IN THE CORONERS COURT

OF VICTORIA

AT MELBOURNE

Court Reference: COR 2015 3645

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 GOET WO TJOENG without holding an inquest:

find that the identity of the deceased was GOET WO TJOENG

born 28 March 1944

and the death occurred on 22 July 2015

at Sunshine Hospital, 176 Furlong Road, St Albans Victoria 3021

from:

1 (a) AORTIC DISSECTION

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

1. Goet Wo Tjoeng was 71 years of age at the time of her death. Mrs Tjoeng was retired and lived in Kings Park with her daughter, Kit Cheung. She had no known significant health conditions and had not seen a general practitioner for some time.

2. During the early evening on 20 July 2015, Mrs Tjoeng became light headed while cooking dinner, then collapsed and was unconscious for approximately five minutes. An ambulance

arrived at 6.00pm, and ambulance paramedics found Mrs Tjoeng to be confused, agitated, pale, tachycardic,[1] nauseated, vomiting, hypothermic,[2] and peripherally shut down.

3. At 6.30pm on 20 July 2015, Mrs Tjoeng was conveyed to the Sunshine Hospital Emergency Department (ED). Mrs Tjoeng's blood pressure was found to be significantly low, at 83/47mmHg. A bedside ultrasound performed in the ED was suggestive of a large pericardial effusion, and at 8.20pm a Computed Tomography (CT) angiogram[3] was performed by a radiology registrar.[4] The CT angiogram revealed a 'large volume haemorrhagic pericardial effusion' and a likely cardiac tamponade[5] of uncertain cause, with no evidence of aortic dissection. The radiology registrar also concluded Mrs Tjoeng had congested hepatomegaly, hypoperfusion of the right kidney and possibly also the small bowel,[6] and recommended an urgent transthoracic echocardiogram (TTE)[7] and cardiology team review.

4. Mrs Tjoeng continued to be clinically unstable. From 9.00pm to 9.30pm, she had a systolic blood pressure of 46-60mmHg, which eventually responded to intravenous fluid boluses before low-dose peripheral intravenous noradrenaline[8] was commenced. A TTE was subsequently performed and confirmed a 'haemodynamically significant pericardial effusion', which led to Mrs Tjoeng being transferred to the Cardiac Catheter Lab. At approximately 10.19pm Mrs Tjoeng underwent an emergency pericardiocentesis, performed by Consultant Cardiologist Dr Nicholas Cox. Dr Cox aspirated 300ml of haemoserous fluid[9] and Mrs Tjoeng's blood pressure improved and the noradrenaline infusion was ceased. A pig-tail drain was inserted to collect any additional blood.

5. Mrs Tjoeng was transferred to the Coronary Care Unit following the procedure, and a post-procedure chest x-ray showed the drain tube was in a suitable position, with no signs of

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[1] Fast heart rate.

[2] Low temperature.

[3] A CT scan using intravenous contrast to outline blood vessels.

[4] I have determined not to name the radiology registrar in this Finding.

[5] Compression of the heart by fluid (in this case blood) in the pericardium so the heart is unable to pump adequately. Causes low blood pressure and ultimately cardiac arrest if not treated.

[6] Enlarged liver, reduced blood flow in the right kidney and possibly small bowel.

[7] An ultrasound of the heart performed through the chest wall, which will detect fluid around the heart and tamponade well, does not image the aorta well and cannot always detect an aortic dissection.

[8] Powerful medication to maintain blood pressure.

[9] Haemoserous is blood stained fluid. This was documented in the typed cardiology discharge summary. The report of the procedure is hand written and difficult to read (122/162) but appears to read 'haemorrhagic pericardial effusion,' ie blood. The cytology report of the specimen of aspirated fluid reported it as 'blood only.'

pneumothorax or pneumoperitoneum.[10] Mrs Tjoeng remained alert on the ward, with mild shortness of breath requiring low-dose supplemental oxygen, but no significant hypotensive episodes[11] and stable vital signs. Mrs Tjoeng's blood results the following day were unremarkable, except for indications of a mild inflammatory process, a moderate degree of acute liver injury (consistent with the hepatomegaly found on the CT angiogram), and a troponin[12] rise suspected to be due to myopericarditis.[13]

6. On 21 July 2015, the cardiology ward round documented that Mrs Tjoeng was complaining of chest pressure that worsened on deep breathing, but was relieved with analgesia. The Cardiology Unit plan was for Mrs Tjoeng to undergo a focused trans-thoracic echo (TTE) as well as a CT chest scan, and for the drain tube to be removed if there was less than 50ml output over 24 hours.

7. By 9.00am on 21 July 2015, the pericardial drain tube had collected approximately 40ml of blood, after which time no further blood was drained. Mrs Tjoeng remained haemodynamically stable,[14] tolerated food and fluids, and was noted to have decreased air entry to her lung bases.

8. At 10.11pm on 21 July 2015, Mrs Tjoeng was noted to have a heart rate of 100. Mrs Tjoeng was documented to be afebrile,[15] normotensive (124/84mmHg),[16] looking well, and she had a Glasgow Coma Scale score of 15.[17] Mrs Tjoeng denied any shortness of breath overnight while receiving two litres per minute of supplemental oxygen, and was independently mobilising.

9. At 5.59am on 22 July 2015, Mrs Tjoeng's blood pressure was checked and found to be 177/116mmHg. A GTN patch[18] had been applied at 5.20am for a previous high blood pressure

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[10] Air between the lung and chest wall and air in the abdominal cavity (possible complications of the procedure).

[11] Low blood pressure.

[12] A substance, measured on blood tests, which is released from the heart muscle if it is damaged.

[13] Inflammation of the pericardium and myocardium (heart muscle).

[14] Vital signs, particularly pulse and blood pressure within normal limits.

[15] Normal temperature.

[16] Normal blood pressure.

[17] The Glascow coma scale is a neurological scale that aims to give a reliable, objective way of recording the conscious state of a person for initial as well as subsequent assessment. A patient is assessed against the criteria of the scale, and the resulting points give a patient score between 3 (indicating deep unconsciousness) and either 14 (original scale) or 15 (the more widely used modified or revised scale). The GCS is a widely used score of a level of unconsciousness, with a score of less than 8 being universally accepted as the level of coma in which a person is likely to be unable to protect their airway from saliva and other secretions and is at risk of obstructing their airway.

[18] Glyceryl Trinitrate is medication which can be given though the skin (as a patch) to lower the blood pressure, also used to treat angina.

of 160/115mmHg. The nurse in charge was informed of the worsening blood pressure, and when the nurse returned to recheck Mrs Tjoeng's blood pressure at 6.13am, she was gasping and unresponsive.

10. A code blue[19] was initiated, and Mrs Tjoeng's heart was found to be in pulseless electrical activity (PEA).[20] Resuscitation efforts were commenced immediately (including cardiac defibrillation and administration of intravenous adrenaline, fluids and electrolytes), however spontaneous circulation was not able to be restored. The drain tube was confirmed to be no longer draining fluid, despite the vacuum suction still being present. Flushing and manual aspiration of the tube was attempted without success.[21] During the resuscitation, the Cardiology Fellow and Consultant Dr Salvatore Rametta were contacted by telephone for further advice.

11. Mrs Tjoeng's pupils were observed to be fixed and dilated,[22] and Dr Rametta subsequently suggested that due to an absence of spontaneous circulation for greater than 30 minutes, cardiopulmonary resuscitation (CPR) should be discontinued. The resuscitation was halted at 6.55am, and Mrs Tjoeng was declared deceased at 6.58am on 22 July 2015.

INVESTIGATIONS

Forensic pathology investigation

12. Dr Gregory Young, Forensic Pathologist at the Victorian Institute of Forensic Medicine (VIFM) performed a full post mortem examination upon the body of Mrs Tjoeng, reviewed a post mortem CT scan and the e-Medical Deposition Form and medical notes from Sunshine Hospital, and referred to the Victoria Police Report of Death, Form 83.

13. At autopsy, Dr Young found an aortic dissection (Stanford type A),[23] associated with a 300mL haemopericardium[24] of clotted blood. The pericardial drain was in situ within the pericardial sac and was uncomplicated. Dr Young noted that the aorta did not show widespread evidence of cystic medial necrosis, which is often seen in hereditary aortic dissections, or inflammation. While Mrs Tjoeng did not have a documented history of hypertension, Dr Young observed that

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[19] Intra-hospital code for medical emergency.

[20] Cardiac arrest where there is electrical activity in the heart but no pulse.

[21] In an attempt to drain further pericardial fluid if fluid has recollected causing cardiac tamponade.

[22] A sign of possible serious brain injury.

[23] An aortic dissection is when blood dissects within the tunica media of the aorta, creating a blood-filled channel within the aortic wall. This can occur when the aorta is weakened or susceptible to dissection due to hypertension, hereditary structural defects in the wall of the aorta, or inflammation.

[24] Haemopericardium refers to the presence of blood in the pericardial sac surrounding the heart.

her heart was enlarged and showed myocardial fibrosis and myocyte hypertrophy, which may all be associated with hypertensive heart disease. Mrs Tjoeng's coronary arteries showed mild to moderate atherosclerosis, with between 40 to 60% occlusion of the lumina. Dr Young ascribed the cause of Mrs Tjoeng's death to natural causes, being aortic dissection.

Coroners Prevention Unit investigation

14. I asked the Coroners Prevention Unit (CPU)[25] to review Mrs Tjoeng's medical assessment and management after the imaging and the drainage of the pericardial effusion.[26] The review encompassed documents including the Sunshine Hospital e-Medical Deposition Form and medical records, and a statement made by Cardiologist and Head of Unit – Cardiology at Western Health, Dr Nicholas Cox dated 15 April 2016.

Statement provided by Dr Nicholas Cox

15. Dr Cox stated that he was the interventional cardiologist[27] involved in the care of Mrs Tjoeng. During the evening of 20 July 2015, Dr Cox was on call, and was informed by the registrar in the ED that a chest x-ray was performed which showed Mrs Tjoeng's heart to be enlarged and unfolding at the thoracic aorta. Dr Cox said that because of the chest x-ray appearance and Mrs Tjoeng's clinical presentation, he agreed for a diagnostic test to exclude aortic dissection, before proceeding with pericardial drainage. To achieve this, the CT angiogram of the aorta was performed. Dr Cox said that the request form specifically noted the possibility of dissection and the presence of tamponade, and the abnormal aortic contour on the chest x-ray was commented upon.

16. Following the CT scan which was not considered suggestive of aortic dissection, Dr Cox performed a pericardiocentesis in the Cardiac Catheter Lab at Sunshine Hospital. Dr Cox stated it was an uncomplicated procedure with immediate improvement of Mrs Tjoeng's haemodynamics post procedure. A chest x-ray confirmed the satisfactory positioning of the drain tube. Mrs Tjoeng remained stable overnight and was monitored in the Coronary Care Unit.

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[25] 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.

[26] Fluid in the sac (pericardium) around the heart.

[27] Cardiologist who performs procedures.

17. Dr Cox stated that on 21 July 2015, Mrs Tjoeng was reviewed on the ward round and other causes of the pericardial effusion were considered. A repeat echocardiogram was performed at approximately 4.50pm, which showed no residual pericardial effusion. The aortic valve was noted to be tri-leaflet, with no comment on any abnormal aortic findings. Of note, there was moderate to severe tricuspid regurgitation and mildly elevated pulmonary pressures.[28] A second CT scan of Mrs Tjoeng's chest was not performed post pericardiocentesis.

18. Dr Cox opined that Mrs Tjoeng's death was not due to a complication of the pericardiocentesis. He noted that the pericardiocentesis was successful in relieving the acute pericardial tamponade which in retrospect was likely due to a spontaneous aortic dissection. Dr Cox stated he was not aware of pericardiocentesis as a cause of aortic dissection in the literature and does not consider aortic root dissection could be a complication of this procedure.

19. Dr Cox noted that aortic dissection was considered a diagnostic possibility at the original time of Mrs Tjoeng's presentation, before the pericardiocentesis and an appropriate test was performed to rule it out. Dr Cox acknowledged that even though the aortic dissection must have been present at the time of the original CT scan, it was not picked up by the test.

Conclusions of the Review

20. The review noted that there are many causes of haemorrhagic pericardial effusion including: malignancy (26%), iatrogenic (18%), post myocardial infarction (11%), aortic dissection (4%), trauma (3%) and others.

21. It was noted that aortic dissection was considered but then discounted following the CT report. However, in the body of the CT report from 8.20pm on 20 July 2015, it was stated:

    - 'Extremely sub-optimal intra-arterial opacification was achieved due to poor cardiac output. Motion artefact... further degrades diagnostic sensitivity. No evidence [...] to suggest acute aortic dissection, however given the poor cardiac output this cannot be excluded.'[29]

22. The conclusion of the CT report commented on the large pericardial effusion with evidence of tamponade and stated, '[n]o obvious evidence of... underlying aortic... dissection.' The review noted that the report indicated, '[t]he above findings were relayed to the referring doctor at the

[28] Observations of uncertain significance.

[29] Due to the patient having very low blood pressure, the intra venous contrast given has not outlined the blood vessels adequately so the images are poor, making interpretation with absolute certainty difficult.

time of the scan.' However the report did not comment exactly what was relayed, and whether the comments in the body of the CT report, regarding suboptimal images, were conveyed.

23. The review suggested it was highly likely that the aortic dissection which caused Mrs Tjoeng's death, was the reason for her initial presentation with pericardial effusion and tamponade on 20 July 2015. The review identified no issues with Mrs Tjoeng's initial assessment and management on this day, and concurred with Dr Cox that it would be virtually impossible for the procedure of pericardiocentesis to cause an aortic dissection.

24. However, the review noted that while the conclusion of the CT report stated: '[n]o obvious evidence of aortic dissection,' there were comments regarding the sub-optimal nature of the images in the body of the report which could not fully exclude an aortic dissection. The review identified that it would have been helpful if this had been included in the conclusion and it was not clear from the medical record whether this information was conveyed to the treating doctors.

25. There was also a consultant amendment by Dr Narayanan which again commented on the sub-optimal images and recommended a repeat scan if there was ongoing concern for an aortic dissection. However, the review noted that in the medical record there is mention of the CT report, but only regarding "[n]o aortic dissection". There is no mention of sub-optimal images and a repeat scan having been recommended. It was not clear if this amendment was reported to the treating team.

26. On 21 July 2015, the day of Mrs Tjoeng's pericardiocentesis, the Cardiology Unit considered possible causes of the pericardial effusion. The review noted that it appeared clinicians did not review the CT scans or the report, so were unaware an aortic dissection had not been fully excluded.

Subsequent case review undertaken by Western Health

27. Dr Cox informed the Court that Mrs Tjoeng's case was reviewed at a Cardiology Mortality and Morbidity meeting on 6 August 2015. The following comments were made:

    - The chest x-ray showed suspicion of aortic enlargement so exclusion of aortic dissection was appropriate prior to proceeding with pericardiocentesis;
    - The team present thought it reasonable that the reported absence of aortic dissection on the CT justified proceeding with pericardial drainage without further investigation;
    - There was a consultant amendment to the CT report dated 21 July 2015 at 12.04pm, which included the comment '[v]isualisation of the aortic root was suboptimal due to

motion artefact and, if there was ongoing clinical concern about aortic root pathology, a repeat CT with ECG gating would be of value.'[30]

- There was concern raised at the discrepancy between the original and follow-up consult report of the aorta on the CT report, and the fact that it had missed the aortic dissection, as later identified by Dr Young.

Subsequent correspondence between the Court and Western Health

28. Following the receipt of Dr Cox's initial statement, it did not appear that any preventative or restorative measures had been taken by Western Health in response to Mrs Tjoeng's death. By way of email dated 1 December 2016, the Court informed Western Health that in finalising the investigation, I intended to make comments that could be perceived as adverse in relation to Mrs Tjoeng's care. Western Health were invited to indicate if it would be preferable to respond to the Court in writing, or to be heard at a Mention Hearing on these issues.

29. By way of email dated 17 January 2017, Western Health provided a letter from Executive Director of Medical Services Dr John L. Gallichio, enclosing a supplementary statement from Dr Cox dated 10 January 2017 and the February 2016 Western Health 'Provision of Medical Imaging Reports' procedure.

30. In his letter, Dr Gallichio advised that Western Health acknowledges that the communication between the Radiology and Cardiology Units in respect of the CT angiogram findings was *'imperfect'*. Dr Gallichio stated that it seemed the Cardiology Unit did not understand the original radiology registrar's report of the CT angiogram[31] to emphasise a failure to exclude aortic dissection.

31. Dr Gallichio noted that while the registrar's report did not suggest a repeat CT angiogram, there was to a great extent uniformity between the registrar's report and the consultant radiologist's report (provided at 12.04pm on 21 July 2015). He added that it is regrettable that, while the consultant's report drew attention to the fact a repeat CT with ECG gating would be of value, the registrar report only suggested an echocardiogram. Dr Gallichio said it was conceded that the clarity and impact of the registrar's report was reduced by the statement in its conclusion that there was '[n]o obvious evidence of underlying acute aortic root dissection', without

[30] The aortic root is the first part of the aorta coming out of the heart. The scan was suboptimal so could not fully exclude a problem with the aortic root (ie dissection) so a repeat scan was recommended if there was ongoing concern.

[31] At approximately 8.20pm on 20 July 2015.

repetition of the earlier comments in the 'findings' section of the report, regarding the shortcomings in the quality of visualisation.

32. Dr Gallichio stated that it was unclear when the consultant's amendment report came to the attention of the Cardiology Unit, although it would have been uploaded to Western Health's computer system, and hence available, at around the time it was created.[32] He added that it was typical for any radiology report prepared by a registrar to be treated as an interim report; it would not be regarded as final until the consultant review had taken place. Dr Gallichio stated that while it was open to the Cardiology Unit to seek out the results of the consultant review; it was unclear whether, and if so when, this occurred.

33. Dr Gallichio acknowledged there was a failure of communication between the Radiology and Cardiology Units; there appeared to be imperfection in the expression of the registrar's report and in its interpretation by the Cardiology Unit. In addition, he noted that the consultant report may not have come to the attention of the Cardiology Unit at the time it was made. Dr Gallichio stated that Western Health apologises[33] for this shortcoming in communication.

34. Dr Gallichio stated that through the Cardiology Mortality and Morbidity meeting following Mrs Tjoeng's death, the Cardiology Unit recognised that the step of a repeat CT angiogram with ECG gating was not taken within a timely fashion and thereby took the opportunity to identify shortcomings and learn from them.

35. The Radiology Head of Unit, Dr Marcus Mykytowycz, conducted a review of the CT images and the registrar's report with its author, ensuring that the radiology registrar can make use of the opportunity to learn and improve from this experience. In addition, in February 2016, the Radiology Unit introduced a new procedure addressing the 'Provision of Medical Imaging Reports'.[34] Dr Gallichio stated that this policy codifies the procedures that were already in place at the time of Mrs Tjoeng's death, and that while it was not introduced in response to the incident, it deals with pertinent matters. The policy provides *inter alia* that staff report upon the

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[32] At 12.04pm on 21 July 2015 (I note that Dr Gallichio's letter referred to 12.04am, while Dr Cox's original statement refers to this occurring at 1204 hours on 21 July 2015).

[33] I refer to Section 70 of the *Coroners Act 2008* (Vic), which provides that an 'apology means an expression of sorrow, regret or sympathy but does not include a clear acknowledgement of fault'. In addition, Section 70 provides that an apology 'does not constitute an admission as to any matter for the purposes of findings that are made under section 67 or 68'.

[34] I noted that this policy includes that with regards to the '9.2 Content of Report', while 'The conclusion should provide a concise, clinically contextualised interpretation of the previously described imaging observations', it also provides that 'If further imaging, investigations, referral or treatment is to be suggested, this should be indicated in the report.

limitations of an examination that is not of good quality; and indicate any need for further investigations. Dr Gallichio submitted that the remedial measures taken by Western Health alleviate the need for any coronial recommendations.

36. In addition, Dr Gallichio submitted that it could not be found that the shortcomings in communication at Western Health caused or contributed to Mrs Tjoeng's death. Dr Gallichio noted that when Mrs Tjoeng presented to Sunshine Hospital she was gravely unwell; following the urgent CT angiogram and the provision of the registrar report, her pericardial effusion was successfully drained, resulting in the stabilisation of her condition. Dr Gallichio stated that the only means of treatment of aortic dissection is surgery. He noted that Western Health does not have cardiac surgery facilities; had Mrs Tjoeng's aortic dissection been diagnosed prior to her acute deterioration early in the morning of 22 July 2015, Western Health would have sought transfer to a tertiary hospital equipped with cardiac surgery facilities, such as the Alfred or Royal Melbourne Hospitals.

37. Dr Gallichio said that a number of uncertainties would have arisen in such a situation, relating to the capacity of either hospital to receive and promptly operate upon Mrs Tjoeng; the capacity to safely transfer Mrs Tjoeng; and the willingness of either potential receiving surgical unit to take and operate upon a gravely unwell elderly woman. Dr Gallichio referred to Dr Cox's supplementary statement and noted that the prospect of survival of a young, otherwise well patient following prompt surgical treatment of aortic dissection is less than 50%. He noted that Mrs Tjoeng was 71 and, even on a best-case scenario, would have had some substantial delay prior to surgery. Dr Gallichio stated that Mrs Tjoeng's chance of survival was substantially lower than a best-case scenario. In addition, he added that given Mrs Tjoeng's age, circumstances, and relatively low chances of survival, there may have been reluctance on the part of any potential receiving surgical team to give priority to her treatment after a diagnosis of aortic dissection. Moreover, Dr Gallichio argued it could not be presumed Mrs Tjoeng would have survived, had surgery been performed.

38. In his supplementary statement, Dr Cox noted that *'while it is possible that Mrs Tjoeng may have survived if we had identified the aortic dissection on 21 July 2015, I am unable to say that the provision of surgery or Mrs Tjoeng's survival was probable.'*

COMMENTS

Pursuant to section 67(3) of the Coroners Act 2008, I make the following comments connected with the death:

1. The investigation has identified that the expression in the radiology registrar's CT report was less than satisfactory, and that the Cardiology Unit's interpretation of the report was also wanting. In particular, it appears that by referring to there being 'no obvious evidence of underlying aortic dissection' in the conclusion of the CT report, without reference to the earlier finding that there was suboptimal visualisation and that 'acute aortic dissection... cannot be excluded', the report lacked clarity and had the potential to misrepresent its findings. However, I acknowledge that the registrar would have been working under pressure at the time, and that the imperfect expression may be starker with the benefit of hindsight. I also note that this lack of clarity regarding the suboptimal nature of the CT scan may have been overcome had clinicians in the Cardiology Unit read the entirety of the registrar's CT report, rather than just the conclusion. I have not identified compelling evidence to suggest that this occurred.

2. Another opportunity to diagnose Mrs Tjoeng's aortic dissection during life, by recognising the need for a repeat CT scan, arose at 12.04pm on 21 July 2015, when the consultant's amendment to the CT report indicated that 'a repeat CT with ECG gating would be of value'. I note that Dr Gallichio stated that a radiology registrar's report is not treated as final until a consultant's review has taken place. However, I am yet to be informed as to whether, and if so when, the consultant's amendment to the report came to the attention of the Cardiology Unit prior to Mrs Tjoeng's death. Given the amended report would apparently have been available on Western Health's computer system once it was made, the lack of impact – and actioning – of the consultant's comments regarding a repeat CT, evinces clear communication deficiencies between the Radiology and Cardiology Units.

3. In addition, it is arguable that on 21 July 2015, the treating team should have reconsidered aortic dissection as a possible cause of the haemorrhagic pericardial effusion. As Mrs Tjoeng had no history of trauma, it was not iatrogenic and she had no myocardial infarction, malignancy and aortic dissection were left as the most likely causes. Further investigation appears to have been warranted, either with a repeat CT scan or a trans-oesophageal echocardiogram under more optimal conditions. As Mrs Tjoeng was now haemodynamically stable, it is likely that a repeat CT scan would have yielded the correct diagnosis.

4. I note that Western Health has taken some remedial steps following Mrs Tjoeng's death, including a Mortality and Morbidity meeting; and a review of the radiology registrar's report with its author. In particular, I note that the Radiology Unit's February 2016 'Provision of Medical Imaging Reports' policy codifies procedures already in place when Mrs Tjoeng died. Significantly, it provides that when an initial report and final report differ in a manner that could alter diagnosis or management, it is the responsibility of the radiologist to ensure that people involved in the care of the patient are made aware of the discrepancy and the notification process is documented. It is to be hoped that the codification of this policy places an impetus upon clinicians to ensure this communication takes place in practice – in contrast to the circumstances of this case.

5. I do note that the policy also provides *inter alia* that staff report upon the limitations of an examination that is not of good quality; and indicate any need for further investigations, but it does not appear to categorically require that this information be provided in the conclusion of the report. Rather, section 9.2 'Content of Report' provides that 'the conclusion should provide a concise, clinically contextualised interpretation of the previously described imaging observations', but then also stipulates that 'if further imaging, investigations, referral or treatment is to be suggested, this should be indicated in the report'. This could be better clarified so as to prevent similar communication and expression issues from arising again.

FINDINGS

The investigation has identified that Mrs Tjoeng presented with a pericardial effusion causing tamponade, which was successfully treated by pericardiocentesis on 20 July 2015. A CT scan showed no evidence of aortic dissection but the images were suboptimal and not adequate to exclude a dissection. The evidence indicates that the inadequate nature of the CT images was not adequately conveyed to or interpreted by the treating doctors, the consultant's subsequent amendment was possibly neither brought to the attention of – nor accessed by – the Cardiology Unit, and the treating team did not fully consider the potential causes of the haemopericardium.

The investigation has evinced that Mrs Tjoeng died as a result of an undiagnosed aortic dissection, and that there were two potential avenues where an opportunity was missed for diagnosis, being the CT report and the treating team's consideration of the pericardial effusion.

While I acknowledge the submissions of Western Health that a diagnosis of aortic dissection would not have necessarily – or even probably – prevented Mrs Tjoeng's death; I do find that inadequate

communication meant that an opportunity was missed to diagnose the aortic dissection during Mrs Tjoeng's life and possibly prevent her death.

I accept and adopt the medical cause of death as ascribed by Dr Gregory Young, and find that Goet Wo Tjoeng died from natural causes, being aortic dissection.

RECOMMENDATIONS

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

1. With the aim of preventing the recurrence of missed opportunities for diagnoses and like deaths, **I recommend** that the Royal Australian and New Zealand College of Radiologists utilise Mrs Tjoeng's case in education regarding report writing, inclusion of all important information in reports' conclusions, and communication of this information with the treating doctors.
2. **AND I recommend** that Western Health conduct a review of its 'Provision of Medical Imaging Reports' procedure, to ensure clarity about the need to include references to further imaging or investigations in the conclusion of a diagnostic imaging report.

Pursuant to section 73(1A) of the Coroners Act 2008, I order that this Finding be published on the internet.

I direct that a copy of this finding be provided to the following:
Ms Kit Cheung
Ms Synnove Frydenlund, Legal Counsel, Western Health
Dr Peter Williams, Western Health
Royal Australian and New Zealand College of Radiologists

Signature:

AUDREY JAMIESON
CORONER

Coroners Court of Victoria

Date: **23 February 2017**