

Future leaders **Communiqué**

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GUEST EDITOR

Noha Ferrah

GRADUATE FACULTY

(alphabetical order)

Hannah Cross

Noha Ferrah

Danielle Forbes

Bharathy Gunasekaran

Kate Hurley

Joey Lam

Nicholas Lonergan

Danielle Todd

Victorian Institute of Forensic Medicine
65 Kavanagh Street,
Southbank, VIC, 3006, Australia

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GUEST EDITORIAL

Dr Noha Ferrah

Junior doctors are at the frontline of the delivery of clinical care in hospital wards. However they may not have developed the appropriate level of experience and support to recognise signs of clinical deterioration in patients, and act upon these. In the worst-case scenarios, patients may become seriously ill and rarely they may die. The clinical staff involved may be deeply impacted by the events. One of the tools developed to support junior doctors in recognising and managing deteriorating patients are rapid response systems, which is our focus in this edition.

We examine the case of a surgical patient whose post-operative deterioration was repeatedly recognised and these concerns escalated, yet delays in implementing intervention, and failure to monitor response led to a fatal outcome. Our commentaries highlight the important clues that herald post-operative complications, and discuss the limitations of the systems used for early detection and treatment of deteriorating patients in hospital wards.

Rapid response systems aim to provide timely detection and treatment of deteriorating patients to prevent adverse events such as unplanned admissions to an intensive care unit (ICU), or death. They consist of an afferent limb - track and trigger scoring systems for early recognition of deviating vital parameters, and an efferent limb - the rapid intervention team, consisting of trained ICU staff, designed to deliver immediate treatment to the patient.

Track and trigger scoring systems were first introduced in 1997, and were soon implemented in many healthcare systems across the world. Although they demonstrated some improvement in clinical outcomes, especially when coupled with a rapid intervention team, there is surprisingly little evidence of their overall effect on patient safety given their ubiquity. This discrepancy has been attributed to the wide variation in track and trigger scoring tools, lack of staff training on their utilisation, and flaws in the efferent limb of the system, such as misunderstandings occurring between the ward staff and the rapid intervention team regarding their respective roles and capabilities at the bedside.

Another reported limitation of track and trigger scoring systems is the lack of a systematic framework to ensure that interventions are implemented in a timely manner, that the patient responds to the intervention, and that the root cause of the deterioration is addressed. First, the assignment of tasks is often ad hoc and may not be clearly formulated. Second, systematic monitoring of response with specific trigger points and a time-frame for re-assessment are seldom part of rapid response systems. By default, these tasks commonly fall upon junior doctors; however, the lack of a systematised approach means that they may not have received sufficient guidance and support, with potentially devastating consequences for patients, as we shall see in this case.

EDITORIAL

Welcome to our final issue of the Future Leaders Communiqué for 2017. Our guest editor for this issue is Dr Noha Ferrah who is currently working as a surgical resident at The Alfred Hospital. Noha completed a post-graduate Doctor of Medicine at Melbourne University and has a strong interest in general and trauma surgery. She has published in the areas of injury prevention and patient safety and is involved in ongoing research with the Department of Forensic Medicine at Monash University. Noha has had a long-standing interest in other cultures and comparative healthcare systems, with extensive travel and volunteering experience, including a clinical elective in Cuba which she described as tantalising.

We are very pleased to present two expert commentaries in this issue, written by experienced clinicians who are both leaders in their specialty fields. Professor Michael Buist is an intensive care specialist, and the Director of Intensive Care at the North West Regional Hospital in Burnie, and Honorary Clinical Professor at the Faculty of Health, University of Tasmania. Professor Jonathan Serpell is a general surgeon, and the Director of the Breast and Endocrine Surgery Unit, The Alfred Hospital, and Professor of General Surgery, Department of Surgery, Monash University. Their cogent views on the critical care and surgical issues raised in this case should be read by every junior doctor working in a hospital system.

FURTHER READING FOR EXPERT COMMENTARIES

Buist M, Middleton S. Aetiology of hospital setting adverse events 1: Limitations of the Swiss cheese model. *Br J Hosp Med (Lond)* 2016; 77(11): C170-C174.

Buist M, Middleton S. Aetiology of hospital setting adverse events 2: clinical futile cycles. *Br J Hosp Med (Lond)* 2016; 77(11): C175-C178.

Golden rules for General Surgery – Professor Jonathan Serpell Available on the Communiqués website at: <http://www.vifmcommuniques.org/?p=5154>

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All cases that are discussed in the Future Leaders Communiqué are public documents. A document becomes public once the coronial investigation process has been completed and the case is closed. We have made every attempt to ensure that individuals and organizations are de-identified. The views and conclusions are those of the authors and do not necessarily represent those of, the individual Coroner, the Coroners Court, Department of Health, Department of Forensic Medicine, Victorian Institute of Forensic Medicine or Monash University. If you would like to examine the case in greater detail, please contact us and we will provide the relevant website for the Coroners Court jurisdiction.

FEEDBACK

The editorial team is keen to receive feedback about this communication especially in relation to changes in clinical practice. Please email your comments, questions and suggestions to: flc@vifmcommuniques.org

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CONSULTANT EDITORS

Joseph E Ibrahim
Nicola Cunningham

MANAGING EDITOR

Alexander Gillard

DESIGNER

Samuel Gillard

CASE CLOSING THE LOOP

Case Number:
2010/1894 Qld

Case Précis Author:
Dr Noha Ferrah MD
Surgical Resident, The Alfred Hospital,
Melbourne

CLINICAL SUMMARY

Mrs M, a fit 69 year old woman, underwent an uncomplicated elective laparoscopic cholecystectomy. The next morning, upon review by the surgical team, it was decided that she should remain in hospital for another night for observation due to shoulder tip pain and nausea. That afternoon, she was transferred without the consultation of the surgical team from the surgical ward to a low dependency rehabilitation unit. By the next morning, she was tachycardic, diaphoretic and had a distended abdomen. Mrs M was reviewed by the rehabilitation ward medical officer who prescribed intravenous (IV) fluids and analgesia, ordered blood tests, and requested an urgent surgical review. The surgical team then saw Mrs M as part of their morning ward round. She still had generalised abdominal tenderness and abnormal vital signs. An abdominal X-ray and CT scan were therefore ordered.

Mrs M continued to deteriorate over the day. Another set of abnormal vital observations was taken following the ward round (which showed a fall in her oxygen saturation levels, hypotension and tachypnoea, but a pulse rate reading was not recorded), yet no doctor was informed. Mrs M was seen by two of the unit's interns after they were called to review her in the CT room for a further set of abnormal observations. They found her looking pale and unwell and relayed their concerns to their registrar over the phone who told them to treat Mrs M with IV fluids and analgesia.

The registrar contacted the consultant surgeon to discuss the blood results, and again to discuss the CT findings. It was decided that Mrs M was to return to theatre later that day for explorative laparotomy, followed by transfer to ICU for post-operative observation. She was therefore assessed by the intensivist on-duty who diagnosed peritonitis and renal failure, and prescribed triple antibiotics, rapid IV fluid therapy, and strict monitoring of fluid balance. She was concurrently seen by the anaesthetic house officer on-duty for a pre-anaesthetic assessment.

It was not discovered until her arrival in ICU later that evening that Mrs M had only received one of the three prescribed antibiotics.

As she had single IV access, only one antibiotic was administered by the time she was called to the operating room.

Once in the operating theatre, surgery was delayed by an hour and ten minutes. This was due to Mrs M becoming profoundly hypotensive upon anaesthetic induction. A bile leak was found intra-operatively and the abdomen lavaged. It was not discovered until her arrival in ICU later that evening that Mrs M had only received one of the three prescribed antibiotics. She was severely septic by then, requiring inotropes, dialysis and mechanical ventilation. A second laparotomy two days later found widespread bowel and hepatic ischaemia, and Mrs M died the next day of multi-organ failure.

PATHOLOGY

A post-mortem examination found the proximate cause of death to be septic shock as a consequence of biliary peritonitis following laparoscopic cholecystectomy.

INVESTIGATION

The death was reported to the coroner on the grounds of 'unexpected outcome of health care', and an inquest was held which lasted nine days over five months.

The coroner received the statements of thirty-four witnesses from the medical and nursing teams, and opinions from two medical experts in the surgical and intensive care fields respectively.

Both experts were also critical of the senior medical staff who failed to provide adequate supervision and input to junior staff.

The expert witnesses were critical of the transfer of Mrs M to a lower dependency unit and the adequacy of the medical and nursing care. This included the crucial delay in prescribing and administering antibiotics, and in reviewing Mrs M as part of the scheduled ward round despite the urgent surgical review requested by the rehabilitation ward medical officer first called to see Mrs M.

Both experts were also critical of the senior medical staff who failed to provide adequate supervision and input to junior staff, including in communicating their concerns regarding the patient's deterioration and their management plan. The two unit interns had been working in this unit for less than a week, and only one had limited experience in caring for patients with post-operative complications.

Upon reviewing Mrs M on the ward round, the consultant surgeon's plan was for her to return to theatre in the afternoon.



Yet this was not documented nor did he communicate this to the rest of the medical and nursing staff, with the effect of Mrs M remaining in a lower dependency unit, where she was seldom monitored, as there were no specific instructions regarding observations nor parameters for intervention documented. The interns were not instructed to follow up on or review Mrs M. Despite the surgical registrar's assertion at inquest that it was the interns' responsibility to check the investigation results, no one was specifically allocated to do so.

Once aware of Mrs M's concerning blood results, the consultant surgeon did not ensure she be reviewed by a doctor more senior than the interns, nor did he instruct that she receive antibiotic therapy despite thinking this was needed.

Therefore, no intern checked her test results. The two interns called to review Mrs M in the CT room due to her deteriorating condition obtained phone advice from the registrar, who did not personally review the patient. The interns then left without confirming she had responded to the IV therapy they had been instructed to prescribe. Once aware of Mrs M's concerning blood results, the consultant surgeon did not ensure she be reviewed by a doctor more senior than the interns, nor did he instruct that she receives antibiotic therapy despite thinking this was needed.

Mrs M, a potentially unstable patient in light of her unplanned return to theatre two days following initial surgery, then underwent a pre-anaesthetic assessment conducted by a house officer who had only worked in anaesthetics for two months, and was not aware of her diagnosis of sepsis. This contributed to her not being sufficiently resuscitated by the time her surgery was due to commence.

CORONER'S FINDINGS

A primary issue identified at inquest was poor documentation and communication regarding provisional diagnoses, management plan and parameters for intervention. The nursing staff were unaware of the consultant's concerns.

It was usual practice for the nursing staff to make the decision to transfer patients without consulting the medical team, which led to the inappropriate transfer of an unwell post-operative patient to a lower dependency ward without an explicit nursing care plan. This also resulted in poor handover during Mrs M's return to the operating theatre and in a critical delay in administering antibiotics.

The coroner heard that following the incident the hospital had implemented a new outlier patient transfer system involving senior medical staff, and a new deteriorating patient identification system. Nonetheless, the coroner recommended an overhaul of the outlier patient system, and the assignment of a discharge planner.

The coroner found that the consultant surgeon, despite being aware of Mrs M's life-threatening condition, failed to act with sufficient urgency, to communicate with and provide supervision and input to his junior colleagues. The case was referred to the Australian Health Practitioner Regulation Agency.

Importantly, there was a failure in ensuring that 1) management plans were implemented, and 2) the patient was responding to the treatment administered.

AUTHOR'S COMMENTS

What is striking is that despite being reviewed by a succession of more or less experienced doctors, shortcomings in supervision, allocation of responsibility, and communication during handover and transfer, resulted in a significant delay in administering adequate treatment, which proved fatal. Importantly, there was a failure in ensuring that 1) management plans were implemented, and 2) the patient was responding to the treatment administered.

Track and trigger scoring systems are today widely implemented. However, their focus has so far been on detection, escalation and immediate response, and a neglected part of the process is follow-up: ensuring that interventions achieve the sought outcome, and if not, what further steps are needed.

As this case illustrates, there seems to be no consensus as to who it is incumbent upon to 'close the loop'.

A systematic approach must be integrated into trigger scoring systems to support and guide junior doctors in closing the loop in the management of deteriorating patients.

Some institutions have medical and/or nursing staff in charge of reviewing patients following medical emergency team (MET) calls. However, the home team must also follow up on their patients who have been involved in MET calls. Although the consultant and hospital are ultimately responsible, junior medical staff are 'on the floor' and have the most direct contact with the patient and nurses. At present, the approach of 'I haven't been called to see the patient so they must be fine' seems to prevail in many healthcare settings. A systematic approach must be integrated into trigger scoring systems to support and guide junior doctors in closing the loop in the management of deteriorating patients.

FURTHER READING

Van Galen L, Struik P, Driesen B, Merten H, Ludikhuizen J, Van der Spoel J, Nanayakkara P. Delayed recognition of deterioration of patients in general wards is mostly caused by human related monitoring failures: A root cause analysis of unplanned ICU admissions. *PLoS one* 2016, 11(8):e0161393. doi: 10.1371/journal.pone.0161393.

Alam N, Hobbelenk EL, Van Tienhoven AJ, Van de Ven PM, Jansma EP, Nanayakkara PW. The impact of the use of the Early Warning Score (EWS) on patient outcomes: A systematic review. *Resuscitation* 2014; 85(5): 587-594.

KEYWORDS

Post-operative complications, track and trigger system, deteriorating patient, delayed treatment, junior doctor

CLINICAL FUTILE CYCLES AND A PATIENT'S DEATH: A ROADMAP FOR PREVENTION

Professor Michael Buist
FRACP, FCICM, PhD

Director of Intensive Care,
North West Regional Hospital,
Burnie Honorary Clinical Professor,
Faculty of Health,
University of Tasmania

The death of Mrs M, a fit 69 year old lady, who underwent an elective procedure, is a classic case of "Clinical Futile Cycles." This term has been borrowed from biochemistry where two or more enzymatic systems continuously change one chemical into another and then back to the original with no net output but the use of a lot of energy. In Mrs M's case, there certainly was a lot of clinical activity from all levels of the medical and nursing hierarchy yet, the net outcome was a preventable death. The rehabilitation ward doctor on day two did all the right things; IV fluids, ordered laboratory tests and requested urgent surgical review. The surgical team certainly had this patient on their radar, did a CT scan, organised theatre and a postoperative ICU bed. The surgical registrar gave good instructions over the phone, and the consultant agreed with all of the above and undertook the re-operations. However, if we "scratch the surface" a bit more in this case, sadly, Mrs M got exactly the product that we usually deliver in our teaching hospitals:

- Nurses who do the right thing, take the observations and notify the medical staff,
- Interns with little knowledge and even less experience of acutely deteriorating patients and the challenges of managing multiple players in a clinical scenario like Mrs M's,
- A surgical registrar who would have all the competencies, but is too busy to attend the patient and direct the care at the bedside, who instead delegates tasks to the interns above, and
- A consultant surgeon with the skill and ability to fix the problem but most commonly employed only on a sessional basis so often not actually in the hospital in question.

So, at four levels above in the traditional hierarchal referral model of care, everyone is doing the right thing. "Clinical Futile Cycles" is the explanation for all this activity.



Whilst appropriate for the doctor or nurse concerned, this was not sufficient to get Mrs M to theatre more urgently and solve the problem.

In addition to the "Clinical Futile Cycles," we have become accustomed to the naive expectation that some sort of track and trigger system (Medical Emergency Team, Rapid Response System) will fix the problem by being alerted to the patient's deterioration. However, that is all they do.

So, what can we learn from the death of Mrs M. First, interns and junior doctors for the most part simply do not have the clinical experience to deal with situations like this (and it is unfair to expect them to).

The rest is up to the clinicians on the ground to make the right diagnosis, determine the level of severity of the condition, initiate management, notify the right people, and with the all pressures of the job, do this in a timely fashion to prevent patient catastrophe.

So, what can we learn from the death of Mrs M. First, interns and junior doctors for the most part simply do not have the clinical experience to deal with situations like this (and it is unfair to expect them to). In North America, hospitalists who oversee and directly supervise activities of junior doctors on the wards, is the fastest growing consultant speciality.

Second, track and trigger systems are a very good 'bandaid', but it is the resultant treatment and management that will determine the patient's outcome.

Finally, we assume and expect too much of each other in medicine without really understanding our colleagues' capabilities and limitations.

Better electronic track and trigger systems for frontline junior nurses and doctors are now commonplace in New Zealand and the United Kingdom, which keep abnormal patient alerts active until they are resolved, and can be escalated up the clinical hierarchy if abnormalities persist.

Finally, we assume and expect too much of each other in medicine without really understanding our colleagues' capabilities and limitations. Our clinical teams behave and perform in exactly the same way as when I was an intern in a Dunedin hospital in 1984. I was on the ward summoned to very sick surgical and medical patients by experienced senior nurses, my registrar was always busy (theatre, clinics, emergency department) and I only ever saw the consultant on ward rounds. Despite all the advances in medical practice we still do not seem to have learnt yet how to prevent a death like Mrs M's.

Conflict of Interest Statement:

Professor Michael Buist was the founder and director of Patientrack, an electronic track and trigger system from 2003 to 2011. He is now a shareholder.

DEVIATION FROM A NORMAL POST-OPERATIVE COURSE IS A RED FLAG

Professor Jonathan Serpell
FACS, MD, MEd, CCPU

Director,
Breast and Endocrine Surgery Unit,
The Alfred Hospital
Professor of General Surgery,
Department of Surgery,
Monash University

Laparoscopic cholecystectomy is a commonly performed operation and a bile leak following surgery is one of the commoner complications. If a bile leak occurs, it will continue to leak into the peritoneal cavity because of its low surface tension. This will lead to the development of initially chemical, then infective peritonitis and septic shock, which untreated will eventually become irreversible. Imaging has limited value in the diagnosis of bile leaks. Bile tends to spread over the peritoneal cavity, and there will often be fluid in the gall bladder fossa after cholecystectomies. The diagnosis therefore rests on clinical suspicion, and it is essential to think of, diagnose, and treat a bile leak at an early stage. Any deviation from a normal postoperative course after a laparoscopic cholecystectomy should flag the possibility of a bile leak.

In this case, the patient was nauseated and had shoulder tip pain on the day following surgery. This should have been an immediate flag that the patient could have a bile leak. This information should have been conveyed to the nursing staff and the consultant, and documented in the patient's medical record on the morning of the first postoperative day. The patient would likely not have been transferred to a low care rehabilitation unit. Further, the patient should have been closely monitored, and assessed on multiple occasions by the surgical registrar and probably by the consultant surgeon. There should have been a low threshold to return the patient to theatre.

Unfortunately, by day two following surgery, the patient was almost certainly in septic shock with diaphoresis, tachycardia and a distended, tender abdomen.

At this point, there was likely only a very narrow window for successful intervention. Urgent laparoscopy should then have been undertaken, as imaging had little to offer in that setting. A further point of concern throughout this case is the repeated use of analgesia for a patient with peritonitis, again a flag that something sinister is occurring within the abdominal cavity.

Track and trigger scoring systems and algorithms are helpful in recognising things are amiss but then a diagnosis needs to be established, interventions undertaken and their effect monitored. Throughout this case, there was a sense of a hands-off approach from more senior surgical staff including registrar and consultant, where the reverse was required.

By the time she was reviewed by an intensivist, the patient was in renal failure indicating established septic shock, which was probably becoming irreversible at that stage. Urgent resuscitation with appropriate intravenous access and monitoring of urine output was a priority. Yet, it seems that despite being seen by the intensivist and a junior anaesthetic doctor, these crucial steps were neither recognised nor followed through.

My major concern is that the underlying root cause of the problem never seems to have been mentioned. Rather, investigations for abdominal distension and peritonitis were ordered, renal failure noted, intravenous fluids and antibiotic therapy prescribed, but none of these will solve the underlying problem.

This case highlights the need for surgical leadership. Reviewing a patient postoperatively by actually seeing the patient rather than providing advice over the phone, and monitoring the effects of prescribed treatment is important for any doctor, including consultants and registrars. Communication and documentation are crucial to this process. Here, deficiencies in both resulted in miscommunication between nursing staff, the surgical registrar and consultant, and the anaesthetist and intensivist, such that no one recognised the gravity of the rapidly escalating situation.

As a guide for junior doctors, we developed a list of 22 golden rules addressing recurrent issues in general surgery practice. One of these, is that any deviation from a normal course following a laparoscopic cholecystectomy signifies a bile leak until proven otherwise.

COMMENTS FROM OUR PEERS

"Don't be afraid to call for extra support, including via MET calls, if the support is not coming from your own team."

"It is also important to document a provisional diagnosis and clinical concerns, so everyone looking after the patient knows what to look out for."

"This case serves as a prudent reminder to follow up on patients and investigations you are concerned about. Having a clear organisational system (e.g. a tick box on your task list) to remind yourself to follow through is very important."

"In the hospital where I work there is always a MET call liaison nurse who reviews patients post MET call. I always felt that this role ensured that patients deemed at 'higher risk' had someone allocated to see how they were progressing and had the immediate avenues to escalate if need be."

"It can be difficult in a busy work day to fit everything in – but this case shows us to remember to keep reassessing patients and take the concerns of junior team members seriously."