pomVLAD

near real-time reporting of risk-adjusted postoperative morbidity outcomes

PQIP Perioperative Quality Improvement Programme

NIAA HSRC Health Services Research Centre

The Health Foundation Inspiring Improvement

The pomVLAD project aims to support local quality improvement through rapid feedback of risk-adjusted morbidity outcomes and targeted process measures via an online dashboard.

pomVLAD is nested within the Perioperative Quality Improvement Programme (PQIP) and will be launched in 10 hospitals in late April 2018. There is no additional burden of data collection as the information used is routinely collected by PQIP. Outcome data will be available via the PQIP webtool immediately when patient records are locked.

The dashboard will be available for all specialties recruiting to PQIP, but the targeted recommendations are aimed at abdominal surgical specialties.

pomVLAD is part of the Health Foundation's Innovating for Improvement programme. The Health Foundation is an independent charity committed to bringing better health and health care for people in the UK.

Defining postoperative morbidity and POMS major

Within the pomVLAD project morbidity is defined using the Postoperative Morbidity Survey (POMS)[1] on postoperative day 7. POMS is a valid and reliable measure of short term postoperative morbidity[2,3]. We will use 'POMS major' as our outcome measure which includes POMS criteria equivalent to a Clavien-Dindo grade II complication and above[4,5].

The following criteria are classified as POMS major:

Pulmonary
- New requirement for oxygen
- New requirement for respiratory support

Infectious
- Currently on IV antibiotics

Renal
- Increased serum creatinine (>30% from preoperative level)
- Presence of oliguria <500ml/24 hours

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The following criteria are classified as POMS major:

Cardiovascular

- Thrombotic event requiring anticoagulation (new)
- Atrial or ventricular arrhythmias (new)
- Hypotension (requiring pharmacological or fluid therapy >200ml/hr)
- New myocardial infarction or ischaemia
- Cardiogenic pulmonary oedema

Neurological

- New coma
- New confusion or delerium
- New focal neurological deficit

Haematological

- Platelet, fresh-frozen plasma, or cryoprecipitate transfusion in last 24 hours
- Packed erythrocyte transfusion in last 24 hours

Wound

- Wound dehiscence requiring surgical exploration or drainage of pus from the operation wound with or without isolation of organisms

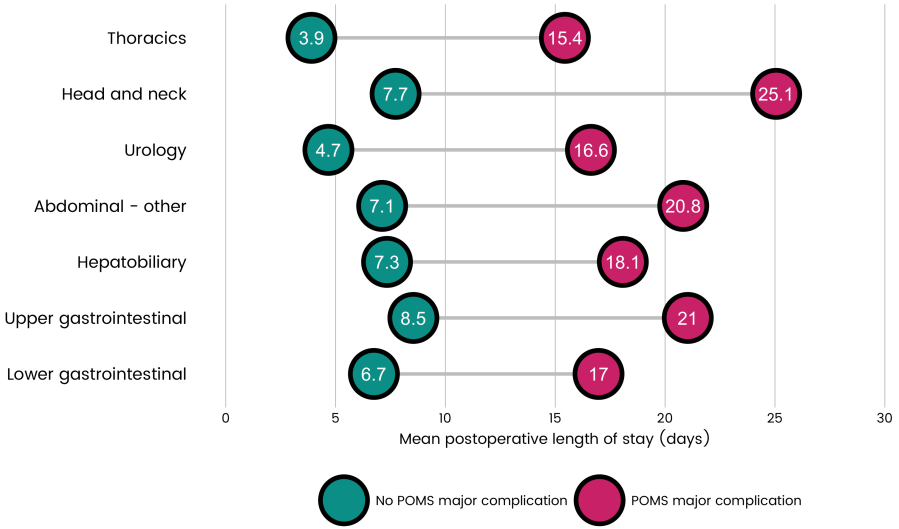
Pain

- New pain significant enough to require regional anaesthesia

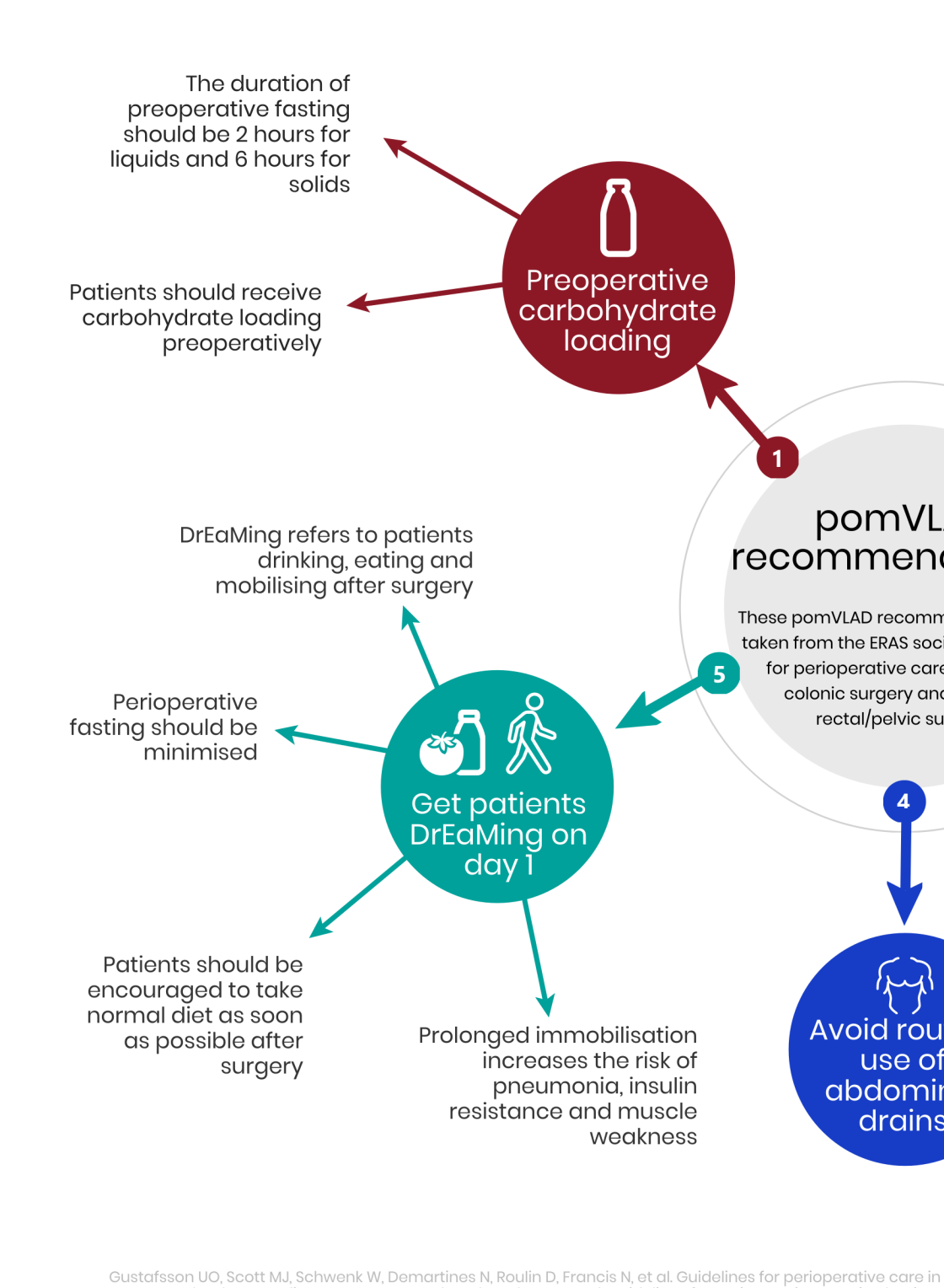
The effect of complications on postoperative length of stay

Complications dramatically increase postoperative length of stay. For patients recruited to PQIP undergoing lower gastrointestinal surgery the mean length of stay was 11 days longer for patients with a POMS major complication.

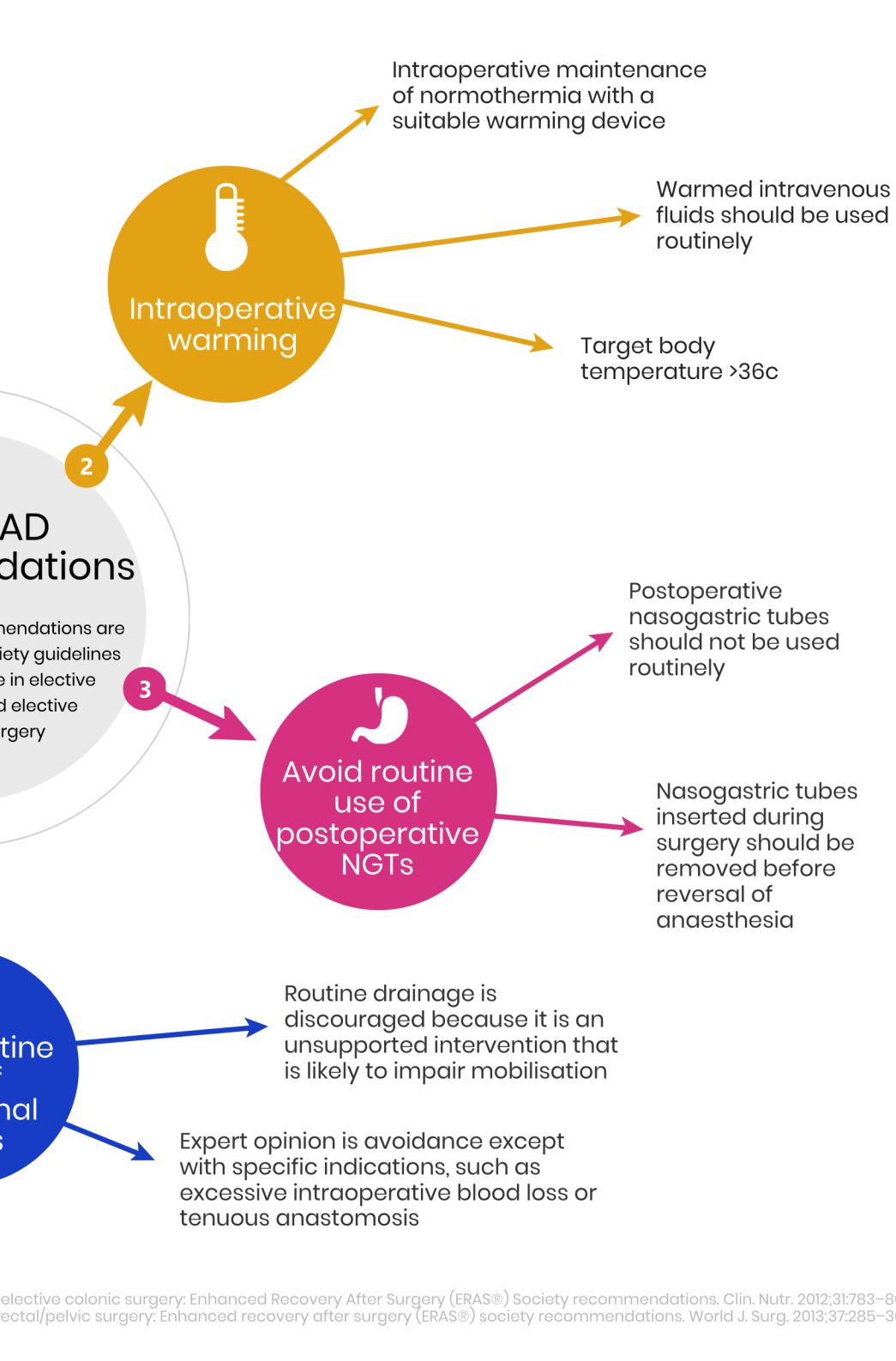
The figure below shows the mean postoperative hospital length of stay for patients recruited to PQIP who suffered a POMS major complication and those who did not*.



*Data from the Perioperative Quality Improvement Programme as of 14th March 2018, including patients undergoing surgery up to 28th February 2018

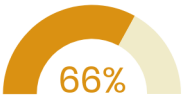


Gustafsson UO, Scott MJ, Schwenk W, Demartines N, Roulin D, Francis N, et al. Guidelines for perioperative care in
Nygren J, Thacker J, Carli F, Fearon KCH, Norderval S, Lobo DN, et al. Guidelines for perioperative care in elective r

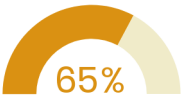


elective colonic surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations. Clin. Nutr. 2012;31:783–800
ectal/pelvic surgery: Enhanced recovery after surgery (ERAS®) society recommendations. World J. Surg. 2013;37:285–305

17% of patients received all five recommendations*

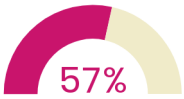


Preoperative carbohydrate loading



Intraoperative warming

Patients without a nasogastric tube on arrival in recovery



Patients without an abdominal drain on arrival in recovery

Patients DrEaMing on postoperative day 1

The figures above show national compliance with each of the pomVLAD recommendations for patients undergoing lower gastrointestinal surgery recruited to PQIP*.

The five pomVLAD recommendations have been developed based on guidelines from the Enhanced Recovery After Surgery (ERAS) Society and data from the first 12 months of PQIP. To develop a succinct list of recommendations we looked at the association between enrolment on an enhanced recovery pathway and each of the ERAS society recommendations for routinely collected information within PQIP.

Enrolment of patients onto an enhanced recovery pathway was associated with improved compliance with each of the five recommendations. There was insufficient data available to assess the direct association between each recommendation and postoperative morbidity.

*Data from the Perioperative Quality Improvement Programme as of 14th March 2018, including patients undergoing lower gastrointestinal surgery up to 28th February 2018

Measuring and reporting the pomVLAD recommendations

Preoperative carbohydrate loading -

This data is collected in Q2.36 of the PQIP webtool (Were preoperative carbohydrates given on the day of surgery?). The percentage of patients recorded as 'yes' will be shown on the dashboard.

Intraoperative warming -

This data is collected in Q3.6 of the webtool. If a patient receives forced air warming **and** IV fluid warming they are classed as compliant with this recommendation.

Avoid routine use of postoperative nasogastric tubes -

Collected in Q4.3 'Was a nasogastric tube present on arrival from theatres?'. Compliance with this process measure is if the patient does **not** have a nasogastric tube present on arrival in recovery.

Avoid routine use of abdominal drains -

Collected in Q4.2 'Was an abdominal drain present on arrival from theatres?'. Compliance with this process measure is if the patient does **not** have an abdominal drain present on arrival in recovery.

Get patients DrEaMing on postoperative day 1 -

This recommendation aims to get patients drinking, eating, and mobilising quickly after surgery. The data for this measure is collected in Q5.2, Q5.3, Q5.4 of the PQIP webtool. Drinking is defined as 'free fluids'; eating as 'soft diet'; and mobilising as sitting out of bed with maximal assistance of one person, all within 24 hours of surgery ending.

We are encouraging sites to aim for >80% compliance with each of the recommendations.

Variable life-adjusted displays

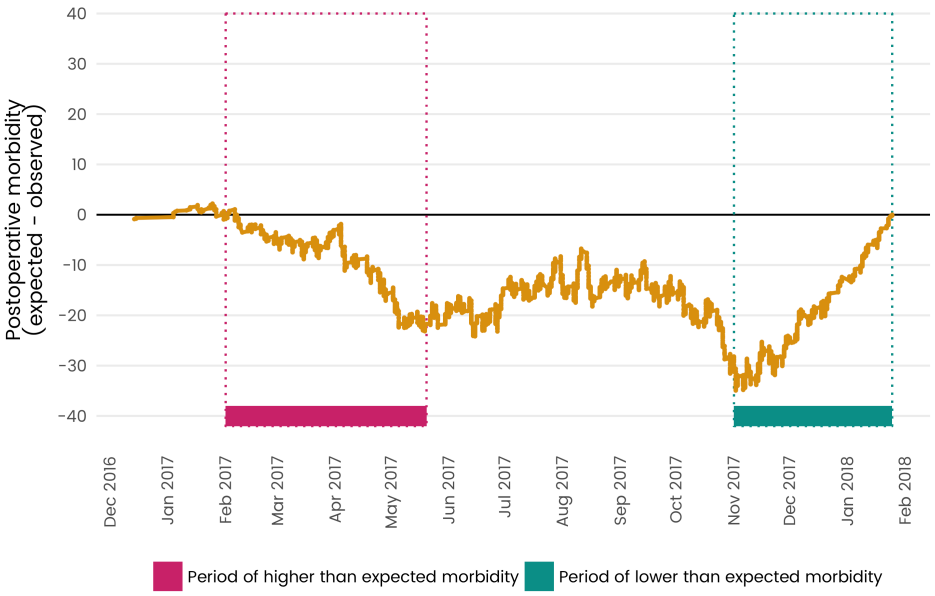
Variable life-adjusted (VLAD) displays were initially developed to monitor observed against expected mortality in cardiac surgery[6], but have subsequently been used in a wide range of environments including paediatric cardiac surgery, trauma care, gastrointestinal surgery and Intensive Care Medicine.

A risk-adjustment model is used to estimate the risk of an outcome (often mortality) in a given patient. The pomVLAD display will show morbidity outcomes using POMS (major). The VLAD chart plots the expected outcome (estimated risk) minus the observed outcome (1=morbidity, 0=no morbidity) for each consecutive patient. Upward trends in the VLAD are positive (lower observed than expected morbidity), downward trends are negative.

This continuous method of data reporting allows early identification of worrying or positive trends in outcomes allowing more timely intervention by local teams compared with annual reporting.

The pomVLAD chart shows expected minus observed morbidity over time, allowing teams to identify worrying or positive trends so they can implement, monitor and learn from local quality improvement initiatives

Example pomVLAD chart



The expected risk of postoperative morbidity will be calculated for each patient using a risk-adjustment model developed in over 4000 patients recruited to the PQIP study. This model includes 10 patient and surgical variables and full details of the model will be published in the medical literature.

Next steps

The pomVLAD dashboard is currently under development with a plan to launch at the end of April 2018. The project will run for an initial 12 months.

Local PQIP teams will be notified when the dashboard is live.

PQIP collaborators in sites receiving the dashboard will be invited to take part in telephone interviews to explore their views of the pomVLAD dashboard and how they are using it.

References

1. Bennett-Guerrero E, Welsby I, Dunn TJ et al. The use of a postoperative morbidity survey to evaluate patients with prolonged hospitalization after routine, moderate-risk, elective surgery. Anesthesia and analgesia 1999; 89: 514–9.

2. Grocott MPW, Browne JP, Meulen JVD, Matejowsky C, Mutch M. The Postoperative Morbidity Survey was validated and used to describe morbidity after major surgery. Journal of Clinical Epidemiology 2007; 60: 919–28.

3. Davies SJ, Francis J, Dilley J, Wilson RJT, Howell SJ, Allgar V. Measuring outcomes after major abdominal surgery during hospitalization : reliability and validity of the Postoperative Morbidity Survey. Perioperative Medicine 2013; 2: 1–9.

4. Wong DJN, Oliver CM, Moonesinghe SR. Predicting postoperative morbidity in adult elective surgical patients using the Surgical Outcome Risk Tool (SORT). British Journal of Anaesthesia 2017; 119: 95–105.

5. Dindo D, Demartines N, Clavien P-A. Classification of Surgical Complications. Annals of Surgery 2004; 240: 205–13.

6. Lovegrove J, Valencia O, Treasure T, Sherlaw-Johnson C, Gallivan S. Monitoring the results of cardiac surgery by variable life-adjusted display. Lancet. 1997;350:1128–30.