STATE CORONER'S COURT
OF NEW SOUTH WALES

Inquest:	Inquest into the death of Melissa King
Hearing dates:	1-5, 24, April and 22 May 2019
Date of findings:	14 June 2019
Place of findings:	NSW State Coroner's Court - Lidcombe
Findings of:	Magistrate Carmel Forbes, Deputy State Coroner
Catchwords:	CORONIAL LAW – Cause and manner of death- hospital death-sodium and fluid overload-flaws in clinical decision making-hospital system shortcomings
File number:	2016/280252
Representation:	Ms D Ward, Counsel Assisting, instructed by Mr D Yang (Crown Solicitor's Office) Mr W Reynolds instructed by Mr P Bannister (Phil Bannister Pty Ltd) for Ms King's partner Mr T Saunders instructed by Ms M Pecker (Meridian Lawyers) for Dr Deol Mr T Hackett instructed by Mr A Georgepoulos (HWL Ebsworth Lawyers) for Dr Kariyawasam Mr P Rooney instructed by Ms V Stojkova (Hicksons Lawyers) for Western Sydney Local Health District Ms B Haider, solicitor (New South Wales Nurses and Midwives Association) for Endorsed Enrolled Nurse Trad-Guida

Findings:	**Identity of deceased**: The deceased person was Ms Melissa King **Date of death**: 16 September 2016 **Place of death**: Blacktown Hospital, NSW **Cause of death:** The death was caused by hypoxic ischaemic encephalopathy with an antecedent cause of in-hospital cardiopulmonary arrest and resuscitation. Chronic alcoholism with liver disease and malnutrition with re-feeding syndrome were also significant conditions contributing to the death **Manner of death:** Natural Causes

REASONS FOR DECISION

Introduction

1. Ms King died on 16 September 2016 at Blacktown Hospital. She was only 33 years old at the time of her death. She had a history of chronic alcohol use. On Wednesday 10 August 2016, after two to three days of vomiting and diarrhoea, she called the National Home Doctor Service who referred her to Mount Druitt Hospital. From there, she was transferred to Blacktown Hospital where she was treated with fluids and electrolyte replacement and was admitted to the intensive care unit (ICU/HDU) with the following medical issues ultimately diagnosed:[1]
   - urinary tract sepsis;
   - severe malnutrition with electrolyte metabolic derangements, notable low sodium (hyponatraemia), low potassium (hypokalaemia), low magnesium, low chloride, low calcium, low vitamin D, anaemia and metabolic alkalosis;
   - deranged liver function; and
   - ascites, pulmonary effusions and obstructive renal calculus diagnosed on CT scan.

2. The urinary tract infection did not adequately explain all of her symptoms. Further investigations were arranged.

3. On 15 August 2016, a CT scan showed bowel wall thickening which together with her diarrhoea suggested inflammatory bowel disease. A decision was made for an endoscopy to be conducted on 17 August 2016. She was discharged from the ICU into the general ward. On the ward she commenced taking the preparation for the endoscopic investigation. At 11:58pm, a nurse checked on Ms King and found her to be unresponsive. Cardiopulmonary resuscitation was commenced and a tracheostomy was inserted. On 13 September 2016, it was decided after a family conference that the tracheostomy be removed and palliative care be provided. Sadly, she passed away on 16 September 2016.

4. Sudden and unexpected deaths or deaths from unknown causes are investigated by coroners.

5. The coroner's role at inquest is to identify a deceased person, when and where that person died, the physical cause of death and how that death came about. It is also to address concerns of relatives and friends about the death and to learn such lessons as the death may be able to teach us so that we can reduce the risk for others in the future. An inquest is an inquiry. It is not the function of this inquest to apportion blame. Nobody is on trial in these proceedings.

6. The issues in this inquest are the manner and cause of Ms King's death and in particular her care and treatment relating to the following issues that have been identified by independent expert review:

   a) The micronutrient replacement;

   b) The decision to transfer Ms King to Ward A71;

   c) The endoscopy procedure; and

   d) Whether the evidence demonstrates systemic issues on the part of Blacktown Hospital and if so, whether the Hospital has made any changes in light of Ms King's death.

[1] Ex 1 Tab 4 p19

Ms King

7. At the time of her death Ms King had been in a de facto relationship for 17 years with Matthew Beynon-Mills. They had 5 children; Tara, Dylan, Tiffany, Nicola and Aaliyah. Sadly, Tara passed away in 2002 with meningococcal disease. Ms King told doctors caring for her at Blacktown Hospital that this terrible event triggered serious depression.

8. Ms King attended Windsor High School and then worked for a few years at Speedo until Tara was born.

9. She had five siblings two of whom were with her when she passed away.

10. Two years before she passed away she became involved with the Salvation Army. She had stopped drinking and was volunteering with that service. Her loving children and family described her as being happy and healthy prior to her death. She had been a kind and caring mother who is now dearly missed.

Outline of the events leading to Ms King's death

11. On Thursday 11 August 2016, Ms King was admitted into Blacktown Hospital ICU. She was admitted under the care of the endocrinology team but was also treated by the gastroenterology team and the intensive care team.

12. Ms King had a long history of alcohol abuse and malnutrition. She weighed 40 kg upon her admission to hospital. She presented with very low serum sodium, low serum potassium, low serum phosphate, low serum magnesium, low serum chloride, low ionised calcium, low serum albumin, low haemoglobin, high serum pH, abnormal liver function, raised white cell and neutrophil counts and abnormal urinalysis.

13. Replenishing her depleted micronutrients needed to take into account the risk of re-feeding syndrome. When a person who is malnourished starts receiving artificial refeeding, there is potentially a fatal shift in fluids and electrolytes. The risk that this posed to Ms King was identified throughout the records in her ICU/HDU admission.

14. Ms King's response to refeeding attempts varied. There were periods where she was nil by mouth, periods where she could have light fluids, periods where she was prescribed a light diet, periods where she could have a full diet but only took small amounts and periods where the level and nature of intravenous fluids she received changed.

15. Ms King's overall condition fluctuated during her admission to ICU/HDU. She had periods where she was lucid, sitting up and able to spend time with her family and answer questions from her doctors. There was a period of deterioration in the early hours of 14 August 2016 when Ms King became confused and agitated. The level of saline being administered was reduced and by late afternoon on 15 August 2016, Ms King was reported as alert and orientated most of the time.

16. On the morning of Tuesday 16 August 2016 at around 7:11am, Ms King was seen by the gastroenterology advance trainee who advised diuresis [that is encouraging the increased production of urine] and a light sodium diet. At 9:25am, the dietician assessing Ms King reported a complaint of "feeling full with abdominal distension." At 11:12am, Ms King was complaining of ongoing abdominal discomfort and Dr Emerson, endocrinology registrar, noted that her abdomen was distended and bowel sounds were difficult to hear. Ms King told Dr Patil, ICU registrar, that she had intermittent mild abdominal pain but no diarrhoea. She also said she was feeling good.

17. Dr Deol, the Intensive Care Staff Specialist at Blacktown Hospital, decided to transfer Ms King into Ward A71.

18. Ms King had been tachycardic for most of her admission into the ICU/HDU ward. A heart rate varying between 120-133 bpm was a fairly consistent feature of her presentation across the admission. The endocrinology and gastroenterology teams felt it was not safe for Ms King to be transferred whilst she was experiencing sinus tachycardia which they considered to be unexplained. They recorded their opposition in the progress notes. Dr Emerson from the endocrinology team said that he raised opposition to this decision in a discussion with Dr Deol's Senior Registrar. (see further at para 40)

19. Dr Deol directed that Ms King's calling criteria under the "between the flags" policy be varied so a medical review would only be triggered upon Ms King's heart rate exceeding 130 bpm. Dr Deol then arranged for the transfer. The endocrinology and gastroenterology teams were not informed of the transfer or the alteration to the calling criteria.

20. Once on Ward A71, preparations continued for Ms King to have an endoscopy the next day. Ms King's preparation for the endoscopy required her to consume three litres of a glycoprep solution over a period of hours aimed at purging bowel contents. It is not clear how much she ultimately consumed.

21. In further preparation for the procedure, Ms King was reviewed by an anaesthetist trainee, Dr Wong. She recorded the presence of a "wheeze" and/or "diffuse rhonci" and prescribed salbutamol. This was the first occasion that Ms King had required a bronchodilator during her hospital stay. Dr Wong also prescribed nebulised normal saline 5ml four hourly if required which was not administered.

22. After the anaesthetic review Ms King's oxygen saturations dropped to 93% on 2 litres of oxygen. Nurse Trad-Guida contacted the after-hours medical officer (AMO) and was advised to increase the supply to 3 litres. Ms King's oxygen saturation increased to 95%. There was no physical review by a doctor at this time.

23. Later that evening, Ms King told Nurse Trad-Guida that she was feeling hot and cold. She was still feeling short of breath on 3L/min oxygen via nasal prongs. Nurse Trad-Guida asked the AMO to review Ms King. That doctor asked Nurse Trad-Guida to write it up in the after-hours book. This is meant to operate as a request for the after-hours doctor to review a patient. Nurse Trad-Guida did so but no review by a doctor followed.

24. Shortly before midnight Ms King called for a bed pan. Nurse Jabbie assisted Ms King and then left Ms King sitting in bed still drinking the glycoprep solution. When Nurse Jabbie returned to finish fixing Ms King's bed she found her unresponsive. Nurse Jabbie activated the MET call bell and an urgent medical response ensued.

25. Ms King suffered an asystolic cardiac arrest, her airway was secured and she was returned to the ICU.

26. Ms King's prognosis was poor. She had suffered a period of hypoxia and there was no neurological improvement after she was weaned off sedation.

27. After meeting with the doctors, her family made the difficult decision to consent to the withdrawal of treatment. Ms King received comfort care for the following two days until she died on 16 September 2016.

Issues

28. Independent expert medical review of Ms King's care and treatment was conducted by Associate Professor Bihari (Intensive Care Physician)[2], Associate Professor Lee (Intensive Care Specialist, Anaesthetist)[3] and Professor Fisher (Honorary VMO ICU North Shore Hospital, Clinical Professor Department of Medicine at the University of Sydney)[4].

29. I now propose to look at the expert's opinion in relation to the care and treatment of Ms King in relation to each of the issues.

<u>The micronutrient replacement</u>

30. Associate Professor Bihari said that there was no evidence of micronutrient replacement with intravenous vitamins and trace elements in the period from 10 to 16 August 2016.[5] He said that Ms King needed thiamine at a rate of least 600my daily, in divided doses, because she was not able to tolerate a normal diet, had vomiting and she would not necessarily be able to absorb thiamine orally.

31. The medical records available at inquest show that thiamine was administered at a higher rate than Associate Professor Bihari had concluded in his report from the limited documents available to him. Dr Deol submits that furthermore, Ms King was tolerating a full diet by 15 and 16 August 2016 which would have supplemented her thiamine levels.

32. Taking into account these rebuttals, I note that thiamine was still not administered at the rate that Associate Professor Bihari would have recommended from 10-16 August 2016.

33. Associate Professor Lee was critical of the fact that the management of vitamin and nutritional replacement was not well coordinated.[6] He said that thiamine should have started on arrival to hospital, complemented with multi-vitamins of B group, vitamin C and folate. A peptide based or high-protein feed rich in trace elements and vitamins should have also been considered.[7]

34. On balance, I accept the criticisms that the overall management of micronutrient replacement was not well coordinated.

<u>Gross fluid and sodium overload</u>

35. Associate Professor Lee was of the opinion that whilst the electrolyte disturbance was initially appropriately and effectively managed, the risk of salt and water retention with refeeding syndrome was not appreciated or managed appropriately. He was of the view that soon after the initial replacement of fluid, it was clear that dehydration was no longer the main problem and that electrolyte abnormalities should have been treated by albumin restoration, limited salt and water input and avoiding worsening positive fluid balance. He said that as a 40 kg woman she would normally require 40 to 50 mls of fluid per hour for maintenance once any deficit had been repaid but Ms King was continued for five days on fluids up to 80 and 120 mls/hour. He said that the fluid administration plan should have been adjusted after thirty six hours when her fluid balance was positive and later that when there were

[2] Ex 1 Tabs 27 and 28
[3] Ex 1 Tab 28A
[4] Ex 1 Tab 28E
[5] Ex 2 Tab 27 p102
[6] Ex 1 Tab 28A p107B.12
[7] EX 1 Tab 28A p107B.12

clinical signs of severe fluid retention.[8] He said it was inappropriate for her to remain on excessive fluid input right up to her cardiac arrest. He was of the opinion that by 13 August 2016, Ms King was 5L positive and her serum albumin levels had fallen to 18g/L so this was the time to advise diuresis and a low sodium diet.

36. Associate Professor Bihari stated that the treatment she received led to gross fluid and sodium overload. He said that the overload was evidenced by oedema, ascites and bilateral pleural effusions.[9] He further said that once a safe level of serum sodium had been achieved and any hypovolaemia corrected, sodium and fluid restriction would have been the treatment of choice.

37. Professor Fisher was of the opinion that two litres of IV fluid per day was excessive when she was oedematous. He stated that "… A significant omission in her records is the evidence of salt water overload and the continuing infusion of saline".[10]

38. There is no dispute that Ms King's electrolyte imbalance was appropriately managed in the initial days of her admission. I accept the expert opinions that by 16 August 2016, the risk of salt and water retention was not appreciated or managed appropriately.

39. I am satisfied on balance that her treatment for hyponatraemia resulted in gross fluid and sodium overload.

<u>The decision to transfer Ms King to Ward A71</u>

40. Some of the communication in relation to the decision to transfer Ms King to Ward A71 occurred via electronic progress notes. There was also face-to-face discussion within and between the various specialties involved in Ms King's care. Recollections of what passed during some of these conversations differ markedly and miscommunication prevailed.

41. Dr Deol's colleagues from the endocrinology and gastroenterology teams entered their opposition to her decision to transfer Ms King in the progress notes. Dr Emerson from the endocrinology team also said that he raised his opposition to this decision in discussions with Dr Deol's Senior Registrar. Dr Deol said that she did not see any of the opposition recorded in the progress notes as the entries were made after her rounds on that day. She said that she was unaware of any opposition other than a concern related to her by her Senior Registrar that Ms King's tachycardia had the potential to very quickly prompt a review under the hospital "between the flags" policy. She asked her Senior Registrar to alter the calling criteria to address this concern and then arranged for the transfer.

42. I do not propose to resolve the discrepancies in the evidence about the communication that went on in relation to the decision to transfer Ms King down to Ward A71. Each witness that gave evidence in relation to the communication on this point was relying on medical records and recalling conversations from almost three years ago. At the time of the decision to transfer Ms King, Dr Deol had been at the hospital for about four and a half months, her registrar had been at the hospital for one month. The consultant endocrinologist believed that Ms King was not going to be transferred and so did not contact Dr Deol. The consultant gastroenterologist cannot remember who he spoke to but felt that he spoke to an ICU registrar when he learnt of the decision to transfer Ms King.

[8] Ex 1 Tab 28A p107B.12
[9] Ex 1 Tab 27 p102,104
[10] Ex 1 Tab 28E p107F.2

43. There was clearly a breakdown in communication. I accept Professor Fisher's observation that "the electronic record is a valuable repository of information but a poor and dangerous communication tool".[11] It was inappropriate that the opposition to transfer recorded in the progress notes was not seen by Dr Deol or, on her evidence, clearly communicated to her. It was inappropriate that the endocrinology and gastroenterology teams were not notified to the fact the transfer was to proceed.

44. Later in this decision I will deal with the changes the hospital have put in place to try to address the poor communication that took place.

45. In relation to the reasons for the decision to transfer Ms King, Professor Fisher said that Ms King needed regular assessment and monitoring which would have been best provided in ICU/HDU.[12]

46. It was submitted on behalf Dr Deol that the treatment Ms King needed was also available in the general ward, that it is common for patients to be discharged from ICU/HDU requiring supplemental oxygen by nasal prongs and that most patients will not have normal physiological parameters when they are discharged. The important factor to remember is that they are being discharged to a general ward bed and not being discharged to go home.

47. It was further submitted that competing demands for beds in the ICU/HDU are always live issues and a risk analysis of competing bed demands with other very ill patients is continually being undertaken. I am reminded that hindsight bias is to be considered in this matter when there has been careful review by the experts without the pressure of real-time decision-making in an ICU/HDU environment. In this respect, Professor Fisher said that "the transfer was debateable but I consider it inappropriate to criticise Dr Deol for this without ascertaining what other patients were in the ICU, how sick they were, and what was the demand on beds".[13]

48. Associate Professors Lee and Bihari were critical of the decision to transfer Ms King from ICU/HDU to Ward A71 in light of the gross fluid and sodium overload evident by this time and the persistent tachycardia. They both noted that she had retained 11.8 litres of fluid at the time of transfer. Associate Professor Lee noted that there were signs of impending problems which should have been heeded and urgently managed. Associate Professor Lee noted that she had gross fluid retention, anasarca with oedema of all limbs and over the sacrum, bilateral pleural effusions and gross ascites, very low serum albumin (16 g/L). He was of the view that it was inappropriate for her to be discharged to the general ward with no plan to manage these issues and with persistent tachycardia. He explained that refeeding syndrome is associated with sudden cardiac death and acute respiratory failure. He noted that she had abnormal ECGs with a very prolonged QT interval and her tachycardia was persisting with no other cause found other than severe electrolyte and metabolic disturbance. Associate Professor Bihari also noted signs of impending problems including in her last arterial blood gas performed at 9:50am on 16 August 2016 before her arterial line was removed which demonstrated a significant degree of hypoxia which he said would probably have related to fluid overload and bilateral pleural effusions.[14]

49. On balance I accept that the decision to transfer Ms King, including the change to the "between the flags" criteria, was premature in that she required the regular assessment and monitoring that could be provided in ICU/HDU. Professor Lee pointed out that while the opposition to transfer was in relation to

[11] Ex 1 Tab 28E p107F.3
[12] Ex 1 Tab 28E p107F.2
[13] Ex 1 Tab 28E p107F.4
[14] Ex 1 Tab 27 p103

tachycardia the more serious concern was the fluid and sodium overload. There was not only inadequate communication between the ICU, endocrinology and gastroenterology teams on the decision to transfer but no one identified the main concern as to why she should not have been transferred out of ICU/HDU.

Ward A71 and the endoscopy procedure

50. The ICU/HDU transfer summary was incomplete and unsigned. It recommended that Ms King "continue NS 80ml/hr" with no reference to a need for diuresis or fluid management or monitoring.[15] It referred to continuing calcium and vitamin D but said nothing about thiamine replacement. It did not refer to the risk of refeeding syndrome. It did not refer to persistent sinus tachycardia during the ICU/HDU admission nor that the MET call criteria had been changed.

51. It is not clear from the hospital records when Ms King arrived on Ward A71. A nursing observation at 3:28pm suggest that Ms King was on the ward by this time. Dr Brett Gardiner, the Director of Medical Services, Blacktown Hospital said that on his review of all the documents that transfer occurred at around 3:30pm to 3:45pm. I accept this timeframe.

52. The endocrinology team were not advised of Ms King's transfer and no medical review by that admitting team took place in the eight and a half hours she was on the ward.

53. The glycoprep mixture was marked on the ward's medication chart.[16] The mixture was prepared as charted but it is not clear how much Ms King was able to consume. By 9:30pm, Ms King was complaining of feeling hot and cold and when Nurse Trad-Guida asked the AMO to review Ms King, she was told to write it up in the after-hours book. No medical review occurred prior to her cardiac arrest.

54. The transfer to the ward and her treatment on the ward were fraught with difficulties. I will address the hospital's response later in these findings.

55. In relation to the decision to proceed with the endoscopy and administer the glycoprep, it was submitted that it proceeded as a result of the various teams collaborating and was a judgement call made in an attempt to obtain a diagnosis for Ms King.

56. Associate Professor Lee formed the view that the abnormal oedematous bowel on CT on 11 August 2016 was best explained by severe hypoalbuminaemia, fluid overload and ascites. He said that the decision to organise endoscopy for 17 August 2016 was unwarranted and unwise in light of her worsening condition at that time. He said that the faecal specimens had shown no red cells and no leukocytes and there was an inappropriate focus on inflammatory bowel disease in absence of any evidence to support that diagnosis. He felt that the gastroenterology team focused on completing their procedure rather than ensuring Ms King's well-being. He also was critical of the team for ordering such a large volume of the oral glycoprep for such a small woman with a distended abdomen and difficulty ingesting. He felt that the glycoprep would further distend her abdomen, interfere with breathing and destruct her electrolyte levels.[17]

[15] Ex 1 Tab 39 p440
[16] Ex 1 Tab 39 p362/8
[17] Ex 1 Tab 28A p107B.10, 107B.14

57. Professor Fisher agreed that the endoscopy was not urgent and could have been delayed. He felt that the glycoprep mixture was inappropriate for an oedematous patient.[18]

58. Associate Professor Bihari suggested that Ms King would have continued to deteriorate on the ward even without the glycoprep but it would have been easier to treat increasing respiratory distress and to treat the sudden cardiac arrest. Associate Professor Lee agreed that Ms King would have continued to deteriorate anyway, but maybe at a slower rate. He said the glycoprep compound sped up the process but she might have developed respiratory distress sometime that night in any event.

59. The Consultant Gastroenterologist firmly holds the opinion that the administration of glycoprep and the decision to proceed with endoscopy was a safe option for Ms King. As the independent experts were not gastroenterologist specialists, coupled with the fact they agree that Ms King may well have continued to deteriorate without the glycoprep, I am not in a position to criticise the decision. It would, however, be appropriate for the relevant gastroenterology treating team to consider and reflect upon the comments made by the independent intensivist experts on this topic.

Systemic issues on the part of Blacktown Hospital

60. It is not in dispute that Ms King's ICU transfer summary to Ward A71 was incomplete and was not provided to the receiving team at Ward A71 as the ICU registrar attending to its creation was called away for a "between the flags" rapid response at another ward. It is also not in dispute that there was no verbal handover between the ICU team and the receiving team at Ward A71. It is also not in dispute that Ms King was transferred to Ward A71 despite objections from her treating endocrine and gastroenterology teams and without adequate communication. Neither of these teams was notified of Ms King's eventual transfer and accordingly they were not given the opportunity to review her when she was moved to the ward. Whilst Ms King was on Ward A71, the AMO did not review her despite a request being made and an entry in the after-hours book. Apart from an anaesthetic assessment by Dr Wong in preparation for the endoscopy, Ms King was not reviewed on the ward by a medical officer subsequent to her discharge from ICU/HDU.

61. Dr Gardiner, the Director of Medical Services for Blacktown Hospital, gave evidence in this inquest of the changes in the practices and procedures at the hospital following the death of Ms King. He explained that a review by the hospital of the circumstances surrounding her death had prompted significant, lengthy and complex changes in hospital policy and procedure. Ms King's case had become an opportunity for the hospital and staff to reflect and implement the lessons that were learnt. Her case was presented to Junior Medical Officers and Intensive Care Unit staff in the 2018 orientation meeting.[19] A new clinical emergency response system introduced in February 2019 has resulted in extensive education across the hospital to all clinical groups. Over 100 education sessions have being conducted including videos highlighting issues from Ms King's case.[20] There is ongoing review and surveys monitoring the improvements in staff understanding of the protocols being introduced.

62. Dr Gardiner gave evidence that in terms of intensive care medicine, in February 2019 an additional medical registrar was rostered for weekday evenings to ensure the necessary expertise level for patient review. This was accompanied by additional critical care senior registered medical officers who have been rostered for after-hours shifts. Funding has also been allocated for an additional intensive care consultant and it is expected that this position will be filled by July 2019. A separate clinical emergency

[18] Ex 1 Tab 28E p107F.3
[19] Ex 1 Tab 26 p100C.2
[20] Ex 1 Tab 26 p100C.3

response team has been established in the hospital to respond to incidents across the hospital. This means that there are now 10 ICU/HDU senior registrars and a senior registrar is present on the ward at all times.[21]

63. The ICU registrars are no longer called away to attend clinical reviews or "between the flags" rapid responses unless there is a code blue call.

64. At the time of Ms King's death there was no transfer guideline from ICU/HDU to the general wards. Since Ms King's death a structured medical and nursing pathway to transfer patients from ICU/HDU was developed and implemented. The guideline document was published in January 2017. The requirements now form part of the orientation programme for all medical registrars at Blacktown Hospital. A copy of the 2019 operational document forms part of Exhibit 1 Tab 26.

65. Under the new guideline, prior to discharge or transfer to the ward, the ward registrar must be contacted by the ICU registrar regarding ongoing management plans and there must be a verbal clinical handover.[22]

66. The guideline includes a requirement that core observations be taken within 30 minutes prior to transfer and that a medical officer on the ward review a patient within one hour of arrival from ICU/HDU. If the review does not happen within the hour then the clinical emergency response system will be activated.[23]

67. Updates are being made to the electronic medical record. A new electronic record for intensive care (eRIC) means the ICU transfer summary is now available electronically to staff on the general wards and is to be saved in the ward's electronic medical records. Dr Gardiner explained that while some hospitals have a single database between ICU/HDU and the general wards, Blacktown Hospital still has separate database and accordingly the ICU/HDU progress notes are only available to clinical staff who know how to navigate the ICU/HDU database. It is hoped that in the future the hospital will receive funding for a single database so that all staff will be able to access the ICU/HDU progress notes. In the meantime the ICU transfer summary is the important tool that is being completed for the receiving ward together with the verbal handover.

68. The after-hours book has been abolished and a jobs list and electronic handover list has been created. Dr Gardiner explained that the new system allows for patients to be automatically flagged for review.

69. In summary, the relevant changes are:

New ICU Discharge Procedure[24]

- Intensivist identifies patients suitable for discharge or transfer twice daily. It is necessary to consider the suitability of a patient for a non-monitored bed and to document that consideration and outcome of any decision made in the patient's ICU record
- ICU Nurse-in-Charge must notify Patient Flow Unit and place request for transfer
- Prior to discharge or transfer, the Ward Registrar must be contacted by the ICU registrar
- After hours the relevant Registrar will be notified of ongoing management plans

[21] Ex 1 Tab 26 p100C.3
[22] Ex 1 Tab 26 p100C.125
[23] Ex 1 Tab 26 p100C.2, 100C.68-69
[24] Ex 1 Tab 26 p1007C.39-41

- The ICU nursing staff will contact the nursing staff in the receiving ward/facility and provide a verbal handover. The contents of the matters discussed at handover are to be documented in the patient's ICU record
- All medication and fluid orders must be reviewed and re-charted onto a general inpatient unit charge if appropriate
- Transfers should be facilitated by 4.30pm at the latest that the patient can be reviewed before staff levels decrease on the night shift. However, Dr Gardiner acknowledged that there may be some cases where this cannot happen

A New Clinical Handover Policy[25]

- Which outlines standard key principles for clinical handover Exhibit 1 Tab 26

Review of a patient[26]

- Core observations must be conducted just prior to (within 30 minutes of) transfer and as soon as practicable on admission to the ward
- Core observations must then be taken every 4-6 hours for the first 24 hours after admission thereafter a minimum of 3 times per day at 8 hour intervals
- Observations must be recorded on the electronic chart
- Patient must be reviewed by the Registrar for the admitting team within 1 hour of arrival to ward
- If the patient is not reviewed within 1 hour of arrival to the ward, the Clinical Emergency Response System will be activated

Audits

- Audits are being undertaken in relation to whether nurses conduct the core observations as required.

Decision to discharge[27]

- The decision to discharge rests with the Intensivist, however they must consult with the other treating teams
- If there is disagreement between teams about whether a patient ought to be discharged, it is to be resolved at a consultant level and may be escalated to the Director of Medical Services or the Director of Intensive Care
- It is necessary to consider suitability for transfer to a non-monitored bed and to document that consideration and the outcome of any decision made

Calling criteria[28]

- Alteration of calling criteria must be approved and reviewed
- Must be escalated to the Consultant
- Must be reviewed every 72 hours otherwise it will automatically revert to the standard parameters

[25] Ex 1 Tab 26 p100C.45-53
[26] Ex 1 Tab 26 p100C.2, 100C.68-69, 100C.117-118
[27] Ex 1 Tab 26 p100C.1, 100C.39
[28] Ex 1 Tab 26 p100C.32, 100C.70-71

- Dr Gardiner notes that a Consultant can unilaterally alter the calling criteria but explained that there is an expectation that this would be discussed with the other treating teams.

Notification of altered calling criteria[29]

- A patient whose observations are in the yellow or red zone may only be transferred if the AMO has altered the calling criteria and advised the receiving AMO and nursing staff.
- Dr Gardiner notes that once a change is made to the calling criteria, the coloured zones will move on the electronic observation chart, and should be obvious to anyone who looks at them
- Dr Gardiner said that a change to the calling criteria should be noted on the ICU discharge summary

70. Ms King's presentation at Blacktown Hospital was complex. Her case has provided an opportunity for lessons to be learned for both the treating practitioners and the hospital. The changes that have taken place at the hospital are supported by audit compliance and continuing education. In those circumstances, I do not propose to make any recommendations.

Cause of death

71. At autopsy the forensic pathologist determined that Ms King's cause of death was hypoxic ischaemic encephalopathy with an antecedent cause of in-hospital cardiopulmonary arrest and resuscitation. Chronic alcoholism with liver disease and malnutrition with refeeding syndrome were also seen as significant conditions contributing to the death.

72. Associate Professor Lee opined that the cause of the cardiac arrest could have been a combination of factors including pulmonary oedema and possible aspiration of the glycoprep solution. Associate Professor Bihari hypothesised that the fluid overload leading to pulmonary oedema was the primary contributing problem but said that he could not know for sure.[30] Professor Fisher agreed with both of the above statements as to the possible causes of the cardiac arrest.

73. It is not in dispute that for the purpose of this inquest, it would be appropriate to make a finding that the cause of Ms King's death was as determined by the forensic pathologist.

Conclusion

Findings required by s81 Coroners Act 2009

The identity of the deceased

Ms Melissa King

Date of death

16 September 2016

Place of death

Blacktown Hospital, New South Wales

[29] Ex 1 Tab 26 p100C.79
[30] Ex 1 Tab 27 p104

Cause of death

The death was caused by hypoxic ischaemic encephalopathy with an antecedent cause of in-hospital cardiopulmonary arrest and resuscitation. Chronic alcoholism with liver disease and malnutrition with re-feeding syndrome were also significant conditions contributing to the death

Manner of death

Natural causes

Carmel Forbes
Deputy State Coroner
Lidcombe
14 June 2019