

A QASM



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Queensland Audit of Surgical Mortality (QASM) assessors have stated that: 'Delay to surgical intervention plays a significant role in "priming" patients for multiorgan dysfunction ... the keys to a good outcome are firstly, minimise delay to surgical intervention and secondly, make the operation as simple and reproducible as possible.'

BACKGROUND

Delay to surgery can have consequences. From emotional complications to financial and health complications, delay to surgery causes more harm than good.¹ A temporary delay to surgery may not have an adverse outcome for a patient whose presentation isn't major or life-threatening, but small problems can quickly progress if not treated in a timely manner. Any prolonged restriction of blood supply can cause mesenteric ischaemia, associated with acute abdominal pain and extremely high risk of further complications. Mesenteric ischaemia causing abdominal pain is associated with a 60% to 80% mortality rate.² Patients with mesenteric ischaemia can present in various ways. The critical factors influencing outcomes for these patients are timely diagnosis and intervention.^{2,3}

QASM reviewed in-hospital death data between 1 January 2018 and 31 December 2022. Delay to surgery was noted in 5.7% (283/4,984) of in-hospital deaths (Table 1). Delay is defined as the time from presentation to surgical diagnosis.⁴ Most patients who experienced a delay to surgery were admitted under General Surgery (47.7%), Orthopaedic Surgery (18.4%), Cardiothoracic Surgery (9.9%), Vascular Surgery (8.8%), Neurosurgery (7.8%) or Urology (5.3%). Of the patients with delay to surgery, 88% were admitted to public hospitals and 12% to private hospitals. Most patients with delays (92.6%) were 50 years or older. Most of the delays were associated with surgical units, medical units, misinterpretation of results, incorrect test and/or inexperience of staff. Delays for some patients were associated with issues with a GP referral (5.3%; 15/283), results not being reviewed (14.1%; 40/283), or unavoidable factors (34.6%; 98/283). Unavoidable factors included: inter-hospital transfers, inconclusive radiology, and non-specific diagnosis resulting in medical admissions. Orthopaedic Surgery and Neurosurgery patients were significantly less likely to experience a delay to surgery compared with those in General Surgery, after adjusting for age, sex and American Society of Anesthesiologists classification.

Table 1. Patients with delay to surgery by surgical specialty and delay associations (n = 283/4,984; 5.7%)

Surgical specialty	Case affected by delay		Unit associated with delay		Cause of delay		
	N = 277 (5.8) n (%)	Adjusted odds ratio 95% CI	Surgical n = 78 (28.2%)	Medical n = 109 (38.5%)	Misinterpretation of results n = 59 (21.3%)	Incorrect test n = 47 (17.0%)	Inexperience of staff n = 52 (18.8%)
General Surgery (n=1,792)	135 (7.4)	Reference	55 (3.1)	47 (2.6)	36 (2.0)	23 (1.3)	30 (1.7)
Orthopaedic (n=1,252)	52 (4.2)	0.55 (0.39–0.77)*	9 (0.7)	30 (2.4)	7 (0.6)	6 (0.5)	5 (0.4)
Cardiothoracic (n=423)	28 (6.6)	0.76 (0.49–1.18)	2 (0.5)	13 (3.1)	4 (0.9)	6 (1.4)	6 (1.4)
Vascular (n=401)	25 (6.2)	0.94 (0.52–1.70)	7 (1.7)	4 (1.0)	5 (1.2)	4 (1.0)	7 (1.7)
Neurosurgery (n=709)	22 (3.1)	0.26 (0.15–0.46)*	5 (0.7)	7 (1.0)	3 (0.4)	5 (0.7)	3 (0.4)
Urology (n=216)	15 (6.9)	0.94 (0.52–1.70)	0 (0.0)	8 (3.7)	4 (1.9)	3 (1.4)	1 (0.5)

Notes:

* Statistically significant

** Excludes any surgical specialties with 5 or fewer patients and those who had delays because numbers too low and patients would be identifiable (i.e. oral/maxillofacial surgery, obstetrics and gynaecology, paediatric surgery, and plastic and reconstructive surgery; n = 6/191).

Adjusted odds ratio adjusted for age, sex, and American Society of Anesthesiologists (ASA) classification.

CI = confidence interval

Each delay may be attributed to multiple associations and causes, therefore the associations and causes will not total 100%.

QASM data show that delay to surgery has decreased over time. In 2012, QASM reported that delay was experienced for 9.3% of patients (293/3,139) across all surgical specialties (deaths reviewed between June 2007 and December 2011).⁴ This compares to the findings from the analysis above (January 2018 through December 2022; Table 1). The data show a 3.6% decrease in delay to surgery over the subsequent years while incorporating an additional 1,845 patients reviewed by QASM (5.7%; 283/4,984). This is a significant decrease in the reporting of delay to surgery (Odds Ratio 0.60; 95% CI 0.51 – 0.71).

Decreases in delays to surgery may be attributed to many factors, including QASM initiatives such as targeted seminars, publications and educational activities that highlight the main causes of delays. QASM has provided recommendations to minimise the occurrence of preventable delays. It is encouraging that delays to surgery are decreasing because the consequences can be life-threatening. The case study below highlights the consequences of delay to surgery.

QASM CASE STUDY

An elderly man (age early 80s) was admitted to the emergency department (ED) with symptoms of acute on chronic mesenteric ischaemia. The decision to provide surgery was delayed.

On admission, the patient had severe abdominal pain for two months. Two months prior to admission, he had had a laparoscopic appendectomy (based on CT findings) with normal histology. One month prior to the appendectomy, he had had a normal gastroscopy. He had a history of anorexia with 20 kg weight loss. On admission, he had an elevated white cell count (16.3 g/dl) but no appearance of an acute abdominal crisis. A CT scan with contrast showed severe stenoses in the common origin of the superior mesenteric artery and coeliac axis. From the outset, this was recognised as the main cause for presentation.

The patient was admitted for General Surgery attention. Based on the finding of no acute gut ischaemia, General Surgery did not think a review was indicated, instead recommending review by Vascular Surgery. Neither review occurred.

On day two, the vascular team arranged for further imaging and outpatient department (OPD) follow-up in eight weeks, and requested medical clearance by the General Surgery team before discharge. On day three, the patient had 'a terrible night' with abdominal pain. The abdominal ultrasound was unremarkable.

On day four, the patient reported severe abdominal pain with nausea and vomiting. A vascular review was requested but did not occur until 8 pm (with a different vascular surgeon). The CT showed distended small bowel. A laparoscopy/laparotomy was planned but the vascular team decided that revascularisation was not appropriate overnight and should be delayed until morning. The vascular team reiterated this plan when a 'bowel of uncertain viability' was found.

On day five, an endovascular revascularisation of the gastrointestinal tract was attempted involving two approaches (femoral and axillary) and three surgeons. When this failed, vascular surgeons performed an open revascularisation using an ilio-mesenteric prosthetic graft. General surgeons resected the small bowel and removed the gall bladder. The intraoperative course was stable and the operation concluded in the mid-to-late afternoon. Postoperatively in ICU, the patient became unstable with increasing inotrope requirements. During the night, it was decided that ongoing treatment was futile.

The patient died on day six with family in attendance.

LESSONS

This patient's surgical care was marked by a dramatic failure to appreciate the urgency of the situation. Multiple references in the notes suggest that the clinical picture was clear and deteriorating.

The case was not escalated until it was too late, due to a mix of inexperience, nervousness

around the complexity of revascularisation, no situational awareness and some denial.

The diagnosis of mesenteric ischaemia can be difficult. This mostly relates to the fact that at first the patient seems reasonably well; and the difficulty balancing the high threshold for a complex, high-risk operation against a patient who appears well. When the patient does become unwell the situation is often unsalvageable. Optimal outcomes are predicated on prompt recognition of the problem, followed by rapid escalation despite the patient appearing well.

These patients fall between Vascular and General Surgery. Unfortunately, despite the impression that the patient is under the care of two teams often neither takes responsibility for important decisions. In this case, despite multiple 'red flags' neither team appropriately calibrated the need for urgency.

DISCUSSION

There were several management deficiencies in this case.

- On admission (in ED), he was not reviewed by the Vascular or General Surgery teams despite being called to do so.
- On day two of his second critical presentation, a decision was made to defer to OPD for review. This was a critical failing.
- On day three, he remained unwell, but his care was not escalated.
- On day four, his vascular review was delayed until the evening despite his clinical deterioration. CTA (computed tomography angiography) was requested despite clear knowledge of the findings of previous imaging.
- His revascularisation was delayed even though his situation was precarious.
- It was decided to attempt a tricky and lengthy endovascular revascularisation rather than a prompt and more certain open revascularisation.

RECOMMENDATIONS

- Hospitals to implement a working system to manage patients who present with an abdominal syndrome and evidence of vascular compromise.
 - ED teams to collaborate with other teams when patients are being evaluated for undifferentiated abdominal pain (i.e. acute mesenteric ischaemia as a potential diagnosis of concern). The radiology service plays a pivotal role in evaluating and escalating mesenteric arterial issues present on emergency scans for undifferentiated abdominal pain.
 - Hospitals to encourage Vascular and General Surgery teams to implement and demonstrate guidance about shared care for patients with a potential diagnosis of acute mesenteric ischaemia.
 - Hospitals to continue to provide guidance to nursing and medical staff on strategies for escalating concerns when faced with ongoing clinical deterioration.
- The Queensland Health Emergency Surgery Access Guideline suggests that the role of the

specialist/consultant is critical to achieving optimal surgical safety and clinical outcomes for patients requiring emergency surgery, and for the development and training of surgical registrars as they progress to operating independently.

The specialist should:

- lead the local model of care for emergency surgery
- lead the diagnostic work-up of patients requiring emergency surgery
- delegate patients/cases to the most appropriate surgical specialty, specialist or surgical registrar
- endorse locally developed criteria for a clinical risk escalation process for registrars
- lead communication with patients and families/friends.

RESOURCES

Queensland Health. Clinical Excellence Division, Healthcare Improvement Unit. 2017. QH-GDL-440:2017. Emergency Surgery Access Guideline (health.qld.gov.au). Available from: https://www.health.qld.gov.au/_data/assets/pdf_file/0033/635784/qh-gdl-440.pdf

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*This case study is edited from QASM first- or second-line assessments that have been generated by expert surgeons in the field. Any recommendations relate to the case as it was presented.