill patients. Drugs 1992;43:507–515.
2. Kollef MH et al. The use of continuous i.v. sedation is associated with prolongation of mechanical ventilation. Chest 1998;114:541–548.
3. Reschreiter H et al. Sedation practice in the intensive care unit: a UK national survey. Crit Care 2008;12:R152.
4. Whitehouse T et al, eds. Intensive Care Society Review of Best Practice for Analgesia and Sedation in the Critical Care. London: ICS; 2014 (https://www.ics.ac.uk/ICS/ICS/GuidelinesAndStandards/ICSGuidelines.aspx).

9.9 Performance and management of tracheostomies on the critical care unit

Dr James Watts, East Lancashire NHS Trust, Blackburn
Dr Brendan McGrath, Manchester University NHS Foundation Trust

Why do this quality improvement project?

The use of tracheostomy in the management of patients in critical care has increased in recent years. The National Tracheostomy Safety Project has created guidelines to standardise the way in which tracheostomies are both performed and managed to reduce complications, many of which are associated with common misconceptions and communication failures.[1] The care of tracheostomies is governed by established care bundles designed to reduce incidence of complications. The aim of this quality improvement project is to monitor how best practice is being implemented, to identify and address barriers to successful implementation and to embed the guidelines into everyday practice.

Background

Tracheostomies can be performed for a variety of indications and can be temporary or permanent. Over 5,700 surgical tracheostomies were performed in adults in England during 2009/10, along with an estimated 5,000-8,000 percutaneous tracheostomies in critical care.[2] Over the same period, about 570 laryngectomies were performed. As with any procedure, complications may occur immediately during performance (eg haemorrhage) or later (eg infection). The management of certain complications (eg displacement, obstruction) will depend on whether the patient has a patent upper airway or not. A variety of different tracheostomy tubes and insertion kits are available and may differ in their longer-term management need. The National Patient Safety Agency and NCEPOD identified a number of common themes in relation to tracheostomy complications.[1,3]

The National Tracheostomy Safety Project was developed to increase awareness of issues surrounding tracheostomy safety and to standardise best practice around insertion, care and the management of complications.[1]

Methodology

A retrospective audit of tracheostomies performed within a set time frame can be used both to quantify numbers and to identify whether established guidelines and care packages are being implemented. Prospective data collection may take longer, depending on the frequency of tracheostomy insertion, but can include aspects relating to the management of tracheostomies performed outside the critical care unit (CCU). Data collection can be coupled with educational events so that knowledge of practice related to tracheostomy can be consolidated among the multidisciplinary team. This can identify barriers to the implementation of best practice, which can be identified and addressed using a plan-do-study-act methodology.

Suggested data to collect

To determine whether all elements of the tracheostomy checklist are implemented and documented whenever percutaneous tracheostomy is performed.[4]

Performance of tracheostomy at the bedside

Preoperative phase:

- Use of appropriate local safety standards for invasive procedures which follow Intensive Care Society/ Faculty of Intensive Care Medicine guidance, including documentation of indication for procedure, staff present and roles, clotting status, airway management plan, anaesthetic record, equipment checklist.[4,5]
- Appropriate consent has been obtained and documented.

Perioperative phase:

- Time outperformed according to the World Health Organization surgical safety checklist.[6]
- Use of bronchoscopic/ultrasound guidance when appropriate.[7]
- CO_2 monitoring to confirm placement.[7]
- Complications and subsequent management.
- Whether a chest x-ray is required and the findings if one is performed.

Postoperative phase:[8]

- Type of equipment and tracheostomy tube used.
- Postoperative management plan recorded.
- Appropriate equipment to manage an emergency tracheostomy issue is available on the unit.

Is the tracheostomy care package being implemented?

- Analysis of documentation to determine whether the following are regularly implemented:
  - Tracheostomy tube is being properly secured and supported; regular wound care of stoma; regular suctioning; humidification device used; cuff pressure monitored and recorded eight-hourly; regular inner-tube cleaning recorded.
  - Display of appropriate signage at bedside.
  - Tracheostomy weaning and decannulation plan recorded.
  - Type and size of tracheostomy tube is clearly recorded.

Departmental and organisational issues

To determine workload and incidence of issues:

- Total number of tracheotomised patients passing through the CCU.
- Percentage of procedures performed in the unit.
- Percentage of procedures performed in theatre.
- Tracheostomy-associated complications recorded.
- Monitoring staff training in tracheostomy related issues (eg leak, blockage, replacement).
- Training for staff.
- Destination of patients on discharge from the CCU with tracheostomy in place.
- Quality of handover to ward concerning further tracheostomy management.

Quality improvement methodology

- A quality improvement project could be designed using the Model for Improvement framework.[9]
- First identify the what you are trying to accomplish (ie what is the aim of the project) using a SMART (specific, measurable, achievable, relevant, and timely) framework.
- The how do you know that a change is an improvement – what are your measures?
- What can you change to result in an improvement? These are your change ideas.
- Depending on what previous critical incidence have been reported with tracheostomies these findings can be used to make changes.
- Multidisciplinary team involvement is much more likely to make change a success.

Mapping

ACSA standards: 1.3.1.3, 1.3.1.5, 1.3.1.6, 1.4.2.2, 1.4.2.3, 1.4.4.2, 2.1.1.5, 2.1.1.11

CPD matrix codes: 1F01, 2A01, 2A03, 3A01, 3C00

GPAS 2020: 3.2.18, 3.2.25, 3.2.31, 4.2.12

GPICS 2019: 4.1, 4.2

References

1. National Tracheostomy Safety Project (http://www.tracheostomy.org.uk).
2. McGrath B et al. Multidisciplinary guidelines for the management of tracheostomy and laryngectomy airway emergencies. Anaesthesia 2012;67:1025–1041.
3. NCEPOD. On the Right Trach? A Review of the Care Received by Patients who Underwent a Tracheostomy. London: NCEPOD; 2014 (https://www.ncepod.org.uk/2014report1/downloads/OnTheRightTrach_FullReport.pdf).
4. Faculty of Intensive Care Medicine and Intensive Care Society. Invasive Procedure Safety Checklist: Tracheostomy. London: Faculty of Intensive Care Medicine; 2019 (https://www.ficm.ac.uk/safety-and-clinical-quality/safety-checklists-invasive-procedures).
5. Intensive Care Society. Standards for the Care of Adult Patients with a Temporary Tracheostomy; Standards and Guidelines. London: ICS; 2014 (https://www.ics.ac.uk/ICS/ICS/GuidelinesAndStandards/ICSGuidelines.aspx).
6. World Health Organization. WHO Surgical Safety Checklist. Geneva: WHO; 2009 (https://www.who.int/patientsafety/safesurgery/checklist/en).
7. Thomas, AN, McGrath, BA. Patient safety incidents associated with airway devices in critical care: a review of reports to the UK national patient safety agency. Anaesthesia 2009;64:358–365.
8. McGrath, BA, Thomas, AN. Patient safety incidents associated with tracheostomies occurring in hospital wards: a review of reports to the UK national patient safety agency. Postgrad Med J 2010;86:522–525.
9. Institute for Healthcare Improvement. How to improve (http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx).

9.10 Transfusion threshold in the intensive care unit

Dr Kyle Gibson
Royal Infirmary of Edinburgh

Why do this quality improvement project?

Blood transfusion is common in the intensive care unit; around 50% of patients receive a blood transfusion. Recommended thresholds for blood transfusion have changed following evidence that higher transfusion thresholds may confer no additional benefit to patients; indeed they may increase morbidity and mortality.

Background

There are multiple reasons why critically ill patients become anaemic, including repeated blood sampling for laboratory testing. The decision to transfuse a patient is always patient specific and guided by clinical factors that include comorbidities and acute illness. Research has led to the development of recommended transfusion thresholds for patients in intensive care to aid clinical decision making.

In general, a restrictive approach to blood transfusion is now favoured. The TRICC (Transfusion Requirements in Critical Care) trial has shown that the 30-day mortality rate was lower among patients transfused when their haemoglobin concentration dropped below a threshold of 70 g/l than among those with a threshold of 100 g/l.[1] Furthermore, observational studies have shown that red-cell transfusions in critically ill patients increase adverse outcomes, including increased risk of infection, acute respiratory distress syndrome and worsening organ dysfunction.

It is recognised that best practice transfusion thresholds can assist clinicians with decision making, but the decision to transfuse will always be patient specific following consideration of the benefits and risks of transfusion.

Best practice

- The Use of Blood Components and their Alternatives (Association of Anaesthetists).[2]
- Blood Transfusion (National Institute for Health and Care Excellence).[3]
- Guidelines on the Management of Anaemia and Red Cell Transfusion in Adult Critically Ill Patients (British Committee for Standards in Haematology).[4]
- Guidelines for the Provision of Intensive Care Services (Faculty of Intensive Care Medicine/Intensive Care Society).[5]

Suggested data to collect

- Review the case notes of patients who receive a blood transfusion in the intensive care unit:
  - What percentage of patients had a documented transfusion threshold/trigger recorded in the patient record?
  - What percentage of blood transfusions were appropriately administered using best-practice transfusion thresholds (or had a justification why there was variance from the suggested threshold)?
- In stable patients, review the percentage of patients who had blood tests to reassess haematology parameters before requesting further blood transfusions.

Quality improvement methodology

- A quality improvement approach should be used to develop a blood conservation bundle for patients in the intensive care unit, with the aim of decreasing blood transfusions.[6] This approach could include regular review of anticoagulant medications and stress ulcer prophylaxis, guidance on the frequency of blood sampling for individual patients and review of blood volumes being removed during sampling.
- A multidisciplinary approach involves including medical, nursing and pharmacy staff to develop a local approach to blood conservation.
- Improvement techniques may include a local programme of education for staff and checklists/techniques to prompt daily consideration of the need for blood sampling and avoiding unnecessary blood tests.
- The impact of the blood conservation bundle would require evaluation – for example, the impact on changing haemoglobin concentration and the number of blood transfusions.
- Implementation of aspects of the bundle can be displayed to the multidisciplinary team using run charts to monitor progress over time.

Mapping

Curriculum competences: POM_BK_28, POM_BS_12, PR_BK_51, POM_IK_07, POM_IS_10, POM_IS_15, PC_IK_08, CT_HK_09, POM_HK_12, AD_HS_12, GU_HS_03, GU_HS_04, GU_BK_06, GU_BK_07, CI_BK_24, OB_BK_06, IO_BS_09
CPD matrix code: 2A05
GPAS 2020: 5.5.50, 5.5.51
GPICS 2019: 4.12

References

1. Hébert PC et al, for the Transfusion Requirements in Critical Care Investigators, Canadian Critical Care Trials Group. A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. N Engl J Med 1999;340:409–417.
2. Association of Anaesthetists of Great Britain and Ireland. AAGBI guidelines: the use of blood components and their alternatives 2016. Anaesthesia 2016;71: 829–842.
3. National Institute for Health and Care Excellence. Blood Transfusion. NICE Guideline NG24. London: NICE; 2015 (**https://www.nice.org.uk/guidance/ng24**).
4. Retter A et al for the British Committee for Standards in Haematology. Guidelines on the management of anaemia and red cell transfusion in adult critically ill patients. Br J Haematol 2013;160:445–464.
5. Walsh T. 4.1.6 Anaemia. In: Faculty of Intensive Care Medicine and Intensive Care Society. Guidelines for the Provision of Intensive Care Services. Version 1.1. London: Faculty of Intensive Care Medicine; 2016. pp. 85–87.
6. Nickson C. Blood transfusion in ICU. Life In the Fast Lane 25 April 2019 (**https://litfl.com/blood-transfusion-in-icu**).

9.11 End of life care

Dr Kyle Gibson
Royal Infirmary of Edinburgh

Why do this quality improvement project?

Around 20% of patients admitted to the intensive care unit will not survive hospital admission despite appropriate life-sustaining treatments.[1] High-quality care is a key component of intensive care medicine for patients and their loved ones at the end of life.

Background

A significant proportion of patients in hospital die in intensive care. Most deaths in the unit occur after withdrawal or withholding of life-sustaining therapies when treatment plans have not benefited the patient. This allows time and opportunity to provide high-quality end of life care.

Many patients will not have the ability to express their wishes, values and preferences. Communication with those close to the patient is thus particularly important to better understand the wishes of the patient.

Effective end of life care involves:

- the prompt identification of patients at the end of life
- a shared approach to decision making with treatment and care which align with the patients' values and preferences (including those previously expressed or documented if lacking capacity)[2]
- communication between teams and the patient/loved ones and symptom management.

Best practice

- Guidelines for the provision of intensive care services.[2,3]
- Care of dying adults in the last days of life (National Institute for Health and Care Excellence).[4]
- Good Medical Practice (General Medical Council).[5]
- Treatment and Care Towards the End of Life: Good Practice in Decision Making (General Medical Council).[6]
- Organ donation for transplantation: improving donor identification and consent rates for deceased organ donation (National Institute for Health and Care Excellence).[7]

Suggested data to collect

Review of patient records for those identified as being at the end of their life to assess the percentage of patients where best practice has been implemented and documented, including:

- discussion with the patient about end of life care (where this is possible)
- discussion with those close to the patient about end of life care (where this is relevant and appropriate)
- discussion with the patient's referring team about end of life care (where this is relevant)
- clear management plan agreed and documented at the end of life, including completion of do not attempt cardiopulmonary resuscitation form if appropriate
- prescription of anticipatory medications (according to local guidelines)
- consideration of spiritual and emotional support for the patient and those close to them
- discussion with the specialist nurse for organ donation where appropriate.

Quality improvement methodology

- Draw a process map of the patient pathway from end of life being identified through to (and shortly beyond) death.
- How can this pathway be improved for patients (comparing your existing local processes against best practice in national guidelines? This can be enhanced using the data you collected from local casenote reviews).
- What members of the multidisciplinary team will you engage in this improvement work?
- How will you evaluate the impact of changes to ensure it is improving the quality of end of life care? (P plan–do–study–act cycles will be helpful).
- How will you communicate progress with improving aspects of the pathway to the rest of the team? Run charts are a great way of showing improved performance over time.

Mapping

Curriculum competences: RC_BK_22, NA_IS_08, NA_IK_23, RC_HS_04, MT_HS_06, TF_AS_18, CC_D1_07, CC_D1_08, CC_D10_01
CPD matrix codes: 2C06
GPAS 2020: 5.9.11, 5.9.13, 5.9.16, 5.9.17
GPICS 2019: 3.11

References

1. Intensive Care National Audit and Research Centre. Key Statistics from the Case Mix Programme – Adult general critical care units 1 April 2017 to 31 March 2018. London: ICNARC; 2018 (https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports/Summary-Statistics).
2. National Coalition for Hospice and Palliative Care. Clinical Practice Guidelines for Quality Palliative Care. 4th ed. Richmond, VA: NCHPC; 2018. (https://www.nationalcoalitionhpc.org/ncp).
3. Bassford C, Cosgrove J. 3.11 Care at the end of life. In: Faculty of Intensive Care Medicine and Intensive Care Society. Guidelines for the Provision of Intensive Care Services, 2nd ed. London: Faculty of Intensive Care Medicine; 2019. pp. 109–112 (https://www.ficm.ac.uk/standards-research-revalidation/guidelines-provision-intensive-care-services-v2).
4. National Institute for Health and Care Excellence. Care of Dying Adults in the Last Days of Life. Quality Standard QS144. London: NICE; 2017 (https://www.nice.org.uk/guidance/qs144).
5. General Medical Council. Good Medical Practice (https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/good-medical-practice).
6. General Medical Council. Treatment and Care Towards the End of Life: Good Practice in Decision Making. London: GMC; 2010 (https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/treatment-and-care-towards-the-end-of-life).
7. National Institute for Health and Care Excellence. Organ Donation for Transplantation: Improving Donor Identification and Consent Rates for Deceased Organ Donation. Clinical Guideline CG135. London: NICE; 2016 (https://www.nice.org.uk/guidance/CG135).