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Next Edition: March 2016

EDITORIAL

When cases of patient deaths in hospital are reviewed at mortality case review meetings or coronial inquests, there are common themes that frequently emerge. These themes are the critical elements that need to be present, or performed well, in order to provide safe and effective patient care. They include communication, documentation, awareness of one's skills and limitations, recognising the deteriorating patient, and following guidelines, to name but a few. Failure or sub-optimal provision of even one element, inevitably leads to a failure in a system and the potential for patients to suffer preventable harm.

What happens when another layer is added to the system? When well-functioning processes are required not only for the care of a patient in a single hospital, but also for the integration of their care between hospitals? The system becomes bigger, more complex, with more room for error. At the primary team level, communication, documentation, and decision-making should be performed as effectively as resources and personnel allow. These professional skills are just as vital however, at the interface of the referral and receiving hospitals, and at the juncture between the hospitals and ambulance or retrieval services.

The two cases in this issue explore the challenging scenarios of managing a deteriorating patient in a rural or regional setting, and the obstacles that are faced when attempting to transfer a critically ill patient for ongoing treatment. The clinicians involved in each of the cases had to deal with the medical issues of the sick patient while also navigating their way through the obvious, and not so obvious, confounding factors that arise when referring or receiving patients from distant geographical locations.

In this issue we have the privilege of presenting two expert commentaries from senior clinicians with vast experiences in regional transfers of critically ill patients. Associate Professor Matt Hooper provides an eloquent and insightful overview of critical care retrieval systems, and Professor Alan Wolff and Mr Ian Campbell share their erudite views on the priorities and actions that regional centres must take when transferring patients to tertiary services.

Our thanks go as well to our guest author, Dr Gerard Fennessy who brings his intensive care and retrieval medicine expertise to the synopsis of the first case.

The end of 2015 marks a historic milestone for us as the Communiqué website is about to reach 80,000 lifetime views. We are very grateful for the readership, the support, and the feedback we receive, as we can all learn valuable lessons from each other in our respective healthcare communities.

As we enter the festive season, we wish everyone safe travels and happy holidays. We look forward to bringing you more cases, commentaries and educational resources in 2016.

ACKNOWLEDGEMENTS

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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:

clinical.communique@vifm.org

CASE #1 WRONG PLACE, WRONG TIME

Case Number:
5862/2008 VIC
Case Précis Author:
Dr Gerard Fennessy FCICM

CLINICAL SUMMARY

Ms VC was a 38 year-old previously well female. She saw her general practitioner six weeks into her second pregnancy, and was given a referral for a routine ultrasound. That same evening she developed increasing abdominal pain and was driven by her husband to Hospital 'A' where she arrived at 10:00pm.

Hospital 'A' is a small rural hospital with limited emergency services. It has an "urgent care centre" but has no access to anaesthetics and does not stock blood or blood products.

On arrival, Ms VC was crying in pain and looked pale. Dr DP was the on-call doctor who attended and diagnosed a possible ectopic pregnancy. Dr DP gave her intravenous fluids and analgesia, and referred her to the nearest gynaecology service at Hospital 'B', who agreed over the phone to accept her for urgent assessment.

Dr DP called the ambulance service and spoke to the call-taker, requesting urgent transfer for Ms VC to Hospital 'B' for management of a possible ectopic pregnancy.

Hospital 'B' is a larger rural hospital, with an emergency department, anaesthetics, operating theatres and blood products. It is 70km or 50 minutes drive from Hospital A.

At 10:30pm, Dr DP called the ambulance service and spoke to the call-taker, requesting urgent transfer for Ms VC to Hospital 'B' for management of a possible ectopic pregnancy. Ambulance dispatchers were juggling resources between other hospitals and the flow-on effects of a major incident earlier in the day. The local ambulance was off-duty. There were three other ambulances based near Hospital 'B', two of which had been dispatched to other jobs already.

Ambulance '1' was allocated to Ms VC as a routine job to attend to after they had finished their current job.

Almost 2 hours later, at 12:09am, Ambulance '1' was upgraded to "urgent".

Over the next two hours, Ms VC's clinical state deteriorated. Her blood pressure dropped (70/50mmHg), her pallor worsened and her abdomen became distended. As no blood products were available, she received 3.5 litres of crystalloid fluids for hypotension. There were a further six telephone conversations between Hospital 'A' staff and ambulance dispatchers, where nursing staff expressed concern over Ms VC's deterioration, and requested an urgent ambulance several times.

Almost 2 hours later, at 12:09am, Ambulance '1' was upgraded to "urgent". A MICA (mobile intensive care ambulance) officer was also called who suggested bringing blood products from Hospital 'B', but this was not done due to perceived time delays in organising it. When Ambulance '1' arrived at 12:18am, Ms VC had deteriorated further and her haemoglobin level was unrecordable. Ambulance officers decided that Ms VC was too sick to be moved by regular ambulance.

On landing at Hospital 'B' at 2:35am, Ms VC was in cardiac arrest.

The MICA officer arrived at 12:45am, and continued to try to stabilise her and requested urgent backup. The air ambulance arrived at 1:26am. Ms VC was intubated and at 2:11am was flown to Hospital 'B', a 24-minute flight.

On landing at Hospital 'B' at 2:35am, Ms VC was in cardiac arrest. She was resuscitated, regained circulation for a short period of time and was taken to theatre. She then had another cardiac arrest. Despite an urgent laparotomy and transfusion of 28 units of blood, Ms VC died after 35 minutes of cardiopulmonary resuscitation.

PATHOLOGY

A post mortem examination was conducted and the pathologist concluded that Ms VC died due to complications following a ruptured ectopic pregnancy.

INVESTIGATION

An inquest was held to determine whether Ms VC's death was preventable and to address some of the concerns raised by Ms VC's family in their correspondence to the coroner.

This was a preventable death. The coroner focused on a number of issues, mainly relating to ambulance staffing levels, workload and communications.

Hospital and ambulance service representatives provided submissions for the inquest and testimonies were heard from the medical and nursing staff of Hospital 'A', the call-takers and dispatchers, and the ambulance officers that were involved in Ms VC's care. The coroner also viewed the ambulance transcripts of the phonecall and radio conversations that took place that night.

CORONER'S FINDINGS

This was a preventable death. The coroner focused on a number of issues, mainly relating to ambulance staffing levels, workload and communications.

The ambulance service had incomplete knowledge of the facilities and support available at Hospital 'A'. Although Ms VC was correctly diagnosed by Hospital 'A' and referred to Hospital 'B' expeditiously, Hospital 'A' was not equipped to deal with haemorrhagic shock. The coroner recommended a system to describe facilities available at each hospital.

Despite receiving accurate information regarding Ms VC's clinical deterioration and explicit requests for urgent transfer, this information was not recorded or actioned until it was too late.

The ambulance resources available were limited for several reasons including the distance between Hospitals 'A' and 'B' and the potential to disrupt cover for the region overnight and the next day, should the off-duty crew be called back in.

The coroner recommended more ambulances for evening and night shifts.

The dispatchers were understaffed and overwhelmed by other cases - they could not even take toilet breaks. Despite receiving accurate information regarding Ms VC's clinical deterioration and explicit requests for urgent transfer, this information was not recorded or actioned until it was too late. The recommendation was that staffing be increased, and that there be clearer guidelines when ambulance upgrades are requested.

Rural health services are particularly vulnerable to resource limitations, as there is less flex in the system, and specific items or expertise may be absent entirely, or only accessible from a distance.

There was significant delay from the time of diagnosis of a ruptured ectopic at Hospital 'A' to arriving at a hospital capable of providing definitive treatment, and there was a question as to whether blood should have been delivered to Hospital 'A'. The recommendation was that any potential delay be relayed to the treating doctor, and a system be developed for making blood available for rural emergencies.

AUTHOR'S COMMENTS

Doctors and nurses are often placed in situations where they need extra support to deal with emergency issues, and this may be difficult in the rural setting. Although this case focuses on hospital staff requesting assistance from ambulance, the same situation occurs daily within hospitals, many now having rapid response systems whereby escalation responses (calling a Medical Emergency Team (MET)) are mandated if certain clinical criteria are met. This can help remove barriers (e.g. resource limitations or difficult interpersonal communication) to the patient receiving the best care.

Rural health services are particularly vulnerable to resource limitations, as there is less flex in the system, and specific items or expertise may be absent entirely, or only accessible from a distance. General resources may be more tightly rationed according to algorithms and clinical need.

Staff working in larger metropolitan hospitals need to remain vigilant of these limitations in rural centres, and contribute to systems that provide support to their rural counterparts.

RESOURCES

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KEYWORDS

Ambulance, rural, ectopic, pregnancy, haemorrhage, delay

CASE #2 THE SUBTLE SIGNS OF SEPSIS

Case Number:
D0166/2011 NT
Case Précis Author:
Dr Adam O'Brien FACEM

CLINICAL SUMMARY

Ms SH, a 21-year-old female delivered a healthy baby, being complicated only by a 2cm perineal tear that required suturing. She was discharged from hospital three days later and was well until a week after the delivery when she felt faint while showering. Ms SH woke the following morning with increasingly severe pain above her right knee and was taken to the local emergency department of a small district hospital at 6:15am.

An ultrasound was performed which excluded a deep venous thrombosis as the cause of her pain, and Ms SH was transferred to the obstetric ward. After a careful re-assessment by an experienced obstetrician, it was unclear what was causing her exquisite and distressing pain. She was afebrile, had a heart rate (HR) of 105 beats per minute (bpm) and a blood pressure (BP) of 110/60mmHg.

The obstetrician contacted the nearest tertiary referral hospital seeking the advice of a medical consultant, but instead was put through to a junior medical registrar.

The first set of blood test results became available at 10:30am and revealed a lymphopaenia, thrombocytopaenia and impaired liver function; the CRP (an inflammatory marker, the C-reactive protein) was pending.

The obstetrician contacted the nearest tertiary referral hospital seeking the advice of a medical consultant, but instead was put through to a junior medical registrar. After two or three conversations with the same registrar, the cause of the pain remained unclear, with the registrar requesting that:

- The patient not be transferred;
- The blood tests were to be repeated again; and
- Antibiotics were to be withheld in the absence of a clear diagnosis.

The registrar discussed the patient with her consultant, an infectious diseases specialist, who agreed with the management plan.

Ms SH's pain continued to be severe. At 2:00pm the second blood test results became available (as did the first CRP) and included a CRP of >270mg/L, with the first CRP being 362mg/L (normal range <10mg/L), and a lactate of 3.8mmol/L (normal range <2mmol/L).

The obstetrician grew increasingly concerned about Ms SH and at 3:00pm contacted her hospital administrator to organise a transfer for Ms SH to the tertiary hospital.

A further discussion with the medical registrar ensued during which the treating doctor was advised to repeat the blood tests later in the evening and report back with the results.

The obstetrician grew increasingly concerned about Ms SH and at 3:00pm contacted her hospital administrator to organise a transfer for Ms SH to the tertiary hospital. The administrator assigned a non-urgent priority to the transfer.

At about 4:30pm the obstetrician handed over to the doctor who was to cover the ward during the evening. Ms SH remained afebrile, her HR was 125bpm, respiratory rate was 35bpm and BP was 110/70mmHg.

The covering doctor, after consultation with an emergency physician at the tertiary hospital, prescribed meropenem to cover the possibility of necrotising fasciitis. The antibiotic was administered at 6:02pm. At 7:30pm Ms SH's condition worsened: her BP was 90/55mmHg and HR was 140bpm with a venous gas revealing a pH of 6.98, a lactate of 9.2mmol/L and a base excess of negative 21 (indicative of severe metabolic acidosis).

She was administered intravenous fluids and oxygen.

The aircraft retrieval team, including an intensive care physician, arrived at 8:05pm. The physician considered sepsis and necrotizing fasciitis to be the most likely diagnosis. Despite extensive resuscitative efforts over the next four hours Ms SH died.

PATHOLOGY

The pathologist found that the cause of death was multiple organ failure as a result of overwhelming *Streptococcus pyogenes* Group A (GAS) infection. GAS was present in the uterine cavity, the perineal wound, and the right thigh muscle in the form of necrotising fasciitis.

INVESTIGATION

An inquest was held with the key issue concerning the delay in diagnosis of sepsis till it was too late. Evidence was heard from the doctors involved, and the family of Ms SH.

The General Manager of the district hospital provided details of a critical incident review that was conducted following Ms SH's death, and a protocol that was subsequently developed in relation to the early recognition of sepsis.

The Health Department's Head of Disease Surveillance, a senior emergency physician, and a microbiologist and infectious diseases physician, were called as experts by the coroner to review the case and present their opinion.

It was acknowledged that although it was an unusual presentation of post-partum sepsis, by 2:00pm there was enough information for a presumptive diagnosis of sepsis to be made. An expert opined that Ms SH should have been given antibiotics and transferred by that time, but that even so, her chances of survival in the face of overwhelming sepsis remained less than 50%.

Several aspects of the case that were highlighted by the coroner included:

- There was a delay in reporting the first CRP result as it required further testing due to the first reading being very high;
- There was no written documentation of the advice that the tertiary hospital provide to the referring doctors;
- The initial priority level allocated to the patient transfer was decided upon after little consultation with the treating doctor; and
- The evidence provided by the medical registrar and the infectious diseases consultant contradicted other evidence and was not accepted as accurate. It was noted that their statements had been written long after the death and that other statements were referred to during their writing.

CORONER'S FINDINGS

The coroner outlined three things that needed to happen for Ms SH to have a chance of surviving: 1) a prompt diagnosis of sepsis, 2) early administration of antibiotics, and 3) urgent transfer for definitive care.

The coroner recommended that:

- The 'Sepsis Recognition Protocol', created during the health service's review of this critical case, be used by all hospitals within the service. The protocol included assessment of risk factors, the presence of infective symptoms, vital signs and a lactate level.
- Unless clearly requiring a sub-specialist, all calls for a consultant should go to the tertiary hospital's Emergency Department's dedicated 'Access Line'.
- Referring doctors seeking the advice of consultants should make contemporaneous notes and place them in the patient's medical records.
- Pathology results should be provided in full and that, if a re-run of a test is required because of a high initial reading, the requesting doctor should be informed as soon as possible.
- The allocation of a retrieval priority level occurs after consultation with the treating doctor.
- Medical statements for the coroner should be written and dated as soon as possible after the death while referring to the medical records and not the statements of others.

KEYWORDS

Necrotising fasciitis, obstetric, sepsis, district, transfer

EXPERT COMMENTARY OPTIMISING ACCESS AND CARE FOR THE CRITICALLY ILL – A REGIONAL PERSPECTIVE

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In an emergency in a rural setting the treating doctor requires support. This includes expert advice about patient treatment and the arrangement of the patient's transport in a timely manner.

Ideally, this support should be provided quickly to then allow the doctor to spend the majority of their time treating the patient. It is acknowledged that, given the unpredictable nature of the demand for urgent patient transport and retrieval services, surges in demand will not always be able to be met in the optimal time. However, we believe that in rural Australia the resources of these services should be sufficient to meet demand 90% of the time.

Discussions regarding transfer of patients from peripheral to tertiary hospitals usually occur between junior doctors at both hospitals, who may not fully appreciate what is going on with their patients. Registrars at receiving hospitals frequently request unnecessary investigations be performed at the referring hospital.

They may not appreciate the limited resources available at the peripheral hospital they are talking to and can have limited knowledge of the geography of the region. We believe communication about patient transfers is best conducted between the senior doctor at the peripheral hospital and the relevant consultant at the tertiary hospital.

The communication should be clearly documented at both ends, which may be difficult for the busy consultant in the tertiary centre, and equally challenging for the time -pressured senior doctor at the peripheral hospital.

Previously, ambulance communication centres were situated locally and their operators were ambulance officers with extensive knowledge of the geography of the region and the limitations of

the physical and human resources at the hospitals in their region. The centralisation of ambulance communication centres has resulted in a reliance on technology and high-powered transport to deal with all situations. There is often a reluctance to use local resources (with perhaps one ambulance officer, who may be a volunteer) in a vehicle, and recall MICA (mobile intensive care ambulance) officers to assist, but rather to send transport from a larger centre to a peripheral centre and then return with the patient. In addition, non-clinical ambulance call operators in highly centralised locations often do not understand the urgency of the patient's clinical situation, and competing demands for urgent transport from across the state can result in requests for transfer not being met in clinically appropriate time frames.

When the delay in transport of a patient could impact negatively on the patient, we believe that a senior doctor from the requesting hospital (i.e. Consultant or Director of Medical Services) should talk with the clinician at the ambulance call centre; and, if all else fails, in Victoria at least, consider reverting to basics, and arrange to transport the patient by road with a local doctor on board rather than waiting for a MICA or air ambulance.

While the many constructive actions taken after both cases described in this issue should decrease the probability of similar events occurring in the future, they will unfortunately not eliminate them occurring altogether. In essence, timely and direct communication between senior staff in peripheral and tertiary hospitals and the ambulance communication centre provides the best opportunity for the appropriate and safe transfer of patients to larger centres.

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EXPERT COMMENTARY THE ANATOMY OF A MODERN RETRIEVAL SERVICE

Associate Professor Matt Hooper
SMB BS, DipIMC RCS(Ed), FACEM,
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SA Ambulance Service
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*The ambulance was available
but it took a doctor's say so
to come. This was refused.
My father pleaded. Was refused.*

*The local teacher's car was got finally.
The time all this took didn't pass,
it spread through sheets,
unstoppable.*

Les Murray.

*Three Poems in Memory of
my Mother.
The People's Otherworld.
Angus and Robertson. 1983.*

Despite enjoying one of the worlds most advanced health care systems in regards to access and health outcomes, many Australians will inevitably find themselves with an illness or injury that overwhelms the capability of the facility caring for them. In essence, such individuals are disadvantaged when compared with those whose initial point of contact with the health system provides a definitive level of care relative to their need. In order to match the health outcomes for such individuals, a response is required that overcomes the very significant logistic and clinical challenges inherent in vast distances, prolonged time frames, multiple providers of transport and clinical care, and the dynamic nature of human illness and injury. In Australia, this response is commonly termed a medical retrieval.

A medical retrieval aims to swiftly deliver to the individual in need the *right* level of care from the *right* clinical team with the *right* equipment and then transport that individual to the *right* health care facility in the *right* time frame via the *right* transport platform. Increasingly relevant is the requirement that this occurs at the *right* cost. Given all these requirements for a successful retrieval, it is unsurprising that adverse events can and do occur. Many of these will negatively impact on the health outcomes for such patients - as illustrated in the two cases presented.

However, both cases provide the opportunity to reflect on the common themes distilled in the coronial recommendations and the significant improvements in Australian retrieval service models of care that have occurred - particularly over the past decade.

Whilst there is some variation in the clinical and corporate governance models for retrieval services nationally and internationally, there are a number of widely supported principles underpinning modern emergency medical retrieval service provision.

Firstly, a single point of contact to a centralised clinical coordination centre is required. Having triaged calls effectively, such a centre should provide high level clinical advice to referring care teams whilst simultaneously tasking the right level of care and the right transport platform in a time frame relevant to the assessed patient priority. The case of Ms SH reminds us that a visual assessment of the deteriorating patient can be critical when simple observations are misleading. For this reason, telemedicine is increasingly utilised.

*Even physiologically
unstable patients may
benefit from rapid transport
with a relatively low level
of clinical care in transit if
the potential benefit of a
highly skilled retrieval team
is outweighed by significant
time delays.*

In many centres, on-site, critical care medical retrieval consultants work within a tiered workforce model to provide a central and overarching clinical point of contact for a given health care region. The ability to rapidly assess clinical severity, provide appropriate critical care advice and liaise with referring and receiving units, retrieval teams and transport providers are key skills for such consultants.

It is difficult to make good decisions without good information. In retrieval decision-making, logistic information is at least as important as clinical information. Knowing where key transport assets are, their inherent or relative limitations, the capability of regional centres and the whereabouts of key resources is critical. The case of Ms VC highlights the common lack of shared mental models by disjointed providers of a retrieval response - specifically with regard to

the clinical capability and availability of blood products in regional health care centres. In addition, the absence of retrieval teleconferencing facilities in both cases meant that critical information was lost through sequential rather than simultaneous information sharing.

Traditional models for a retrieval response require a transport team that can at least match if not exceed the level of clinical care provided at the referral facility. For this reason, most Australian retrieval teams include an experienced critical care physician trained specifically for the retrieval and aeromedical environment. Such a team may, on occasion, provide a level of care that is in fact definitive for the patient during the retrieval phase. However, the case of Ms VC (and to a lesser extent Ms SH) reminds us that, on occasion, a patient may reach definitive care far earlier if they are transported immediately rather than retrieved. Even physiologically unstable patients may benefit from rapid transport with a relatively low level of clinical care in transit if the potential benefit of a highly skilled retrieval team is outweighed by significant time delays. Again, such decisions can only be made by experienced clinicians working within a mature, retrieval coordination system.

Finally, retrieval clinical governance, audit and educational activities should be multidisciplinary such that referral and receiving teams and the retrieval service are able to share learning outcomes. In this way, future retrieval care delivery can be more integrated. It is only when this occurs that the outcome for individuals disadvantaged by the need for retrieval are improved irrespective of gradients in the level of care available or significant distances.

RESOURCES

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