IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: **COR 2015 4959**

FINDING INTO DEATH WITHOUT INQUEST

Form 38 Rule 60(2)
Section 67 of the Coroners Act 2008

Findings of:	**MR JOHN OLLE, CORONER**
Deceased:	**PETER HENG DOWE CHIAM**
Date of birth:	**25 AUGUST 1938**
Date of death:	**30 SEPTEMBER 2015**
Cause of death:	**CEREBRAL INFARCTION (STROKE) COMPLICATING ELECTIVE HERNIA REPAIR**
Place of death:	**MCCULLOGH HOUSE, MONASH HEALTH 246 CLAYTON ROAD, CLAYTON VICTORIA 3168**

HIS HONOUR:

BACKGROUND

1. Peter Heng Dowe Chiam was born on 25 August 1938. He was 77 years old at the time of his death. He lived with his wife in Wheelers Hill and he was retired.

2. Mr Chiam has a past history of diabetes mellitus Type 2, renal disease and a cardiac history including hypertension, hypercholesterolaemia, atrial fibrillation, myocardial infarction and ischaemic heart disease. To reduce the risk of stroke, Mr Chiam was prescribed the anti-coagulant warfarin 1.5mg and Aspirin 100mg daily.

3. Mr Chiam's anticoagulation was co-ordinated between his General Practitioner Dr Muraledaran and Dorovitch Pathology. Until 4 September 2015, Mr Chiam's monthly International Normalised Ratios (INRs) were stable[1]. However, in response to an INR of 3.1 on 4 September 2015, the warfarin dose was reduced to alternating daily warfarin 1.0mg and 1.5mg, with a plan to retest the INRs on 18 September 2015.

4. On 2 September 2015, Mr Chiam had a pre-operative renal review, and he had cardiac review on 11 June 2015. Both reviews assessed Mr Chiam's renal disease and cardiac status to be unchanged. Therefore, there were no changes to either the prescribed medications or medical management.

5. Mr Chiam attended the Alfred Hospital for a pre-surgical clinic review by an anaesthetist. The anaesthetist recommended rather than a general anaesthetic, regional anaesthesia to be administered for the inguinal hernia repair. There was provision for a post-operative admission to the high dependency clinic following surgery. The plan was to cease warfarin five days before surgery, but to continue the aspirin.

THE PURPOSE OF A CORONIAL INVESTIGATION

6. Mr Chiam's death constituted a '*reportable death*' under the *Coroners Act 2008* (Vic), as his death occurred in Victoria, and his death occurred following a medical procedure where the death is or may be causally related to the medical procedure.[2]

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[2] Section 4, definition of 'Reportable death', *Coroners Act 2008*.

7. The jurisdiction of the Coroners Court of Victoria is inquisitorial[3]. The purpose of a coronial investigation is independently to investigate a reportable death to ascertain, if possible, the identity of the deceased person, the cause of death and the circumstances in which death occurred.

8. It is not the role of the coroner to lay or apportion blame, but to establish the facts.[4] It is not the coroner's role to determine criminal or civil liability arising from the death under investigation, or to determine disciplinary matters.

9. The "cause of death" refers to the medical cause of death, incorporating where possible, the mode or mechanism of death.

10. For coronial purposes, the circumstances in which death occurred refers to the context or background and surrounding circumstances of the death. Rather than being a consideration of all circumstances which might form part of a narrative culminating in the death, it is confined to those circumstances which are sufficiently proximate and causally relevant to the death.

11. The broader purpose of coronial investigations is to contribute to a reduction in the number of preventable deaths, both through the observations made in the investigation findings and by the making of recommendations by coroners. This is generally referred to as the 'prevention' role.

12. Coroners are also empowered:

    (a) to report to the Attorney-General on a death;

    (b) to comment on any matter connected with the death they have investigated, including matters of public health or safety and the administration of justice; and

    (c) to make recommendations to any Minister or public statutory authority on any matter connected with the death, including public health or safety or the administration of justice. These powers are the vehicles by which the prevention role may be advanced.

13. All coronial findings must be made based on proof of relevant facts on the balance of probabilities. In determining these matters, I am guided by the principles enunciated in

[3] Section 89(4) *Coroners Act 2008.*
[4] *Keown v Khan* (1999) 1 VR 69.

Briginshaw v *Briginshaw*.[5] The effect of this and similar authorities is that coroners should not make adverse findings against, or comments about individuals, unless the evidence provides a comfortable level of satisfaction that they caused or contributed to the death.

MATTERS IN WHICH THE CORONER MUST, IF POSSIBLE, MAKE A FINDING

Identity of the Deceased pursuant to section 67(1)(a) of the *Coroners Act 2008*

14. Mr Chiam was visually identified by his daughter Maria Mei-Lai Chiam on 30 September 2015. Identity was not in issue and required no further investigation.

Medical cause of death pursuant to section 67(1)(b) of the *Coroners Act 2008*

15. On 1 October 2015, Dr Heinrich Bouwer, Forensic Pathologist at the Victorian Institute of Forensic Medicine, conducted an inspection on the body of Mr Chiam and provided written report dated 5 October 2015, concluding a reasonable cause of death to be "I(a) Cerebral infarction (stroke) complicating elective hernia repair". I accept his opinion in relation to the cause of death.

16. Dr Bouwer commented that the post mortem Computed Temography (CT) scan showed that in addition to the large right hemisphere infarction, there was marked cardiomegaly and coronary artery calcification.

Circumstances in which the death occurred pursuant to section 67(1)(c) of the *Coroners Act 2008*

17. On 13 September 2015, five days prior to surgery, Mr Chiam ceased taking warfarin and continued, as advised, his daily 100mg of aspirin. There was no indication for bridging enxoparin[6]. On 18 September 2015 the right inguinal hernia repair surgery was performed under regional anaesthesia. The surgery was uncomplicated and did not require a post-operative admission to the high dependency unit.

18. On 19 September 2015, anticoagulation was commenced and Mr Chiam recommenced Aspirin 100mg and alternating daily warfarin 1.0mg and 1.5mg dose with the first dose administered at 5.00pm.

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[5] (1938) 60 CLR 336.

[6] Bridging anticoagulant therapy is the administration of a short-acting parenteral anticoagulant during the peri-operative period, when the person is not taking an oral anticoagulant. The bridging of enoxaparin is avoided in hernia surgery due to the increased risk of bleeding.

19. Following a surgical review Mr Chiam was discharged home with his wife on 20 September 2015. The medical discharge was hand written and noted in the comments section "Dorevitch for INRs". In relation to his medications, the discharge summary indicated Mr Chiam was assessed as adequate in an "Adherence assessment". The remainder of the assessment relating to medication education and medication risk factors was blank. A completed electronic nurse initiated discharge summary detailed post-surgical instructions, wound care and surgical review appointment booking in two weeks' time.

20. At 11.30am on 22 September 2015, Mr Chiam was found by his wife unconscious and unresponsive. Emergency Services were called. Ambulance Paramedics transferred Mr Chiam to Monash Health. At Monash Health, Mr Chiam was diagnosed with a right internal carotid artery occlusion and massive right brain hemisphere infarction. Mr Chiam suffered a large ischaemic stroke[7] which was not survivable. He was palliated and he died on 30 September 2015.

21. The INR was 1.0, which indicated that the stroke occurred in the context of a sub therapeutic warfarin level.

Investigation into Medical Treatment and Management

22. At my request, the Health and Medical Investigation Team of the Coroners Prevention Unit [CPU][8]to investigated the peri-operative and post-operative warfarin management of Mr Chiam.

Atrial Fibrillation and Anticoagulation

23. Atrial fibrillation (AF) is the most common cardiac arrhythmia that can have adverse consequences related to reduced cardiac output and increased risk of thrombus formation. AF is a significant contributor to the incidence of strokes. Those with a moderate to high stroke risk with AF[9] are managed with prophylactic anticoagulant therapy.

24. The most common antithrombotic medicines used for the reduction of stroke risk are the the anticoagulant warfarin, and/or the antiplatelet agents aspirin and/or clopidogrel. Warfarin is more effective that the antiplatelet agents and has been shown to reduce the risk of stroke in

[7] The ischaemic stroke resulted brom an occlusion of blood flow to the right hemisphere of the brain.
[8] The Coroners Prevention Unit [CPU] was established in 2008 to strengthen the prevention role of the Coroner. CPU assists the Coroner to formulate prevention recommendations and comments, and monitors and evaluates their effectiveness once published. CPU is staffed by practising physicians and nurses who are independent of the health professionals or institutions involved. They assist the Coroner's investigation of deaths occurring in a healthcare setting by evaluating the clinical management and care provided and identifying areas of improvement so that similar deaths may be avoided in the future.
[9] Factors such as cardiac failure, hypertension, age greater the 75 years, Diabetes mellitus and a history of prior stroke can be used to stratify patients into categories of stroke risk.

those with AF by approximately 65%. The risk of stroke is further reduced with the addition of aspirin.

Anticoagulation and Surgery

25. Warfarin needs to be closely monitored by INRs to ensure the appropriate level of anticoagulant control. Warfarin has a narrow therapeutic index and its effectiveness and safety is a tight balance between risk of stroke and risk of bleeding.

26. A person's response to warfarin is monitored by measuring the INR, which is a measure of the extent of anticoagulation. In AF, the clinical benefits of warfarin are highly dependent on maintaining the INR within the therapeutic range of 2-3. There is an increased stroke risk when INR values are below this range, whereas INR values above 3-4 are associated with an increased bleeding rate.

27. The half-life of warfarin is approximately 40 hours and its anticoagulant effects last 2-5 days. Pre-operatively, the need for anticoagulation has to be carefully considered by balancing surgical bleeding risk and stroke prevention benefit.

Conclusions

28. The preoperative anticoagulation plan to withhold warfarin was appropriate and consistent.

29. The post operatively, according to the Alfred Health statement, a copy of the hand written discharge summary was provided to Mr Chiam by nursing staff. The only notation on the discharge summary was "Dorevitch for INRs", however a date for INR testing was not recorded. An electronic nurse initiated surgical discharge summary was completed on 19 September, printed on 21 September and stamped as received by Dr Muraledaran on 24 September 2015, two days after Mr Chiam's stroke. The discharge summary outlined wound care and outpatient surgical review in two weeks, there was no mention of warfarin management.

30. It appears that Alfred Health assumed the responsibility for completion of INR stabilisation following the interruption for the surgery. However, it appears that after the interruption in dosing, it became the responsibility of Dorevitch Pathology and Dr Muraledaran, but this was not clearly communicated to Mr Chiam or the General Practitioner.

31. In relation to his medications, the Alfred Hospital discharge summary indicated Mr Chiam was assessed as adequate in an "Adherence assessment ". The remainder of the assessment

relating to medication education and medication risk factors was blank. No information has been provided to the Court in relation to Mr Chiam's psycho social circumstances, cognitive function or history of medication adherence and therefore whether Mr Chiam was at greater risk of a medication-management related adverse event.

COMMENTS

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

    1. The death of Mr Chiam following a stroke highlights the importance of clear communication of the warfarin management plan with transitioning care from hospital to home. Clear communication is required when assigning responsibility for warfarin management and monitoring adherence by the patient to the correct medication regime. However, Mr Chiam had only been home 36 hours when he collapsed from stroke. Even if discharge communication and planning had been optimal, it is unlikely that Mr Chiam would have had an INR measured or a dose adjustment in this time and therefore these shortcomings in communication are unlikely to have affected the outcome in this case.

FINDINGS

33. Having investigated the death of Mr Chiam and having considered all of the available evidence, I am satisfied that no further investigation is required.

34. I make the following findings, pursuant to section 67(1) of the *Coroners Act 2008*:

    (a) that the identity of the deceased was Peter Heng Dowe Chiam, born 25 August 1938;

    (b) that Peter Heng Dowe Chiam died on 30 September 2015, at McCulloch House, Monash Health 246 Clayton Road Clayton Victoria from cerebral infarction (stroke) complicating elective hernia repair; and

    (c) that the death occurred in the circumstances described in the paragraphs above.

RECOMMENDATION

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

1. I recommend that the Alfred Health review the process of communicating the discharge warfarin management plan and assigning responsibility for assessing and educating patients at discharge on warfarin changes, for the benefit of future patients.

36. I convey my sincerest sympathy to Mr Chiam's family and friends.

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

(a) Mr Chiam's family, senior next of kin;

(b) Investigating Member, Victoria Police; and

(c) Interested Parties.

Signature:

MR JOHN OLLE
CORONER
Date: 27 March 2017