IN THE CORONERS COURT

OF VICTORIA

AT MELBOURNE

Court Reference: COR 2017 0935

FINDING INTO DEATH WITHOUT INQUEST

Form 38 Rule 60(2)

*Section 67 of the **Coroners Act 2008***

I, AUDREY JAMIESON, Coroner having investigated the death of SUNUNTHA SUTTHA

without holding an inquest:

find that the identity of the deceased was SUNUNTHA SUTTHA

born 6 January 1960

and the death occurred on 24 February 2017

at 10 Joshua Court, Bundoora, Victoria

from:

1 (a) HAEMOPERICARDIUM COMPLICATING ASCENDING THORACIC AORTIC DISSECTION

Pursuant to section 67(1) of the **Coroners Act 2008**, I make findings with respect to **the following circumstances**:

1. Sununtha Suttha was 57 years of age and lived in Thailand. At the time of her death she was visiting her daughter in Melbourne. Ms Sutha had a medical history which included Systemic Lupus Erythematosis[1] (**SLE**) but did not take any medication for the condition.

2. At 4.42pm on 19 February 2017, Ms Suttha presented to the Northern Hospital Emergency Department (**ED**). Her daughter acted as an interpreter. Ms Suttha's observations were normal at the time and she received a triage category of '3'. The triage note stated the presenting problem as

   "*Unconscious collapse at 14:30. Was kneeling down cleaning the floor at the time. Prior to complaining of feeling dizzy, SOB[2] and lower back pain which proceeded to LOC[3] and abnormal breathing. Denies chest pain, unable to ambulate secondary to back pain and altered sensation to leg foot.*"

3. At approximately 5.41pm, Ms Suttha was reviewed by an ED registrar, Dr Wei Ng. Ms Suttha's pain was documented as '*sudden onset sharp stabbing pain to the mid back*' and that it was associated with feeling faint and dizzy, sweating, and shortness of breath. It was also noted that Ms Suttha felt as though she couldn't move her right leg at the time. Save for the back pain, all of Ms Suttha's symptoms had apparently resolved by the time of Dr Ng's review. Ms Suttha's observations were normal, as was her cardiac and neurological exam. She had some mild paraspinal mid thoracic tenderness. Dr Ng noted his impression as

   "*??MSK[4] back pain with vasovagal event ?? Cardiac event though unlikely*"

4. An electrocardiogram (**ECG**) was performed at 7.13pm. The results of blood that had been sampled from Ms Suttha earlier that evening showed a very mildly elevated

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[1] An autoimmune disease affecting 20,000 Australians. It is characterised by flare ups and remissions of inflammation of almost any organ system in the body though usually only affects skin and joints. A flare up is treated with steroids.

[2] Shortness of Breath

[3] Loss of consciousness

[4] Musculoskeletal

Troponin[5] I level and the general chemistry examination revealed mild elevation of urea and creatinine.

5. Dr Ng discussed Ms Suttha's presentation with senior Emergency Physician, Dr Peter Papadopolous. The presentation conveyed the impression of Dr Ng that Ms Suttha was likely suffering from musculoskeletal pain as a result of bending over and cleaning. Dr Papadopolous recommended that serial high sensitivity troponins testing be undertaken to rule out acute coronary syndrome. If these results were normal, then Ms Suttha could be discharged. At 11.43pm, further blood test results returned as normal and Ms Suttha was discharged into the care of her daughter. She planned to fly back to Thailand the following day to be reviewed by her doctor there.

6. At approximately 9.00pm on 24 February 2017, Ms Suttha was found unresponsive in her bed at her daughter's home. She was moved to the floor where cardiopulmonary resuscitation was commenced but which was ultimately found to be futile. She was last seen alive approximately 12 hours earlier, having complained of back pain.

INVESTIGATIONS

Forensic pathology investigation

7. Dr Matthew Lynch, Senior Forensic Pathologist at the Victorian Institute of Forensic Medicine (**VIFM**), performed an autopsy upon the body of Ms Suttha, reviewed a post mortem computed tomography (**CT**) scan and referred to the Victoria Police Report of Death, Form 83. Post-mortem imaging showed haemopericardium and the suggestion of an infarcted right kidney.

8. Dr Lynch commented that at autopsy there was evidence of an ascending thoracic aortic dissection with resulting haemopericardium and cardiac tamponade. The dissection extended distally to involve the abdominal aorta and origin of right renal artery. Microscopic examination of the dissection showed an established inflammatory reaction suggesting it is *possible* that the dissection process was the explanation for Ms Suttha's back pain when she presented to hospital.

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[5] An increased level of the cardiac protein isoform of troponin circulating in the blood has been shown to be a biomarker of heart disorders, the most important of which is myocardial infarction. Raised troponin levels indicate cardiac muscle cell death as the molecule is released into the blood upon injury to the heart.

9. Dr Lynch explained that when aortic dissection occurs in elderly patients it is often in association with significant atherosclerosis and a history of hypertension. In youger patients, the possibility of an inherited disorder of connective tissue such as Ehlers-Danlos, Marfan or Loeys-Dietz syndrome warrants consideration. In this instance, the presence of impaired renal function and a known history of SLE would make the presence of an inherited connective tissue disorder seem less likely, but it is not excluded.

10. Toxicological analysis of Ms Suttha's post mortem blood detected the presence of paracetamol (~12 mg/L).

11. Dr Lynch ascribed Ms Suttha's death to natural causes, namely, I(a) Haemopericardium complicating ascending thoracic aortic dissection. The ruptured dissection resulted in haemopericardium and cardiac tamponade, a process whereby the sac surrounding the heart fills with blood thus preventing it from beating effectively.

Coroners Prevention Unit Review

12. I requested that the Health and Medical Investigations Team (**HMIT**) of the Coroners Prevention Unit[6] (**CPU**) review the medical management of Ms Suttha in the weeks preceding her death. A statement was subsequently obtained from Dr Peter Jordan, Director of Emergency Medicine for Northern Health.

13. In his statement, Dr Jordan stated that the diagnosis of aortic dissection was not known to Northern Health until they had received the request for a statement from the CPU. A local review was initiated and a report entered in the Victorian Hospital Incident Management System. Outcomes of the review were pending at the time of his statement.

14. Dr Jordan commented that clinicians could have been alerted to a possible diagnosis of aortic dissection by a number of clinical features including Ms Suttha's sudden onset

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[6] The Coroners Prevention Unit (CPU) was established in 2008 to strengthen the prevention role of the coroner. The unit assists the coroner with research in matters related to public health and safety and in relation to the formulation of prevention recommendations, as well as assisting in monitoring and evaluating the effectiveness of the recommendations. The CPU comprises a team with training in medicine, nursing, law, public health and the social sciences.

back pain, and further its combination with lower limb neurological symptoms, as well as her history of SLE and her very mild cardiac troponin levels.

15. Dr Jordan also noted that Ms Suttha's initial ECG was recorded and interpreted by Dr Ng who could not recall if the ECG was seen by Dr Papadopoulos. Similarly, Dr Papadopoulos could not recall seeing an ECG for Ms Suttha. Dr Jordan stated that it was ED policy that all ECGs be reviewed and signed by a senior ED doctor. Dr Jordan further noted that the changes on Ms Suttha's ECG could be suggestive of a recent myocardial infarction but were quire nonspecific. Dr Jordan advised that Dr Ng recalled noting the changes but did not consider the possibility of these changes being secondary to a dissection.

16. Dr Jordan concluded that '*a combination of distracting clinical features and a lack of abnormal signs led to an incorrect diagnosis of syncope secondary to musculoskeletal back pain. Application of the Aortic dissection Detection Risk Score would have likely led to a request for CT aortogram and a diagnosis of Acute Aortic dissection.*'

Assessment of Health Care Diagnosis/Treatment/Follow Up

17. The CPU advised me that Ms Suttha presented to Northern Hospital with many of the red flags for an aortic dissection which were recorded by both the triage nurse and Dr Ng. These flags were not recognised and therefore an aortic dissection was not on Dr Ng's differential diagnosis. Dr Jordan stated that the discussion between Dr Ng and Dr Papadopolous was:

'*...brief and mostly limited to findings reinforcing the likelihood of benign aetiology for Mrs Suttha's syncope and back pain. The discussion was taken at face value and led to a limited plan for further testing.*'

Identification of Potential Efficacious Prevention Interventions

18. According to Dr Jordan, the ED at Northern Hospital had missed two previous aortic dissections (in 2011 and 2014), both of which resulted in death. As a result of those deaths, the following measures were introduced:

    a. Education about aortic dissection as a cause of back pain has been included in a repeating educational module for all junior medical staff, and access to CT

scanners has been increased. These measures combined has resulted in a 90 percent increase in the ordering of CT aortograms in the past four years; and

b. The number of Emergency Physicians has increased by 40 percent from 17.5 full-time equivalents (FTE) in 2014 to 24.5 FTTE in 2018.

Previous Coronial Recommendations and Comments

19. In 2013, Coroner Paresa Spanos, held an inquest into the death of Constandia Petzierides[7], who she found died from a haemothorax secondary to dissecting thoracic aorta in circumstances where the diagnosis of aortic dissection was missed by clinicians in the Emergency Department she attended in the 24 hours prior to her death. As part of Coroner Spanos' investigation, a round-table meeting occurred which identified that following contributing factors to the diagnosis being missed:

a. Uncommon presentation compared to the vastly more common presentation of ischaemic chest pain;

b. Lack of reliable clinical signs;

c. Lack of validated clinical risk score to help risk stratify patient; and

d. Lack of validated screening test.

20. The relevant recommendations arising from the Petzierides case were:

"*That the Australasian College for Emergency Medicine (ACEM) considers highlighting in training curricula the importance of considering the diagnosis of aortic dissection for patients presenting with chest pain, and the nuanced presentations of aortic dissection. This is particularly important where ED patients are treated in accordance with a chest pain pathway, and ischaemic heart disease has been excluded by appropriate testing. A practice of re-visiting the diagnosis at the end of the pathway and/or review by a senior clinician before discharge would improve patient safety.*"

and

[7] Available on the Coroner's Court of Victoria website under file case no. 157110

"That the Minister for Health, the Secretary of the Department of Health and/or the Departments Emergency Care Improvement and Innovation Clinical Network (ECIICN) consider funding research aimed at developing and evaluating a structured clinical tool for risk stratification of patients presenting with chest pain and suspected of having aortic dissection."

21. The CPU commented that since Coroner Spanos made those recommendations, education on aortic dissection routinely occurs in all emergency departments (both as part of general education and often in morbidity and mortality meetings when the diagnosis is missed). A clinical risk tool for stratification of aortic dissection[8] has also been developed.[9] The CPU noted that the tool was in use by the ED of the Northern Hospital at the time of Ms Suttha's death, and highlights the issue with all such tools – that the diagnosis still needs to be considered by the treating doctor in order to use the tool.

Discussion

Summary of Contributing Factors

22. The CPU advised me that the diagnosis of Ms Suttha's aortic dissection was missed as it was not considered in the differential diagnosis by the treating doctor despite many of the clinical red flags being noted. The error is due to a lack of medical knowledge and is compounded by inadequate supervision of junior staff.

23. The CPU commented that while education on aortic dissection is important, it has not been shown to be an effective prevention strategy for preventing similar incidents in the future. The reason for this is two-fold; the large and rapid turnover of staff that occurs in all public hospital training sites, and the size of the curriculum for Emergency Medicine training; and is compounded by the uncommon and varied presentation of an aortic dissection.

24. The CPU further advised me that adequate supervision of training staff is one way to decrease error related to the inexperience of junior staff. However, it is not sufficient to

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[8] Diagnostic Accuracy of the Aortic dissection Detection Risk Score plus D-Dimer for Acute Aortic Syndromes. Circulation 2018; 137:250-258

[9] Not by the Victorian Department of Health but by an international consortium of researchers.

simply task someone to supervise a group of trainees. The allocated supervisor must have the time and resources to adequately supervise. The CPU noted that this is particularly relevant after hours when there is a decrease in senior staffing despite no decrease in workload. The CPU noted that Ms Suttha presented on the weekend and commented that while the reduction in weekend Emergency Physician coverage varies from institution to institution, a reduction of 25-50% would be common. While the Northern Hospital acknowledged this as a factor and has increased senior staffing levels, personal communication to the CPU is that weekend consultant staffing is not commensurate with weekday staffing.

25. The CPU noted that most supervision tends to lack structure, and relies on the junior staff to report issues. As a result, key aspects of history can be missed, or the report may be biased by the presenter. The NSW Clinical Excellence Commission constructed a cognitive diagnostic checklist to called 'Take 2, Think, Do' in an effort to counter these problems. The checklist encourages the active search for clinical red flags and seeking help with the diagnosis rather than seeking confirmation of a doctor's own biases. It should be noted, however, that evidence of the checlist's effectiveness, at this stage is lacking.

RECOMMENDATIONS

Pursuant to section 72(2) of the **Coroners Act 2008**, I make the following recommendations:

1. **With a view to promoting public health, safety and reducing the risk of like deaths, I make the following recommendation:**

   That Ms Suttha's case be discussed at the Northern Hospital's ED 'morbidity and mortality meeting' highlighting the clinical red flags of aortic dissection, the cognitive biases and system issues involved in the case, as well as the strategies to combat these.

2. **With a view to promoting public health, safety and reducing the risk of like deaths, I make the following recommendation:**

   That the Northern Hospital utilise a structured cognitive de-biasing strategy such as the NSW Clinical Excellence Commission's 'Take 2, think do' for all discussions between junior staff and senior staff and for transitions in care in the department such as handovers and transfers to the Short Stay Unit;

3. **With a view to promoting public health, safety and reducing the risk of like deaths, I make the following recommendation**:

That Northern Health management ensure adequate senior staffing to allow adequate supervision of junior staff is possible. Staffing levels – both number and seniority - should reflect workload.

FINDINGS

The investigation and the acknowledgement from Northern Health has identified that a diagnosis of Ms Suttha's aortic dissection was missed due to a combination of a lack of medical knowledge of the treating doctor, and inadequate supervision.

Accordingly I find in all the circumstances that Ms Suttha died on 24 February 2017 from haemopericardium complicating ascending thoracic aortic dissection subsequent to attending the Emergency Department of the Northern Hospital on 19 February 2017 with complaints, signs and symptoms indicative of aortic dissection. The failure to identify aortic dissection as a differential diagnosis was an opportunity lost which may have prevented Ms Suttha's death subsequent to her discharge.

As Coroner Spanos said in the matter of Constandia Petzierides, Ms Suttha's death "*...was preventable in the sense that correct diagnosis, and the commencement of treatment before catastrophic rupture...*" gave her a "*...reasonable chance of surviving an otherwise lethal condition, whereas discharge home gave her little, if any, chance.*"

I direct that a copy of this finding be provided to the following:

Ms Thitirat McDonald, Senior Next of Kin;
The Northern Hospital;
Senior Constable John Logan (#39278), Reporting Officer, Victoria Police.

Pursuant to section 73(1B) of the Act, I order that this finding be published on the internet in accordance with the rules.

Signature:

AUDREY JAMIESON
CORONER
Date: **11 October 2018**