STATE CORONER VICTORIA

CORONIAL COMMUNIQUÉ

Clinical Liaison Service – Connecting Clinicians with Coroners

VERITAS OMNIA VINCIT

State Coroner's Office and Victorian Institute of Forensic Medicine (Monash University, Department of Forensic Medicine)

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Contents

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What's in this edition?

In this edition of the Coronial Communiqué, the Clinical Liaison Service presents another three interesting cases from the Coronial Services Centre.

The first case (page 2) was summarised by Ms Elizabeth Newman (Research Nurse, Clinical Liaison Service). This case involves a death that was caused by haemorrhage associated with surgery. The coronial investigation highlighted a number of issues with the patient's care, including: 1) Availability of medical officers in private hospitals, 2) compliance with orders and 3) delays in the delivery of blood products.

The second case (page 3) was summarised by Dr. Adam O'Brien. This case involved an unrecognised oesophageal intubation causing cerebral hypoxia that may have been prevented with the use or availability of appropriate equipment.

The third case (page 4) was précised by Dr David Ernest, a member of the Coroner's Health and Medical Advisory Committee (refer to the February edition of the Communiqué - Volume 2 Issue 1). He discusses a rare case involving the use of propofol, which caused propofol infusion syndrome in a previously well male. The Coroner's investigation highlighted the need for the medical profession to be made aware of the dangers of prolonged use of high dosages of propofol, particularly in head injury patients.

Visitor from Queensland Health

The Clinical Liaison Service recently received a visit from the Principal Project Officer (Integrated Risk Management for Clinical and Corporate Services) from Queensland Health, Ms. Jane Carlisle. The visit was to gain insight of the services offered by the Clinical Liaison Service with a view to implementing a similar service in Queensland to assist the Queensland State Coroners Office. Queensland Health saw the benefits of working together sharing information across the jurisdictions and departments leading to improvements in patient safety.

Welcome

The Clinical Liaison Service wishes to welcome our new Administrative Officer, Megan Bohensky. Megan completed her undergraduate (Bachelor of Arts - psychology) at Stanford University in the United States and is currently studying a Master in Public Health at Melbourne University. She comes to us from the Human Research Ethics Committee at Sir Charles Gairdner Hospital in Perth.

Thanks for your feedback

The Clinical Liaison Service has receive a great deal of feedback about the Communiqué, which has been most encouraging. Please tell us what you think! Email your comments and questions to the Managing Editor: staceye@vifm.org

When things aren't what they seem

Case Number: 1949/00
Case Précis Author: Ms. E. Newman

Clinical summary

A 44 year old male with a history of severe oesophageal reflux was admitted to a small private hospital for an elective laparoscopic fundoplication procedure.

The procedure was conducted routinely. Half an hour after the patient was returned to the ward a nurse found his systolic blood pressure (BP) to be 70mmHg and attributed this to the pethidine as he had a known sensitivity to it. Despite the post-anaesthetic orders specifying that the anaesthetist should be called if the patient's systolic BP was less than 100mmHg, this did not occur. The patient's hypotension continued and it was not until nurses on the next shift came on duty two hours later that the anaesthetist was contacted. A fluid bolus was ordered after which the patient improved.

Five and a half hours post-surgery, haemorrhage was noted through the patient's dressings. The surgeon was contacted and blood tests, including cross-matching for two units of packed red blood cells, were ordered. The surgeon arrived twenty minutes later and arranged for the patient to return to theatre, suspecting that he may have cut a blood vessel. The surgeon was also on call for a major teaching hospital and was requested to attend an 'emergency', so he left the private hospital without communicating his clinical assessment to the nursing staff. He anticipated that he would return to the private hospital in a short time.

The pathology collection service had been paged after the surgeon's order for blood tests and these were collected approximately one hour later and arrived at the pathology laboratory after a further half an hour. The laboratory staff found the patient's haemoglobin to be 4.7 g/dL and cross-matched the blood. The patient's blood group was AB negative and the Red Cross Blood Bank was contacted to order further blood products. The blood was despatched from the laboratory approximately two and a half hours after it had been requested.

Meanwhile the patient's condition deteriorated approximately six and a half hours post-surgery. The anaesthetist (who was en-route to the hospital) was contacted and ordered morphine and further blood products. Nursing staff attempted to insert a second intravenous cannula unsuccessfully. An hour later the patient had a cardio-respiratory arrest for which resuscitation was commenced. The anaesthetist and surgeon arrived and the blood was transfused when it arrived. The patient died soon afterwards.

Coronial investigation

Following autopsy, the patient's cause of death was considered to be 'haemorrhage (associated with surgery)'.

The main elements of the coronial investigations and findings were:

- The decision to operate at the private hospital was deemed to be appropriate;
- The post-operative haemorrhage was not adequately tracked by the nursing staff and actions resulting from the downward trend in the patient's BP did not comply with the anaesthetist's orders. Experts, who assisted in the inquest, commented that had a haemoglobin testing machine been available at the hospital, the staff may have been alerted to the seriousness of the patient's condition sooner;
- The surgeon's decision to leave the private hospital to attend at the public hospital was criticised. The surgeon may have been able to alter the outcome had he remained with his private patient. The call out to the public hospital was a complicating factor and it appeared that the surgeon misjudged the severity of the private patient's condition;
- The delay in obtaining blood products was attributable to several factors. First, it was considered inappropriate to order only two units of packed cells. Second, a courier may have been more efficient in delivering the blood to the hospital compared to a taxi driver who had difficulties locating both the pathology laboratory and the private hospital. Third, there was an absence of formalised procedures relating to the ordering of urgent blood. Fourth, there was a failure of the pathology laboratory to advise the hospital, including the surgeon, of the likely time of arrival of the blood. Fifth, the blood request slip did not explicitly indicate the urgency of the order.

Recommendations

The Coroner made the following recommendations:

1. The colleges of Anaesthetists and Surgeons develop guidelines for practitioners who are on-call for public hospitals whilst serving the private sector. Furthermore, the guidelines should address the availability of medical officers to private hospitals in time critical situations. The colleges were reminded of the importance of open communication with nursing staff regarding treatment and clinical plans.
2. Private hospitals should consider the purchase of haemoglobin testing machines and the storage of emergency blood products on-site.
3. The development of a protocol for blood collection and despatch, including which body is responsible for each step.
4. The nursing profession were reminded of the importance of the key issues of complying with a doctor's orders, adequate documentation, and increasing the frequency of observations in appropriate cases.

Quote

"Learn all you can from the mistakes of others. You won't have time to make them all yourself."

Alfred Sheinwold

Correction

The volume and issue number of the February edition of the Coronial Communiqué should have read: Volume 2 Issue 1 rather than Volume 1 Issue 2.

Frequently asked Question

What do I need to do when a reportable death occurs in my hospital?

When a reportable death occurs in your hospital, there are a few administrative actions that are required. These are all outlined in: *Victorian Hospitals' Association (Ltd) Reference Manual, Administrative Procedures: Deceased Person.* An abridged list of these actions is given below:

1. The Coroner should be notified immediately
2. A Coroner's Medical Deposition should be completed. No death certificate should be completed without prior consultation with the State Coroner's Office, and no cremation certificate should be completed
3. If relatives are present, the Statement of Identification Form should be completed
4. When last offices are being performed, particular attention should be paid to:
   a. Intravenous lines
   b. Arterial lines
   c. Nasogastric tubes
   d. Endotracheal tubes
   e. Drain tubes
   f. Indwelling catheters
   g. Other extraneous items

   None should be removed. I.V. tubing should be tied and cut or spigotted; Nasogastric tubes should be spigotted; Catheters should be disconnected from drainage bags and tied, or spigotted; Other tubing should be secured so as not to allow leakage.

   Where hospitals wish certain items of equipment to be returned, the Coroner's Officer should be notified and every assistance will be given.
5. Valuables should be collected and deposited with the appropriate hospital officer (in some circumstances, wedding rings cannot be removed or relatives specifically ask that the ring remain with the deceased. The ring should be taped on). Belongings, other than valuables, should be given to next of kin.

Life-saving equipment

Case Number: 2213/00
Case Précis Author: Dr. A.J. O'Brien

Clinical summary

A middle aged male had elective nasal surgery at a rural hospital. He was anaesthetised by a general practitioner (GP) anaesthetist with assistance from a second year resident.

Following surgery the patient was extubated and observed in theatre before being moved to the Recovery Room at 11:45 hours. The patient was heavily sedated and was cared for by an experienced nurse.

The patient soon became agitated and required restraint. The GP anaesthetist was unable to reassess the patient but authorised the administration of 2.5mg of intravenous midazolam. Marked stridor developed at 12:00 hours associated with rapidly decreasing oxygen saturations. The GP anaesthetist remained unable to attend the patient as there were difficulties with his subsequent patient. Instead, the resident attended and found the patient had ceased breathing. With difficulty, the resident inserted an endotracheal tube.

When the GP anaesthetist was able to assist the resident he ordered a portable chest x-ray and considered the most likely cause of the problem to be inhalation of a large quantity of blood. This was supported by the on-call specialist anaesthetist who had checked the position of the endotracheal tube with a flexible bronchoscope during which he was only able to visualise blood.

The chest x-ray revealed an oesophageal intubation. The GP anaesthetist immediately re-inserted the endotracheal tube into the trachea. The patient subsequently developed bradycardia and asystole. A cardiac output was regained and the patient was transferred to a regional intensive care unit where he later died.

Coronial investigation

Three anaesthetists gave expert evidence with agreement being reached regarding the absence of 'robust and reliable methods [for] confirming proper placement of the endotracheal tube, [which may have] contributed to the difficulties experienced in the recovery room and the series of events that culminated in a cardiac arrest.'

There were concerns about the administration of midazolam without further assessment. However, the Coroner could not comment as to whether its administration without further assessment would have affected the outcome. Nor could the Coroner comment on the outcome had the midazolam was not been administered at all.

Findings

The 'down time', when oxygen was not being adequately delivered to the brain, was about 30 minutes, resulting in extensive cerebral oedema. The cause of death determined at autopsy was "hypoxic brain injury"

The cause of the collapse was due to blood from the back of the nose entering the larynx causing laryngeal spasm and airway obstruction. One of the experts explained that *'a non-breathing patient who had blood in the pharynx and upper airway is a major challenge of resuscitation skill. The view obtained at laryngoscopy under such circumstances is usually very poor, and in the absence of a capnograph to record carbon dioxide levels, the unrecognised oesophageal intubation is understandable.'*

Had the misplacement of the endotracheal tube been appreciated earlier correct re-intubation may have resulted in a different outcome. The Australian and New Zealand College of Anaesthetists (ANZCA) guidelines suggest that *'once an endotracheal tube has been passed, to protect against unrecognised oesophageal intubation, secondary confirmation with capnometry is recommended.'* It was noted that at the time of this case, the ANZCA guidelines did not require a capnograph be present in the Recovery Room, but have since been revised to do so.

Hospital response

The hospital advised that more experienced residents now rotated to the hospital and a capnograph had been purchased for the Recovery Room.

Coronial comments

A letter written by family members suggested to the Coroner that the full circumstances of the problems encountered in the post-operative management of the deceased had not been adequately conveyed to them, or if they had, there had been a fundamental misunderstanding of what was communicated. It was noted that a national standard for open disclosure was being ratified. The Coroner went on to comment that not only open, but early, indeed immediate full and open disclosure should be fostered so that families like those in this case are not left with residual festering misgivings which are virtually impossible to subsequently resolve.

Rare drug reactions - Spreading the word

Case Number: 2192/01
Case Précis Author: Dr. D Ernest

Clinical summary

A thirty one year old male with an unremarkable past history sustained a closed head injury without evidence of other significant injuries in a motor vehicle accident. He was intubated and sedated as part of his initial management and a CT scan of his brain at that time was reported as normal. He was subsequently transferred to an Intensive Care Unit (ICU) of a major metropolitan hospital.

A repeat CT brain scan on day 2 was reported as normal and a lumbar puncture on day 3 excluded any Central Nervous System infection. Subsequently, it was noted that he developed abnormal ECG changes and an elevation of his creatinine kinase levels. During the course of his ICU admission due to persistent agitation, propofol was administered as the predominant sedative agent, both as a high dose background intravenous infusion supplemented by intravenous boluses (average dose of 68 mcg/kg/min [4.1 mg/kg/h]). By day 6 further ECG abnormalities were noted and a transthoracic echocardiography examination demonstrated normal left ventricular size and function. The patient developed renal impairment and the urine was noted to have developed a green discolouration.

On day 8, the patient's clinical condition had deteriorated further and he was noted to have developed a metabolic acidosis, his plasma was lipaemic and the propofol infusion was accordingly decreased. The ECG had progressively become more abnormal with bizarre ST-T wave changes. His cardiac rhythm degenerated into a polymorphic ventricular tachycardia culminating in a cardiac arrest from which resuscitation was unsuccessful. An autopsy failed to reveal any specific pathology to explain the circulatory collapse, rhabdomyolysis and renal impairment. The cause of death was metabolic acidosis.

Coronial investigation

The focus of the Coroner's Investigations related to the use of high dose propofol and its association with the patient's subsequent clinical deterioration. An independent expert opinion informed the Coroner that the association of unexplained myocardial failure, metabolic acidosis and rhabdomyolysis developing in the context of high dose propofol treatment was termed '*propofol infusion syndrome'*. Sometimes associated with hyperkalaemia and renal failure, the syndrome has been described in both the paediatric and adult literature in a series of case reports and retrospective reviews. The relationship between the syndrome and high dose propofol has been regarded as an association only and no causal link has been clearly established.

The Coroner noted that subsequent to this case the hospital had modified its guidelines in relation to the use of propofol to state that the maximum dose for sedation shall not exceed 3 mg/kg/h.

The Coroner found that at the time of death, there was little by way of any case studies to alert the medical profession to prolonged use of propofol at high dosage rates, and as such, no adverse findings were made. However, the Coroner commented that it was reasonable to infer that the cause of death was propofol infusion syndrome resulting in *'Metabolic Acidosis'*, the stated cause of death.

Recommendations

The Coroner recommended the important need for the medical profession to be made aware of the dangers of prolonged use of high dosages of propofol, particularly in head injury patients.

Comments

This case highlights the broad requirement for the medical profession to promulgate information regarding adverse outcomes, particularly when infrequent but clinically significant events such as medication related deaths are concerned. Specifically, hospitals in which propofol infusions are used for sedation should ensure that their protocols are consistent with recommendations from their relevant Colleges or Special Societies.[1]

References

1 Nasraway SA, Jacobi J, Murray MJ, et al. Sedation, analgesia and neuromuscular blockade of the critically ill adult: Revised clinical practice guidelines for 2002. *Crit Care Med* 2002;30(1):117-41

For further clinical details of this case and a discussion of the mechanism of the propofol infusion syndrome, see:

Ernest D, French C. Propofol Infusion Syndrome – Report of an Adult Fatality. *Anaesth Intensive Care* 2003;31:316-319

Interesting reads....

Reforming the Coroner and Death Certification process: a position paper

Published by the Home Office, this report describes the proposed changes for the Coronial and Death Certification process in the UK. The report is available at

www.official-documents.co.uk/document/cm61/6159/6159.htm

Health Alert

Health Alert is published weekly and contains a summary of the critical judgments, legislation, press releases and news items which have come to Phillips Fox's attention. Go to the following link for the latest Health Alert.

http://www.aushealthcare.com.au/publications/publication_details.asp?pid=89

Investigation Report. Campbelltown and Camden Hospitals, Macarthur Health Services

The report of the investigations into the Campbelltown and Camden Hospitals is available at:

http://www.health.nsw.gov.au/pubs/i/pdf/invstign_hccc_2.pdf

A message from the cartoonist!

"Buried in history!"… **Look out for the next edition of the Coronial Communiqué (August 2004) for a review of some historical findings with pertinent recommendations concerning systems**

Subscription

The Clinical Liaison Service will publish an additional two issues of the **Coronial Communiqué** in 2004. Subscription to the Communiqué is free of charge and is sent electronically to your preferred email address. If you would like to subscribe to the Communiqué, please email Stacey on: staceye@vifm.org