13 Cardiac and thoracic surgery

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13.1 Delays in thoracic aortic surgery from diagnosis to theatre

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Why do this quality improvement project?

Timely referral and transfer to a specialist centre is required when dealing with acute aortic syndrome. Improvements in this process will ensure better outcomes for patients.[1]

Background

Aortic surgery within the UK takes place in specialist aortic centres with multidisciplinary teams with a specialist interest in prevention, detection and management of aortic disease (acute aortic syndrome and chronic aortic disease). Acute type A aortic dissection has a mortality of 1% per hour or 50% if not operated on within 48 hours.[1] In contained rupture of a thoracic aortic aneurysm, mortality is 54% at six hours.[2] When referral and transfer to a specialist centre is required for treatment, delays can occur, which could lead to significant patient harm. This has been highlighted by the Healthcare Safety Investigation Branch, which reported on the death of a 54-year-old man with an acute diagnosis of Stanford type A aortic disease.[3]

Best practice

- Acute aortic syndrome pathways recommend a door-to-treatment decision within six hours.[4]
- Where lesions are more complex, such as type B dissection or contained rupture, diagnosis should be made within four hours and a decision on their treatment made within six hours.
- The timescales involved in other pathologies such as vasculitis, infection and blunt trauma are difficult to legislate for, but a decision on management is required within six hours.
- Abdominal aortic aneurysms have set standards for timeframes from diagnosis to surgery of 60% of patients within 8 weeks and 100% within 12 weeks.[5]

Suggested data to collect

Acute presentations:

- date and time of symptom onset, hospital admission, diagnostic imaging and referral to aortic centre
- method of referral to aortic centre
- ambulance transfer booking time
- medical escort present
- date and time of arrival at specialist centre and time of surgery
- reasons for any delay in transferring to surgery.

Chronic presentations:

- date of appointment with specialist (chronic)
- date of preoperative assessment (chronic)
- date of surgery
- reason for delay, if applicable.

Quality improvement methodology

- A stakeholder group can be formed, including relevant representation from referring hospitals and specialist aortic centres.
- A process map of patient pathway can be mapped to identify any unnecessary waiting or unreliable steps as areas for improvement.
- The above data collected should be triangulated with morbidity; mortality reviews can be used to identify common themes where care is perceived to be suboptimal.
- Common emerging themes can be targeted for small-scale improvements.
- Run charts can be useful in displaying performance of key process measures over time, to keep staff engaged in making changes and understanding the team's performance.
- Multidisciplinary team meetings are a good opportunity for learning and sharing to identify potential areas for improvement. Teams can also visit other specialist centres to share learning.

Mapping

ACSA standards: 1.1.3.1, 1.5.1.4, 1.1.1.4, 5.4.1.1, 5.4.1.2, 5.4.2.2, 5.4.2.4, 5.4.3.1
Curriculum competences: POM_AK_03, CT_HS_04, CT_HS_10, TF_HS_10, AR_BS_10, AR_HS_09
CPD matrix codes: 1I05, 2A03, 3G00, 3A05
GPAS 2020: 2.1.1, 2.1.3, 2.5.12, 2.5.12, 5.5.42, 5.2.13, 5.2.14, 5.2.15, 5.2.16, 7.3.13, 18.1.1, 18.1.13, 18.1.14, 8.7.2,

Acknowledgements

Mr Mark Field, Consultant Aortic and Cardiac Surgeon, Aortic Dissection Awareness (patient group).

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13.2 Consent for transoesophageal echocardiography

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Why do this quality improvement project?

The use of intraoperative transoesophageal echocardiography (TOE) as a diagnostic and monitoring technique is now routine for many elective cardiac procedures. Current best practice states that patients should be included in the decision-making process when determining anaesthetic technique for elective surgical procedures. This should include decisions regarding the use of invasive monitoring techniques, as their use carries a risk of complications. The risk of associated morbidity from TOE is not insignificant, with reports of up to 1.4% of patients experiencing some form of complication, while the risk of mortality has been quoted as 0.03%.[1,2]

Background

In order 'for consent to be valid, it must be voluntary and informed, and the person consenting must have the capacity to make the decision'.[3] Written consent for TOE in elective cardiothoracic surgery is not routinely obtained in most tertiary units. Information regarding the benefits and risks of the use of TOE is usually provided to the patient verbally by the anaesthetist, following inpatient admission, and during the immediate preoperative period. The patient's capacity to understand and retain information regarding interventions and make an informed choice about their use may be impaired due to a number of confounding factors, such as fear and a desire to prevent delay to surgery. Guidance surrounding consent advises that information should be made available to patients at the earliest opportunity, in a range of formats, to facilitate processing and understanding. The balance between risk and benefit must be considered on an individual patient basis as each patient will have their own definition of acceptable risk. Patients should also be made aware of alternatives to any proposed intervention.

There are a number of recognised complications of TOE.[1] While many complications may be deemed to be minor, damage to the oropharynx or upper gastrointestinal tract can lead to the need for surgery and carries a small risk of mortality. Absolute and relative indications and contraindications to use of TOE are published.[4–6]

Best practice

Information regarding patient consent is available from the following sources:

- RCoA Accreditation Standards.[7]
- RCoA Guidelines for the Provision of Anaesthesia Services.[8]
- General Medical Council.[9]
- Association of Anaesthetists.[10]

Suggested data to collect

- How consent for TOE is obtained in your institution?
  - What are the timings?
  - How is validity of consent assessed?
  - Is consent verbal or written?
- What information is available to patients about the procedure?
  - When do they receive such information: preoperative assessment; after admission to the ward etc?
  - Who is responsible for giving this information?
- How are complications of TOE are identified and documented?
- How are critical incidence and near misses communicated to members of the team?
- What are the alternatives available in case of contraindications for TOE?

Quality improvement methodology

- Survey and interview staff to explore the barriers to taking consent for TOE. Consider using some behaviour change models to think about how to improve consent. Do staff have the right resources (time, supporting leaflets etc) and are motivated to take consent (do they believe it is necessary)?
- Consider co-designing information leaflets with patients to ensure that they are clear and meet patients' expectations. Are there any other ways you can share helpful information (eg via video or on the hospital website)?

Mapping

ACSA standards: 1.2.1.1, 3.1.1.1, 3.1.2.1, 3.1.1.2

Curriculum competences:
Core: OA_BK_11, OA_BK_12, POM_BS_08, AR_BS_06
Intermediate: POM_IS_03, PC_IK_12
Higher/Advanced: CT_HS_02, CT_HS_10, POM_HK_04, AR_HS_05

CPD matrix codes: IF01, 1I05, 3G00

GPAS 2020: 2.9.1, 2.9.4, 2.9.13, 18.2.11, 18.3.22, 18.9.3, 6.9.1, 6.9.4, 10.9.1, 10.9.2

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13.3 Timeliness of primary percutaneous coronary intervention for ST-segment elevation myocardial infarction

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Why do this quality improvement project?

Prolonged door-to-balloon times in patients with ST-segment elevation myocardial infarction (STEMI) are associated with increased mortality, notably in those with cardiogenic shock or following out-of-hospital cardiac arrest.[1,2] This quality improvement project focuses on improving provision of primary percutaneous coronary intervention (PCI).

Background

Anaesthetists are frequently involved in the multidisciplinary care of patients undergoing primary PCI. Specific groups include those requiring organ support or sedation or following out-of-hospital cardiac arrest. It is important to ensure that timely assistance is provided to maximise the outcomes for these patients.

The FITT-STEMI trial found that after one hour from first medical contact, every 10-minute treatment delay resulted in 3.3 additional deaths per 100 PCI-treated patients with cardiogenic shock, and 1.3 additional deaths per 100 patients after out-of-hospital cardiac arrest without cardiogenic shock.[3] Centres will differ in their provision of acute cardiology services.

Best practice

The European Society of Cardiology and the European Association for Cardio-Thoracic Surgery recommend reperfusion in patients less than 12 hours from symptom onset with persistent ST-segment elevation. Primary PCI should be offered in a timely fashion with a 24/7 service at specialist centres. Primary PCI should be performed as soon as possible.[3]

Suggested data to collect

Standards	Measures
PCI centre	
Time from first medical contact to diagnosis less than 10 minutes.[3,4]	■ Time from diagnosis to reperfusion (wire crossing) less than 60 minutes. ■ Percentage of patients undergoing primary PCI after STEMI where the diagnostic time target has been met. ■ Percentage of patients undergoing primary PCI after STEMI where the therapeutic time target has been met.
Non-PCI centre	
Time from first medical contact to diagnosis less than 10 minutes.[3,4]	■ Time from diagnosis to reperfusion by PCI less than 90 minutes. ■ Percentage of patients undergoing primary PCI after STEMI where the diagnostic time target has been met. ■ Percentage of patients undergoing primary PCI after STEMI where therapeutic time target has been met.
Out-of-hospital cardiac arrest	
Time from return of spontaneous circulation to reperfusion less than 120 minutes.[3,4]	■ Percentage of patients undergoing primary PCI after out-of-hospital cardiac arrest where the therapeutic time target has been met.

ST-segment elevation myocardial infarction.	■ Time of symptom onset. ■ Time of first medical contact (hospital arrival or emergency medical services). ■ Time of STEMI diagnosis. ■ Time catheterisation laboratory activated. ■ Time catheterisation laboratory ready. ■ Time of arrival into catheterisation laboratory. ■ Procedure start time. ■ Revascularisation time. ■ Pre-hospital times (eg time of ambulance arrival). ■ Pre-hospital and in hospital airway management. ■ Anaesthetic intervention(s) required.
Additional data fields in out-of-hospital cardiac arrest.	■ Time of collapse. ■ Time of return of spontaneous circulation. ■ Time without basic life support (this includes provision by bystanders). ■ Initial rhythm. ■ Requirement for imaging before transfer.

Quality improvement methodology

- Construct a process map of the patient pathway and annotate your measured times on the map. Which steps are the cause of greatest delay? How can you mitigate or reduce these delays?
- Multidisciplinary learning is an effective way of engaging staff and an opportunity to discuss change ideas and how they may be implemented. Simulation is a useful way to trial new ideas in a low-stress environment. Simulate the journey of a patient to the cardiac catheterisation laboratory. Can you make any improvement to the logistics involved? Is all equipment easily accessible and are lines of communication clear and easy?

Mapping

ACSA standards: 1.5.1.4, 5.4.2.4, 5.4.2.16

Curriculum competences:
Basic: RC_BK_21, RC_BS_10, AR_BS_11
Intermediate: CT_IK_04, TF_IK_07, TF_IS_01, TF_IS_05, TF_IS_09
Higher: CT_HS_10, CT_HS_11, POM_HK_04, AR_HS_05, AR_HS_07

CPD matrix codes: 1I05, 2A08, 2A11, 2A12, 3G00

GPAS 2020: 18.1.6, 18.1.7. 18.1.10, 18.1.11, 18.2.1, 18.2.2, 18.2.3, 18.2.18, 18.3.18, 18.3.19, 18.3.20, 18.3.21, 18.4.1, 18.5.6, 18.5.7, 18.7.2

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13.4 Adherence to patient blood management for cardiac surgery

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Why do this quality improvement project?

Cardiac surgery is associated with perioperative blood loss and a high risk of transfusion. Reducing blood product use has the potential to avoid transfusion-related complications, decrease adverse postoperative events and reduce health care costs.

Background and best practice

The three pillars of perioperative blood management include preoperative, intraoperative and postoperative measures aimed at identifying patients at high risk of bleeding and pre optimising them, maintaining haemostasis, minimising blood and microvascular blood loss postoperatively. The first two pillars are particularly open to influence by the anaesthetist. Detection and management of preoperative anaemia has been shown to reduce perioperative transfusion.[1] The National Institute for Health and Care Excellence recommends that all patients presenting for elective surgery should have their haemoglobin measured at least two weeks prior to surgery and, if necessary, preoperative management of any coexisting anaemia.[2] International consensus guidelines advise optimising haemoglobin to 130 g/l in both sexes prior to surgery.[3]

Intraoperatively, the use of antifibrinolytics has been shown to reduce hyperfibrinolysis and bleeding. Both tranexamic acid and aprotinin have been extensively studied and have been shown to reduce the risk of reoperation for bleeding in cardiac surgery.[4,5] The use of cell salvage may contribute to an overall reduction in the need for transfusion. In cases with cardiopulmonary bypass, the use of cell salvage rather than cardiotomy suction may help to prevent systemic inflammation and continued bleeding, as cardiotomy suction may activate platelets and cause extracorporeal thrombin generation.[6] The washing of blood has been shown to reduce inflammation.[7]

Suggested data to collect

There are five subcategories used to calculate the total composite score. All subcategories should be completed to indicate whether guidelines are being met. Operative urgency should also be recorded as, for patients in need of urgent surgery, there will be less time to optimise and investigate preoperative anaemia.

Denominator: Patients aged 18 years and above who undergo a cardiac operation.

Numerator: Patients for whom selected blood conservation strategies were used.

- Preoptimisation of haemoglobin (Aim more than 130 g/l in both sexes):
  - numbers of patients presenting for surgery with suboptimal haemoglobin
  - numbers of patients with anaemia who had received supplemental iron (intravenously or orally)
  - percentage of total patients with anaemia.
- Use of antifibrinolytics:
  - percentage of patients who received intraoperative tranexamic acid or aprotinin.
- Use of red-cell salvage using centrifugation:
  - percentage of patients receiving cell-saved blood
  - volume of cell saver collected and given (do not include autologous, allogeneic, pump-residual, or chest-tube recirculated blood)
  - percentage of patients receiving cardiotomy blood after bypass.
- Use of transfusion algorithm supplemented with point-of-care testing:
  - Does the unit use point-of-care testing?
  - Does the unit have an evidence-based transfusion algorithm?
  - Percentage of patients having product transfusion without point-of-care testing.
- Bleeding rates/take back to theatre for bleeding as a percentage of numerator:
  - percentage of patients needed re-exploration for bleeding.

Quality improvement methodology

Draw a process map of the patient journey to identify areas for potential improvement:

- When and how are patients with anaemia identified?
- What changes can you make to the pathway to enable earlier detection of anaemia? Remember to measure any balancing measures of changes you introduce (eg the impact of patient experience or delays to surgery).
- What information do patients receive to inform them of the importance of managing anaemia, encouraging compliance with medication and dietary changes?
- A driver diagram will help to identify potential issues that can be targets for improvement.

Mapping

ACSA standards: 1.2.1.1, 2.2.2.2

Curriculum competences:
Core: IN_BS_01, POM_BK_11, POM_BS_04, AR_BK_05
Intermediate: POM_IK_03, POM_IK_07, POM_IS_14, POM_IS_15
Higher: POM_HK_01, POM_HK_04, AR_HS_05

CPD matrix codes: 2A03, 2A05, 3G00

GPAS 2020: 18.2.6, 18.2.7, 18.2.8, 18.2.25, 18.2.26

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13.5 Simulation in cardiothoracic anaesthesia

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Why do this quality improvement project?

Multiple studies have shown the benefit of simulation to improve patient safety both through improvement in clinical skills and behaviours.[1,2] ACSA guidelines recommend multidisciplinary training for emergencies based on the Guidelines for the Provision of Anaesthetic Services (GPAS).[3,4] Use of simulation allows a department to address a number of different requirements including:

- technical skills training
- equipment training
- environment familiarisation
- testing standard operating procedures
- human factors
- multidisciplinary team working.

Background

Cardiac anaesthesia and critical care are staffed by many different professions and experience levels who will often be unfamiliar with the environment, equipment and procedures. Teams may only meet for the first time at the start of an emergency and high patient turnover may preclude prior in-depth knowledge of the patient's background. Non-technical skills, such as communication, situational awareness and leadership, are essential. The benefits of simulation to improve these areas have been well known in the aviation industry,[5] and are now being transitioned into the healthcare industry not only to improve non-technical skills but also to guide wider organisational changes.[6]

Best practice

- ACSA standard 4.4.3.2: There is regular multidisciplinary team training for emergency situation.
- GPAS 5.4.5: Teams should train for and practise their standard operating procedures for serious, complex and rare emergencies, as well as major incidents. There should be regular multidisciplinary training for emergency situations, and simulation training should be considered.
- The benefits of simulation training decrease over time and are almost entirely gone after one year. For this reason, multidisciplinary team training should be available on a monthly basis. Individuals should attend at least annually.

Suggested data to collect

Cath lab:

- the deteriorating patient
- cardiac arrest
- inter- and intra-hospital transfer of patients for cardiological interventions.

Critical care:

- cardiac arrest
- reopening of chest in the unit
- accidental extubation
- preparation for transfers.

Design and implementation

- In-situ compared with simulation suite: In-situ simulation will have the benefit of environment familiarisation but the impact on patient care should be considered.
- Timing: use of an audit/educational day will allow the greatest number of staff to be involved. Induction days for incoming trainees are an alternative option but are likely to reduce the multidisciplinary approach. Prior announcement will potentially increase the likelihood that a session will go ahead but may reduce some of the benefit that may come from the surprise element.
- Equipment and personnel: engagement with local education departments may help with session design and implementation as well as the provision of equipment including high-fidelity manikins and spare consumables (eg laryngoscopes, endotracheal tubes). A minimum of two but preferably three people are recommended to facilitate a simulation session, with the following roles as a guide:
  - first person – introduces, directs a session and leads debrief.
  - second person – controls the manikin and adjusts the monitoring.
  - third person – assists with maintenance of fidelity by filling in missing multidisciplinary team roles.
- Session content: provide context via an initial background brief. Ensure that the outline of the session has been created, including the anticipated clinical course with all the necessary physiological parameters. Where required, imaging and bloods should be printed and given to the participants on request.
- Alinier has created a useful resource for the design and implementation of a simulation session.[7]

Feedback

Feedback is best given via a 'hot' debrief immediately after the simulation session. Areas to focus on include:

Technical skills:	Clinical knowledge
	Ability to use equipment
Non-technical skills:	Communication and handover between teams
	Situation awareness
	Leadership
	Team working
Organisation issues:	Staffing
	Standard operating procedures
	Functionality and availability of equipment

Any areas of risk highlighted should be noted and reported via the local governance chain.

Quality improvement methodology

- Simulation and multidisciplinary team teaching are good opportunities to get various members of the team together. New ideas can be developed and trialled in a low-risk environment.
- Processes such as handovers and transfers can be practised/drilled.
- Having different perspectives will ensure that ideas are viable and likely to make sustained improvement.

Mapping

ACSA standard: 2.5.6.2

Curriculum competences:
Core: CI_BK_31, CI_BK_34, CI_BS_03, CI_BS_04, CI_BS_06
Intermediate: CT_IK_09, CT_IK_24, CI_IS_01, CT_IS_02, RC_IS_05, RC_IS_07, TF_IK_06, TF_IK_08, TM_IS_06, TM_IS_09
Higher/Advanced: CT_HS_08, CT_HS_11, RC_HS_02, DI_HK_01, DI_HS_01, IS_K_05, IS_K_06, TM_HK_04, TM_HS_08, TM_HS_09, TM_AK_22

CPD matrix codes: 1B04, 1I02, 1I03, 2A06, 3G00

GPAS 2020: 18.1.4, 18.4.7, 18.5.5

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13.6 Pain control in thoracic surgery

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Why do this quality improvement project?

Good pain relief after thoracic surgery is essential to improving patient experience and outcomes. Pain after thoracic surgery, especially after thoracotomy, is severe. It has multiple implications, including the inability to adequately clear secretions by effective coughing, respiratory failure due to splinting, both of which predispose to postoperative chest infections.[1,2] In addition, thoracic surgery is generally performed on patients with multiple comorbidities including cardiorespiratory disease, predisposing them to poor outcomes. Thoracic surgery is also a high-risk surgery for the development of chronic pain, which is quoted to affect more than 50% of patients.[1,3] Adequate pain relief after thoracotomy may reduce the likelihood of developing chronic pain.

Background

Thoracic epidural analgesia has been considered the 'gold standard' for pain management after thoracotomy but many centres have moved to the use of paravertebral blocks as a lower-risk effective alternative. Regardless, severe ipsilateral shoulder pain and the prevention of the post-thoracotomy pain syndrome remain the most important challenges for post-thoracotomy pain management. Thoracic anaesthetists should consider using a multimodal approach to analgesia when treating patients undergoing thoracic surgery, using a combination of regional anaesthetic blockade and systemic analgesia, with both non-opioid and opioid medications and local anaesthesia blockade.[1,2]

Best practice

The RCoA Guidelines for the Provision of Anaesthetic Services for Cardiac and Thoracic Procedures highlighted the importance of clearly defining pain relief protocols for thoracic surgery patients.[4]

Analgesic options must be tailored for each patient after a discussion between the anaesthetist and surgeons about the best option with involving patients themselves. The anaesthetist should balance the risks and benefits for each technique.

Suggested data to collect

- Percentage of patients receiving intraoperative supplementary blocks either by anaesthetists or surgeons.
- Percentage of patients who have received thoracic epidural analgesia admitted to the high-dependency unit for at least 24 hours.
- Analgesic efficacy:
  - patient satisfaction in postoperative period – 90% of patients to be satisfied with analgesia on day 1 post-thoracotomy
  - pain scores, including effectiveness of pain relief on deep breathing
  - failure of technique
  - supplemental analgesia
  - opioid consumption.
- Percentage of delayed discharges due to insufficient pain control.
- Frequency and management of adverse effects.
- Percentage of patients requiring opioid patient-controlled anaesthesia post-thoracotomy.
- Other measures could include:
  - length of hospital stay
  - critical incidents or near misses in relationship to pain management and intraoperative blocks.

Quality improvement methodology

- Construct a driver diagram to identify areas which influence pain management. You can use this to produce change ideas.
- Management of acute pain post-thoracotomy:
  - A stakeholder group should be used to design the patient pathway and develop local pain protocols.
  - Produce supporting information aimed at patients, nursing, associated health professionals and medical staff. Why is this important and what is their role?
- Identification of chronic post-thoracotomy pain:
  - Process map the pathway of identifying patients at risk of developing chronic post-thoracotomy pain.
  - How are these patients are identified and by whom?
  - Where are the points that an intervention can be trialled?
  - Patient feedback and surveys are a good way to identifying issues important to them to ensure that any change implemented is sustained and meaningful.

Mapping

ACSA standards: 1.4.5.1, 3.1.1.2, 5.4.3.2, 5.4.1.5, 5.4.2.7, 5.4.2.8, 5.4.2.15

Curriculum competences:
Core: PO_BK_07, PO_BS_07, PM_BS_01, PM_BS_06, POM_BK_21, POM_BK_31, AR_BK_05, AR_BS_10, AR_BS_11
Intermediate: CT_IK_19, CT_IK_24, CT_IS_15, POM_IK_18
Higher: CT_HS_16, POM_HK_04, POM_HK_10, POM_HK_14

CPD matrix codes: 1D01, 1D02, 2E01, 3G00, 3E00

GPAS 2020: 4.1.11, 18.2.22, 18.2.24, 18.2.33, 18.1.8, 18.3.22, 18.2.31, 18.7.2

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13.7 Acute pain management after cardiac surgery

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Why do this quality improvement project?

Acute pain following cardiac surgery is common and is associated with increased risk of respiratory complications, a prolonged length of stay and chronic post-sternotomy pain.[1–4] Acute pain management has been the subject of clinical protocols but adherence to these protocols can be poor.[3,5]

Background

Acute pain post-surgical intervention should be overseen by an acute pain team.[6] Acute pain rounds should be conducted at least once a week by consultants with acute pain training. Other members of the acute pain team may conduct more frequent pain rounds but a consultant should always be available for advice.

For the acute pain service to be effective, patients with poor pain control must first be identified. The assessment of pain severity should be standardised and specified in protocols.[3] In practice, on the wards this often means assessing pain at the time of performing observations for the National Early Warning Score (NEWS) chart. In the critical care unit this scoring may occur more frequently.[7]

Best practice

- To optimise the treatment of postoperative pain, protocols should specify that prescriptions include multimodal regular and as-needed (PRN) analgesia.[3,5]
- To minimise the risk of accidental overdose, protocols should include initial use of mild, short-acting opioids before escalation to stronger long-acting opioids and this should be reviewed regularly.[8]
- Administration of PRN medication has been identified as a factor contributing to poor pain management in this setting.[3,5]
- Where pain relief is inadequate after initial treatment escalation to a pain specialist should be part of the pain protocol.[6]

Suggested data to collect

- Presence of a pain protocol including prescription of postoperative analgesia and recommendation for escalation to acute pain team.
- Weekly consultant-led acute pain rounds covering all acute pain patients.
- Prescription of regular and PRN simple analgesia, as per the local protocol.
- Appropriate use of mild/short-acting opioids before escalation to long-acting strong opioids.
- Pain assessed regularly on taking NEWS observations (critical care and ward).
- Frequency of appropriate administration of PRN analgesia with one hour of a pain score above mild.

Quality improvement methodology

- What are the barriers to patients accessing good pain relief? Ask patients, relatives, ward staff and acute pain teams for their views on how to improve. Are there any concerns among ward staff on prescribing strong opioids? How could you address their concerns?
- Draw a driver diagram of the local drivers to good pain relief, based on the views of your local team. An example could look like Figure 13.7.1.

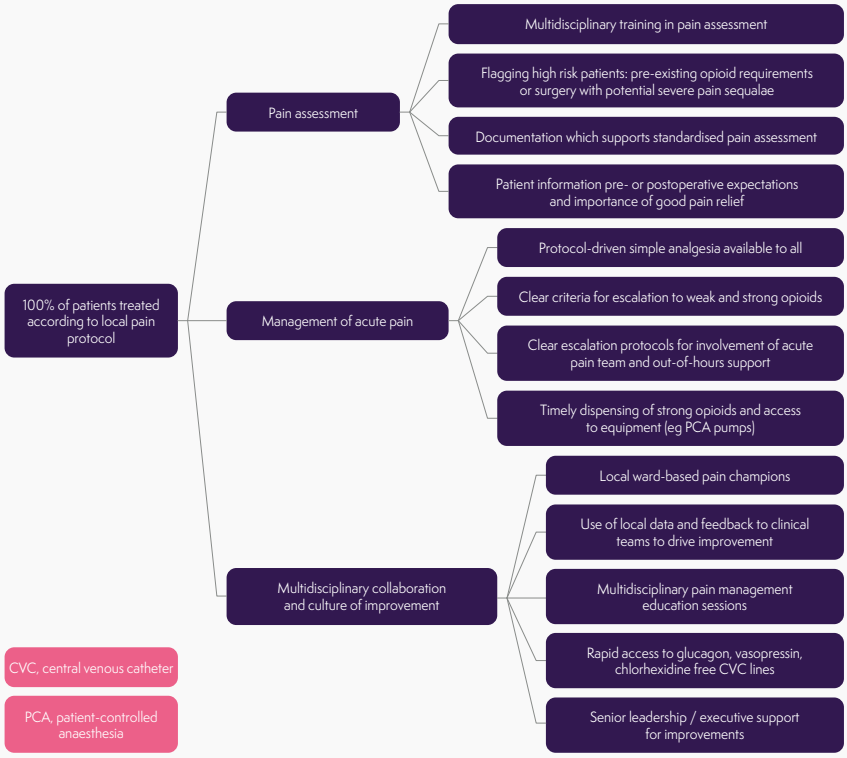

Figure 13.7.1: Driver diagram to improve outcomes and follow-up care of patients with suspected perioperative anaphylaxis.

Mapping

ASCA standards: 1.4.1.2, 1.4.5.4, 5.4.3.2, 5.4.1.5, 5.4.2.7, 5.4.2.8, 5.4.2.15

Curriculum competences:
Basic level: PO_BK_07, PM_BK_04, PM_BK_08
Intermediate level: PM_IK_01, AR_IS_03
Higher level: CT_HK_04, POM_HK_14, PM_HK_02, AR_HS_05, AR_HS_07, POM_HS_17

CPD matrix codes: 1D01, 1I05, 3E00, 3J02, 3G00

GPAS 2020: 4.1.11, 18.2.22, 18.2.24, 18.2.33, 18.1.8, 18.3.22, 18.2.31, 18.7.2

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13.8 Enhanced recovery after thoracic surgery: patient information, education, counselling and preoperative rehabilitation

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Why do this quality improvement project?

Regardless of the type of surgery, ERAS® Society guidelines recommend preadmission counselling and education. These efforts may reduce anxiety, improve recovery, enhance would healing and decrease hospital length of stay. A variety of approaches are acceptable, including personal counselling, printed materials and electronic media, alone or in combination.[1] Preoperative prehabilitation is the process of enhancing the functional and physiological capacity of an individual to enable them to withstand a stressful event, which may aid recovery after surgery.[2]

Background

Preoperative counselling helps to set expectations about surgical and anaesthetic procedures and may diminish fear, fatigue and pain and enhance recovery and early discharge.[3] Verbalised education, leaflets and multimedia information containing explanations of the procedure and cognitive interventions may improve pain control, nausea and anxiety after surgery and general anaesthesia.[4] Similar results have been demonstrated in patients provided with preoperative video information prior to lung resection.[5] Preoperative exercise and smoking cessation in patients undergoing lung resection due to lung cancer significantly improve pulmonary function and functional capacity, reduce postoperative morbidity and hospital length of stay. However, when exercises were performed only postoperatively, length of stay and postoperative morbidity did not reduce.[6,7]

Best practice

- Association of Anaesthetists: Consent for Anaesthesia.[8]
- RCoA Cardiothoracic Accreditation Standards Domain 5.[9]
- Guidelines for Enhanced Recovery after Lung Surgery: recommendations of the Enhanced Recovery After Surgery Society and the European Society of Thoracic Surgeons.[3]

Suggested data to collect

Assessing the distribution of preoperative management:

- Percentage of patients receiving information material, verbal information and counselling in the correct time frame before being actively involved in the enhanced recovery after surgery (ERAS) protocol.
- Percentage of patients receiving appropriate education including the attendance in preoperative clinics and 'surgery schools'.
- Percentage of suitable patients enrolled to the prehabilitation programmes before lung resection.

Assessing quality and suitability of preoperative management:

- Percentage of clinical pathway steps in the ERAS protocol clearly mentioned in patient information material.
- Percentage of preoperative rehabilitation measures validated against the most recent evidence for ERAS protocol preoperative rehabilitation.

Assessing the effectiveness of preoperative management:

- Percentage of patients satisfied with the information delivered in the preoperative period and their preferred materials.
- Percentage of ERAS protocols targets achieved among patients who had the set of information and received appropriate preoperative rehabilitation.

Quality improvement methodology

Patient information

- Patient information should be co-designed with patients, where possible, and certainly reviewed by patient groups before publication. Find out what concerns patients most want addressed prior to surgery and ensure that they are included in your information.
- Could your patient information be supported by website or video resources, as well as paper leaflets? Are your resources accessible to those who do not have English as a first language or have other access needs?

Prehabilitation

- Draw a process map of patient journey to identifying where patients can be invited; can this be done earlier in the pathway to facilitate more time for prehabilitation prior to surgery?
- Do prehabilitation education resources use behavioural psychology or 'nudge' principles to encourage behaviour change?[9]

Mapping

ACSA standards: 5.4.1.2, 5.4.1.6, 5.4.3.3
Curriculum competences:
Core: POM_BK_11
Intermediate: CT_IS_09, POM_IK_04, POM_IK_21
Higher/Advanced: CT_HK_01, CT_HS_12, CT_HS_13, POM_HK_02, POM_HK_04
CPD matrix codes: 1I05, 2A03, 3G00
GPAS 2020: 2.5.22, 2.5.12. 18.3.22, 18.9.1, 18.9.2, 18.9.3, 18.9.4, 18.1.8, 18.2.18, 18.2.20, 18.5.4, 18.2.31, 18.7.2

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13.9 Postoperative critical care provision in thoracic surgery

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Why do this quality improvement project?

Thoracic surgery impairs pulmonary function postoperatively and carries a higher pulmonary complication rate compared with most other surgeries. Therefore, optimisation of postoperative care in an intensive care setting aims to:

- reduce postoperative pulmonary complications
- reduce hospital stay
- reduce readmission rates to intensive care and high-dependency units
- reduce the number of deaths.

The use of integrated postoperative clinical pathways in thoracic critical care units allows the administration of evidence-based practice in a standardised manner.[1,2]

Background

Postoperative pulmonary complications contribute significantly to morbidity and mortality following thoracic surgery. The ageing patient population, with an increasing number of comorbidities, has required further focus in the optimisation of perioperative care and the identification of the high-risk patient. Preoperative risk factors such as increasing age, smoking status, cardiorespiratory comorbidities and poor pulmonary function are all associated with increased rate of postoperative complications.

The basics of postoperative care can significantly impact on the overall outcome of the patient and reduce complication rates. Postoperative strategies such as early mobilisation, regular chest physiotherapy, fluid and electrolyte management, regional anaesthesia, atrial fibrillation prevention and good management of chest drains can all reduce future respiratory complications.[3]

Best practice

The Guidelines by the Enhanced Recovery After Surgery (ERAS®) Society and the European Society of Thoracic Surgeons suggest measures that would be strong indicators for providing optimal postoperative care for the thoracic patient and improving outcomes.[1]

Suggested data to collect

Standards	Measures
Regional anaesthesia should ideally use paravertebral blocks and intercostal catheters in conjunction. These have been shown to be as effective as thoracic epidurals but carry a lower adverse effect profile.[4]	■ Percentage of patients who received intraoperative paravertebral blocks and/or intrapleural catheter.
Multimodal analgesia, including paracetamol, nonsteroidal anti-inflammatory drugs where appropriate and the judicious use of opioids. Ketamine can be used in patients with chronic pain.	■ Percentage of patients who received a multimodal analgesia prescription.
Fluid and electrolyte management- 2-3 ml/kg/hour of balanced crystalloids for initial fluid maintenance and aim for euvolaemia.	■ Percentage of patients who had balanced crystalloids and percentage of patients where enteral feeding was resumed on day 1 postoperatively.
Atrial fibrillation prevention and management: avoid acute withdrawal of beta blockers. Consider prophylaxis with diltiazem or amiodarone in the high-risk patient.	■ Percentage of patients who continued to use beta blockers in the postoperative period where appropriate.
There is no routine indication for urinary catheter use if preoperative renal function is normal.	■ Percentage of patients who had a urinary catheter inserted.

Chest drain management: avoid routine external suction on chest drain, digital drainage systems to allow early mobilisation and single chest tube use for lobectomies.	■ Measure: percentage of patients where chest drains were removed if serous fluid output less than 450 ml/24 hours.
Use of digital drainage system: early postoperative physiotherapy at least twice daily and early mobilisation day 1 postoperatively.	■ Percentage of patients who had twice daily physiotherapy and were mobilised on day 1 postoperatively.
Postoperative nausea and vomiting prophylaxis: risk stratification according to the Apfel score.	■ Percentage of patients who had Apfel score documented and postoperative nausea and vomiting treated.
Venous thromboembolism (VTE) prophylaxis from day 1 of admission to hospital.	■ Percentage of patients who had VTE prophylaxis prescribed from day.[1]
Documentation of complication monitoring: postoperative bleeding, bronchopleural fistula, persistent air leak, wound sites monitoring.[1]	

Quality improvement methodology

- Process map the critical care postoperative patient journey following thoracic surgery. Are there any concerns among ward staff on administering strong opioids? Highlight which patients should be admitted postoperatively to a critical care environment based on perioperative risk factors.
- Consider formulating a departmental clinical pathway for the postoperative management of thoracic patients in a critical care environment. The pathway could include subsections for nursing, surgical, medical and allied health professional care. Could you develop 'pain management champions' within these professional groups, to teach and encourage their peers?

Mapping

ACSA standards: 1.4.1.2, 1.1.3.1, 5.4.1.5, 5.4.2.7, 5.4.2.8, 5.4.2.9, 5.4.2.10

Curriculum competences:
Core: PO_BK_06, PO _BS_07, PO_BS_08, POM_BK_31, POM_BK_33
Intermediate: CT_IK_24, CT_IS_15, POM_IK_21
Higher: CT_HS_16, POM_HK_04, POM_HS_17

CPD matrix codes: 1I05, 3G00

GPAS 2020: 18.1.8, 18.2.3, 18.2.33, 18.2.20, 18.2.32, 18.5.4, 18.7.2, 18.9.2

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13.10 Postoperative delirium screening and management

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Why do this quality improvement project?

After cardiac surgery, patients diagnosed with delirium have a prolonged intensive care unit (ICU) stay and longer intubation times, higher risk for falls, increased length of stay in the hospital, higher likelihood of discharge to a nursing home or home with assisted care and prolonged inpatient physical therapy duration.[1] Delirium after coronary artery bypass graft surgery is also associated with increased mortality up to 10 years postoperatively.[2]

Background

The incidence of delirium after cardiac surgery in patients above 65 years is 21.4%. The stress associated with cardiac surgery, especially when cardiopulmonary bypass is used, leads to a systemic inflammatory response. When this occurs, the brain is susceptible to neuronal injury via neuroinflammation and the activation of microglia ensues which may be a key component to the development of delirium.[3] A review by Kotfis et al highlighted factors which are strongly associated with increasing the risk of developing delirium postoperatively.[4]

Non-pharmacological interventions such as reorientation, effective communication and maintenance of consistent sleep–wake cycles are considered first-line interventions for delirium. Second-generation antipsychotics were shown to decrease the incidence of postoperative delirium when administered prophylactically.[5]

Best practice

- A clinical pathway including detailing the whole perioperative pathway should be agreed. Where 'fast track' cardiac surgery is carried out there are agreed robust criteria for managing patients.[6]
- All patients should be assessed for delirium risk factors as part of a preoperative assessment. The National Institute of Health and Care Excellence guidelines suggest the risk factors scored should include: over 65 years of age, chronic cognitive decline or dementia, poor vision or hearing, severe illness and presence of infection. There are further risk factors listed on the American Geriatrics Society Expert Panel postoperative delirium best practices guideline.[8]
- Perioperative measures to prevent delirium:[8]
  - Medication review and appropriate medication management.
  - Adequate pain relief and regional analgesia and non-opioid analgesia where possible.
  - Daily postoperative rounding by the multidisciplinary team including elderly care liaison if appropriate.
  - Nutritional and fluid repletion enhancement.
  - Non-pharmacological prevention may include sensory aids (ensuring glasses, hearing aids or listening amplifiers), mobility enhancement (ambulating at least twice per day if possible), cognitive orientation and therapeutic activities (tailored to the individual).
  - Sleep enhancement (daytime sleep hygiene, relaxation, nonpharmacologic sleep protocol and night-time routine).
- Patients should be screened daily postoperatively. The confusion assessment method for the ICU (CAM-ICU) and the Intensive Care Delirium Screening Checklist are the most valid, sensitive and specific tools for detecting and monitoring delirium in adult ICU patients.[7]
- Postoperative delirium best practices guideline published by the American Geriatrics Society Expert Panel is used to equip the healthcare professional caring for older adults in the perioperative setting with a set of evidence-based recommendation statements regarding the optimal care of older adults with delirium.

Suggested data to collect

Assessment of delirium risks in before cardiac surgery:

- Percentage of patients who had documented risk assessment for the development of postoperative delirium.
- Percentage of patients having pharmacological assessment for medications with potential association with postoperative delirium.

Prevention of delirium:

- Percentage patients suitable for regional analgesia who have an epidural.
- Percentage of multidisciplinary team members who have had some teaching on delirium.

Screening for delirium perioperatively:

- Percentage of patients who had daily review and screening for delirium.

Assessing the effectiveness of postoperative delirium management:

- Percentage of patients with delirium receiving senior medical review and screening for sepsis.
- Percentage of patents with postoperative delirium achieving the fast track targets in relation to length of hospital stay.

Quality improvement methodology

- Write a process map detailing the patient pathway from referral to discharge home. At what point does screening occur and how are any risk factors managed? Could this be done earlier in the pathway? How are patients kept informed along the pathway?
- Form a multidisciplinary stakeholder group to look at patient pathways:
  - How are high-risk patients identified and what mechanisms for communication exist between professional groups (eg medication review by pharmacist, care of the elderly liaison etc)?
  - Are bedside guidelines and routes of escalation and communication clear for staff managing a delirious patient?
- Patient involvement is key to implementing any meaningful and lasting change. Consider recording and sharing some patient stories with your stakeholder group to illustrate the importance of delirium and its effect on patients and their families.
- What are learning and training opportunities on prevention and detection of delirium and can staff access them? Is there learning you can share from other part of the hospital (eg care of elderly or orthopaedic wards) or from visiting other centres?

Mapping

ACSA standards: 1.2.1.4, 1.2.1.5
Curriculum competences:
Intermediate: CT_IS_01
Higher: CT_HK_01, CT_HK_04, CT_HS_04
CPD matrix codes: 1I05, 2A03, 3G00
GPAS 2020: 18.1.8, 18.2.18, 18.2.20, 18.2.22, 18.5.3, 18.5.4, 18.9.1, 18.9.2

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