IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2007 2281

FINDING INTO DEATH WITH INQUEST

Form 37 Rule 60(1)
*Section 67 of the **Coroners Act 2008***

Inquest into the Death of: Beatrix DAMMERS

Delivered On:	29 July 2015
Delivered At:	Coroners Court of Victoria
	65 Kavanagh Street Southbank 3006 Victoria
Hearing Date:	13,14,15 May 2014
Findings of:	IAIN TRELOAR WEST, DEPUTY STATE CORONER
Representation:	Mr Michael Regos DLA Piper Australia on behalf of Healthscope Ltd (including Knox Private Hospital)
	Mr Sean Cash on behalf of Dr Dupuche
	Mr Paul Halley on behalf of Dr Phillip Bloom
Police Coronial Support Unit	Sergeant Dave Dimsey

I, IAIN TRELOAR WEST, Deputy State Coroner having investigated the death of BEATRIX DAMMERS

AND having held an inquest in relation to this death on 13-15 May 2014

at MELBOURNE

find that the identity of the deceased was BEATRIX DAMMERS

born on 19 October 1950

and the death occurred on 17 June 2007

at The Alfred Hospital, 55 Commercial Road Melbourne, 3004 Victoria

from:

1 (a) INTRACRANIAL HAEMORRHAGE IN A WOMAN WITH HEPARIN THERAPY

in the following circumstances:

1. Beatrix Dammers was a 56 year old woman who resided in Vermont South with her husband, Mr Johannes Dammers. They had two children together, Mrs Mirella Dammers-Roberts and Mr Roger Dammers.
2. Mrs Dammers did not have an extensive medical history apart from an allergy to penicillin, arthritis and migraine headaches.
3. On 15 June 2007, Mrs Dammers-Roberts visited her mother for lunch. Mrs Dammers told her daughter that she felt a striking pain in her head and Mrs Dammers-Roberts observed her mother's eyes to roll back.[1] They attended General Practitioner Dr Coralia Jigau who advised that Mrs Dammers was suffering from a severe migraine. He administered 2 injections for pain relief and told Mrs Dammers to contact him if her symptoms returned.
4. On 16 June 2007 there was improvement in her condition in the morning, however, at approximately 4.00 pm Mrs Dammers was in pain again and attempted to contact Dr Jigau, who was unavailable. She attended the practice of Dr Dileep Singh who instructed her to attend hospital for some x-rays.

Arrival at Knox Private Hospital (KPH)

5. At 5.10 pm, Mrs Dammers attended the Emergency Department at Knox Private Hospital (KPH). She was seen by the emergency department medical officer Dr Phillip Bloom at 5.15 pm.
6. Dr Bloom considered migraine as the likely diagnosis[2] and ordered a CT scan by way of investigation. In examining Mrs Dammers, Dr Bloom noted that her blood pressure was 140/76 with a pulse rate of 70. There was no photophobia or neck stiffness and no focal neurological signs.[3] A full blood examination was also done which was within the normal range.

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[1] Statement of Ms Mirella Dammers-Roberts dated 19 June 2007 at pg 1

[2] TS at pg 31,33

[3] Letter from Dr Phillip Bloom to Coroners Court dated 28 January 2009

7. The CT scan was reported by the radiologist as having an area that could represent a small infarction in the left frontoparietal region.[4] On the basis of that report, Dr Bloom considered a differential diagnosis of cerebrovascular ischemic event (stroke) or migraine.[5] He considered that Mrs Dammers required hospitalization and ongoing management and contacted the on-call general physician, Dr Rene Dupuche. Her condition and CT scan results were discussed and both were satisfied with a diagnosis of stroke.

Admission to KPH

8. Mrs Dammers was admitted to the hospital and under the direction of Dr Dupuche, was commenced on Clexane 80 units subcutaneously at 9.35 pm with a MRI scan to be performed at a later time.[6] She was transferred to the ward at 9.35 pm when she reported to nursing staff that her symptoms had resolved.[7] Shortly thereafter, however, Mrs Dammers complained of a visual disturbance and Dr Bloom saw her at 10.35 pm. He assessed her and found that she had a right homonymous hemianopia and no other neurological signs. He reported those findings to Dr Dupuche by telephone at 11.00 pm.

9. Dr Dupuche decided to give Mrs Dammers rapid anticoagulation therapy in the form of Heparin and to be given a starting dose of 5,000 units/stat dose and maintenance of 25,000 units over 24 hours. The loading dose of 5,000 units was administered at 11.00 pm followed by the further IV infusion commencing at 11.30pm.

10. At approximately midnight, nursing notes indicate that Mrs Dammers became sweaty, grey and non responsive and the on-duty Intensive Care Fellow, Dr John Ding was contacted via a MET call at 1.00 am. He observed Mrs Dammers to have a Glasgow Coma Score of 7/15, right sided paresis and intact airways. Dr Ding believed the plain brain CT scan was normal[8] but noted; '*there was no CT angiography, MRA or lumbar puncture for xanthochromia for a possible diagnosis of cerebral aneurysm which was more likely in the presence of her prominent presenting feature of prolonged severe headache without any initial focal neurological signs and symptoms. Headache is not a usual presenting feature of embolic stroke. I thought that bleeding from heparin/clexane therapy or ruptured aneurysm was the most likely cause of Mrs Dammers' deteriorating condition.*'[9]

11. Dr Ding contacted Dr Dupuche and told him that they needed to cease the Heparin therapy right away and reverse the effects if possible. Dr Ding's statement indicates that Dr Dupuche agreed to stop the Heparin and asked for another CT brain scan to be urgently done but did not agree to reverse the Heparin until the CT results were available. [10] At inquest, Dr Dupuche could not recall whether or not he had given that instruction.[11]

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[4] Radiology Report of Dr Stubbe dated 16 June 2007. " A small subtle area of reduced attenuation at the grey white interface superiorly in the left fronto-parietal region, this could represent a small area of infarction. Suggest a follow up with post contrast CT or MRI scan. Remainder satifactory."

[5] TS at pg 31and Letter of Dr Phillip Bloom to Coroners Court dated 28 January 2009

[6] Letter of Dr Phillip Bloom to Coroners Court dated 28 January 2009

[7] Letter of Dr Phillip Bloom to Coroners Court dated 28 January 2009 and TS at pg 19

[8] Letter of Dr John Ding to the Coroners Court dated 23 August 2009

[9] Letter of Dr John Ding to the Coroners Court dated 23 August 2009

[10] Letter of Dr John Ding to the Coroners Court dated 23 August 2009 and TS at pg 171

[11] TS at pg 72

12. A further CT scan was arranged and Dr Ding was able to observe the results at 2.00 am. The results of the CT were '*a large left occipital/posterior temporoparietal cerebral haematoma with subarachnoid extension into the ventricles and adjacent sulci associated with considerable subfalcine herniation and mild hydrocephalus.*' According to Dr Dupuche, this haemorrhage explained Mrs Dammers' further rapid deterioration from midnight.

13. Mrs Dammers was taken to the intensive care unit and intubated at 1.45am. Dr Ding urgently contacted the on-call neurosurgeon Dr Richard Bittar with regards to an emergency operation. In the meantime, Mrs Dammers was given 50mg of protamine to reverse the heparin effects.[12]

14. The initial plan was for the surgery to be done at KPH. Dr Ding stated that Dr Bittar called him back to say that the operation could not be done at KPH as a '*neurosurgical nurse*' was not available.[13] Dr Bittar had already spoken to his registrar at the Alfred Hospital and arrangements were made for Mrs Dammers to be transferred there.[14]

15. An ambulance was contacted at 2.05am and arrived at 2.33 am. Shortly prior to her departure from KPH, Dr Ding assessed Mrs Dammers again and noted she had dilated and fixed pupils. He contacted Dr Bittar and informed him of this development and was advised to proceed with the transfer of Ms Dammers,[15]with her subsequently arriving at the Alfred Hospital at 3.20 am.

16. At the Alfred Hospital, Dr Bittar confirmed a haemorrhagic transformation of a cerebral infarct. After reviewing her scan and poor neurological condition, it was recognized by clinicians that surgical intervention would not be in Mrs Dammers' best interest. This was discussed with her family and it was decided that palliative care be implemented.[16]

17. Mrs Dammers subsequently died at 10.55 am on 17 June 2007.

AUTOPSY RESULTS

18. Forensic Pathologist Dr Sarah Parsons from the Victorian Institute of Forensic Medicine conducted an autopsy on 20 June 2007 and provided a written report of her findings. She identified an intracerebral haemorrhage which was more posterior than one would expect in a case of a pure haemorrhagic complication of intravenous heparin therapy. The underlying cause of the haemorrhage could not be identified, as it was obliterated by the size of the bleed.[17] Dr Parsons stated it was likely that there had been a haemorrhage within a focus of acute infarction. Natural disease in the form of moderate coronary artery disease was identified at post-mortem. Toxicological analysis revealed the presence of Propofol, an intravenous anaesthetic agent.

19. Associate Professor Penny McKelvie conducted a neuropathological examination of the brain. She confirmed a large left parietal lobar white matter haemorrhage with raised intracranial pressure, midline shift with left uncal herniation and left cingulated gyrus herniation with brainstem herniation and secondary haemorrhages. There was widespread subarachnoid haemorrhage. There was no evidence of underlying acute cerebral infarction.

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[12] Letter of Dr John Ding to the Coroners Court dated 23 August 2009

[13] TS at pg 190

[14] TS at pg 171

[15] TS at pg 171

[16] Letter from Dr Richard Bittar to Dr John Ding dated 17 June 2007

[17] TS at pg 98

There was no evidence of amyloid angiopathy or vascular malformation. Professor McKelvie felt that the haemorrhage was likely to be secondary to anticoagulation.

Purposes of the coronial investigation:

20. The primary purpose of the coronial investigation of a reportable death[18] is to ascertain, if possible, the identity of the deceased person, the cause of death (interpreted as the medical cause of death) and the circumstances in which the death occurred.[19] An investigation is conducted pursuant to the *Coroners Act 2008* (the Act).

21. Coroners are also empowered to report to the Attorney-General on a death they have investigated; the power to comment on any matter connected with the death, including matters relating to public health and safety or the administration of justice; and the power to make recommendations to any Minister, public statutory authority or entity on any matter connected with the death, including recommendations relating to public health and safety or the administration of justice.[20] This is generally referred to as the prevention role of the coroner.

Standard of proof:

22. Coronial findings must be made on the basis of proof of relevant facts on the balance of probabilities. Assistance in determining the level of satisfaction required is found in the High Court decision of *Briginshaw* v *Briginshaw*.[21] The Court stated: "*The seriousness of an allegation made, the inherent unlikelihood of an occurrence of a given description, or the gravity of the consequences flowing from a particular finding, are considerations which must affect the answer to the question whether the issues had been proved to the reasonable satisfaction of the tribunal. In such matters 'reasonable satisfaction' should not be produced by inexact proofs, indefinite testimony, or indirect inferences...*" [22]

23. This finding is based on the entirety of the investigation material comprising the coronial brief of evidence, including material obtained after the provision of the brief, the statements and testimony of those witnesses who gave evidence at the inquest and any documents tendered through them, other than documents tendered through Counsel (including Counsel Assisting), and written submissions of Counsel and family following the conclusion of the inquest. All this material, together with the inquest transcript, will remain on the coronial file and comprises my investigation into the death of Mrs Dammers. I do not propose to summarise all the material/evidence in this finding, but will refer to it only in such detail as is warranted by its forensic significance and where otherwise appropriate.

INQUEST

24. The inquest in this matter was held on 13,14 and 15 May 2014 and investigated the following issues;

    a. **What illness did Mrs Dammers present with at KPH on 16 June 2007?**

    b. **What facilities were available at KPH for the treatment of Mrs Dammers?**

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[18] Section 4 of the Act requires certain deaths to be reported to the coroner for investigation.
[19] Section 67 of the Act.
[20] Sections 72(1), 72(2) and 67(3) of the Act regarding reports, recommendations and comments respectively.
[21] (1938) 60 CLR 336
[22] Ibid at 362

c. **Was treatment with anticoagulant therapy indicated?**

d. **What should have happened when Mrs Dammers deteriorated around 10.30pm?**

e. **When should Mrs Dammers have been transferred?**

f. **What was the cause of death?**

Each of these issues will be considered in turn

25. Evidence was heard from the following witnesses in relation to Mrs Dammers' death;

a. Mrs Mirella Dammers-Roberts

b. Dr Phillip Bloom (Emergency Department Medical Officer)

c. Dr Rene Dupuche (Consultant Physician)

d. Ms Jennifer Kent (General Manager at KPH)

e. Dr Sarah Parsons (Forensic Pathologist)

f. Dr John Ding (Emergency Medicine Specialist)

g. Professor Bruce Brew

h. Professor George Braitberg

i. Associate Professor Brian Chambers

26. Of the witnesses called, three gave expert evidence;

a. Professor Brew, is Professor of Medicine (Neurology) at the University of New South Wales and a Consultant Physician and Neurologist. Professor Brew was engaged to provide an opinion by Maurice Blackburn Lawyers, acting for the family.

b. Professor Braitberg, Professor of Emergency Medicine, Southern Clinical School Monash University and Director of Emergency Medicine and Consultant Toxicologist, Southern Health. Professor Braitberg was engaged to provide an opinion by TressCox Lawyers, acting for Dr Bloom

c. Associate Professor Chambers, Neurologist, was engaged to provide an opinion by the Court.

What illness did Mrs Dammers present with at KPH on 16 June 2007?

27. Mrs Dammers was initially diagnosed as suffering from a migraine headache by Dr Bloom. She was treated as for migraine with analgesia and anti nausea medication. However, after the results of the CT scan were available, Dr Bloom added stroke and concluded that was what she was suffering.

28. The CT scan was reported by the radiologist as having a hypodensity in an area of the left side of the brain. Professor Chambers explained that a cerebral infarction can cause hypodensity, however, there can be many other causes. He stated: *'I have looked at the scans. If it is an infarction, you can't tell whether it's an acute lesion or chronic lesion. You can't tell whether it's just chronic ischaemic change. You can't tell whether it's an area of inflammation as you might see with encephalitis. There are lots of other reasons why that abnormality could have been there. The patient required further investigation.'*[23]

[23] TS pg 160

29. Dr Bloom conveyed to Dr Dupuche that there was 'no intra-cerebral or extra-cerebral collection'[24] on the CT scan that fitted with a diagnosis of ischaemic stroke (a blockage in the blood vessels that causes cell death, or infarction, around the blockage). As he believed there was no bleed, he was able to discount that a haemorrhagic stroke was occurring.[25]

30. Neither Professor Brew nor Professor Chambers agree with the diagnosis of ischaemic stroke. Professor Chambers told the hearing that a stroke is the sudden onset of a focal deficit of vascular origin. Professor Chambers noted that Mrs Dammers presented with severe headache of two days duration, with vomiting on the first day and temporary improvement after analgesia. There were no focal neurological signs. He believed the initial CT scan was of good quality and showed no evidence of intracerebral or subarachnoid haemorrhage. There was also no mass effect. [26]

31. Professor Chambers noted that there was subtle hypodensity in the left fronto-parietal region on the initial CT scan which may or may not have been a genuine abnormality. In his view, there was insufficient basis for a diagnosis of ischaemic stroke and further clinical assessment and investigation was warranted at that time. He felt that the original diagnosis by Dr Jigau of severe migraine was not unreasonable and other diagnostic possibilities included subarachnoid haemorrhage not detected by CT and encephalitis. In his opinion, cerebral infarction would have been low on the list of differential diagnoses.[27]

32. Professor Brew stated, '*The clinical picture is not one of stroke. I say this because there are no focal disturbances, visual disturbance, limb weakness or numbness. Furthermore, headache as the presenting feature of stroke is uncommon.*'[28]As both Professor Brew and Associate Professor Chambers stated that the reported CT abnormality was non-diagnostic, they believed further clinical assessment was warranted, such as lumbar puncture and MRI.[29]

33. Support for the view that the initial CT scan could not be relied on as diagnostic, is found in the report[30] of Dr Christopher O'Donnell, Consultant Radiologist at the Victorian Institute of Forensic Medicine. He indicated that he could not detect the radiologist's (Dr Stubbe) reported findings (*'either due to its absence or poor quality of the images provided'*), but even if present, they were not necessarily relevant to the case:

    a) *"Mrs Dammers did not present with signs or symptoms of a cerebrovasular accident i.e. stroke.*

    b) *Headache is not a common manifestation of ischaemic stroke.*

    c) *Even if Mrs Dammers did have an ischaemic stroke, CT scanning of the brain is unreliable within the first 24-48 hours after onset of symptoms.*

    d) *Incidental findings of 'reduced attenuation' on CT of the brain as described by Dr Stubbe are common and often not clinically relevant."*

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[24] Medical Records pg 15

[25] TS pg 41

[26] Report of Associate Professor Brian Chambers dated 14 July 2008 at pg 2

[27] Report of Associate Professor Brian Chambers dated 14 July 2008 at pgs 2-3

[28] Report of Professor Bruce Brew dated 5 June 2013 pg 2

[29] TS pg 152

[30] Dr Christopher O'Donnell report, Ex 18 pgs 22-23

34. Conversely, Professor Braitberg was comfortable with the diagnosis of a stroke and considered whether Mrs Dammers could have had a stroke without neurological signs, stating; '*not all strokes manifest with focal neurological signs. Silent cerebral infarcts by definition lack stroke like symptoms...At the age of 56, the prevalence of silent cerebral infarction is between 3 to 8%.*'[31] Professor Brew also indicated this was a possibility, but was most uncommon.[32]

Was treatment with anticoagulant therapy indicated?

35. Professor Brew and Professor Chambers stated that it was inappropriate to commence treatment with anticoagulation on the basis of the CT report of a subtle left fronto-parietal hypodensity in a patient whose primary complaint was severe headache. Even if the patient was suffering from acute cerebral infarction, which would be most unlikely to present as headache without focal neurological signs, there was no evidence to support anticoagulation. It was stated that anticoagulation in patients with acute ischaemic stroke is not used by stroke specialists, apart from exceptional cases.

36. Professor Chambers explained that *'The use of anticoagulants for acute stroke is something that was fashionable decades ago and unfortunately the practice is still widespread, despite evidence to suggest that it is harmful. The International Stroke Trial (Lancet 1997) showed that patients treated with subcutaneous heparin had significantly more transfused or fatal extracranial bleeds, more haemorrhagic strokes and more deaths or non fatal strokes within 14 days.'*[33]

37. The evidence indicates that there was *'much controversy in medicine regarding heparin, clexene or even thromobolytic agents to treat a stroke.'*[34] Nevertheless, Professor Brew told the court, *'Back in 2007 there were no institutions that I am aware of that I have collaborative links with that used heparin, that is anticoagulation for stroke.'* He added however, '*I obviously cannot comment on what happens in Victoria.*'[35]

38. Conversely, as Professor Braitberg had not excluded the possibility of an ischemic stroke, and since anticoagulation was widely practiced for acute stroke, he considered it was not unreasonable in this case. At inquest, Professor Braitberg clarified that the use of anticoagulation therapy was something that was being provided in 2007 but that is not something that he currently supports.'[36] He further stated that it didn't surprise him that Dr Bloom and Dr Dupuche had initiated this therapy in 2007,[37] but added "*I think there's a difference between accepted practice and best practice and this was accepted practice.*'[38]

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[31] Report of Professor George Braitberg dated 8 February 2013 at pg 8

[32] Report of Professor Bruce Brew dated 5 June 2013 at pg 2

[33] Report of Associate Professor Brian Chambers dated 14 July 2008 at pg 3

[34] TS 182

[35] TS pg 122

[36] TS at pg 140

[37] TS pg 146

[38] TS pg 145

What facilities were available at KPH for the treatment of Mrs Dammers?

39. At the time of Mrs Dammers' admission to KPH, the following facilities were available to clinicians:[39]

    a. On-call neurosurgeon being Dr Bittar in this case

    b. 24 hour a day radiology services. During Mrs Dammers' after hours attendance, these services were available on an on-call basis. The on-call radiographer was required to be within 30 minutes and the radiologist was available online.

    c. 10 bed ICU Unit with 24 hr coverage

    d. 24hr Cardiac Cath lab

    e. 24 hr pathology services with one laboratory on site (this has now been changed to two)

    f. 240 beds

    g. 7 days a week physiotherapy services

    h. 7 days a week speech therapy services

    i. MET call system

    j. The capacity to administer thrombolytic therapy if clinicians required it

    k. Operating theatre facilities available 24 hrs a day. Out of hours, a theatre could be arranged within 30 minutes. On call staff for urgent operations were required to be within 30 minutes of the hospital.

40. Dr Ding gave evidence that Dr Bittar informed him that surgery could not be performed at KPH because there was no 'neuro nurse' available. No explanation was given as to what was meant by this term. Counsel for Healthscope, Mr Michael Regos, submitted that it is not known '*whether this meant that a neuro nurse was not on the roster, or was on the roster but not answering his/her call, or was in some other way incapacitated.*'[40] Further, Healthscope submits that there is no evidence before the Court as to what nursing staff are essential for surgery, what the role is of a neuro nurse, whether a qualified theatre nurse would have been sufficient as a substitute or whether the decision to transfer the patient to the Alfred involved other additional considerations.[41]

41. In his report of 14 July 2008, Professor Chambers stated '*patients with neurological problems should not be managed in hospitals where there is no neurology service. Patients with suspected strokes should be treated in hospitals where there is an Acute Stroke Care Unit.*' Further, in his report dated 1 August 2012, Professor Chambers stated '*I am still of the view that patients with stroke or other acute neurological problems should be transferred directly from the Emergency Department at KPH to another hospital that provides those services.*'

42. Healthscope submits that in evidence at inquest, when asked what facilities were required to treat stroke victims, Professor Chambers listed a number including a neurologist (or a

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[39] Report of Ms Jenny Kent dated 4 May 2012 and Submissions of Healthsope Operations dated 11 August 2014 at pgs 7-9

[40] Submissions on behalf of Healthscope Operations dated 11 August 2014 at pg 9

[41] Submissions on behalf of Healthscope Operations dated 11 August 2014 at pg 9

general physician who has elective training in strokes) as well as '*allied health services who meet in a sort of team arrangement; physiotherapists, occupational therapists, speech pathologists, social worker, where they consult - where they meet about patients. They all - they all have experience in the management of stroke.*'[42] Haealthscope submitted that each of those facilities is offered at KPH.[43] Professor Chambers also indicated that KPH was '*almost there*'[44] and if they establish specific stroke management protocols and if the facilities are organised in one region of the hospital, then there is no reason why KPH would not establish a Stroke Unit.[45]

43. Healthscope submitted that this evidence of Professor Chambers was given after the KPH's General Manager Jenny Kent had been excused from the inquest. Accordingly, there is no evidence as to whether KPH has these types of protocols. However, Healthscope submits that there is no evidence that there are relevant protocols that exist in stroke units that ought to exist in all hospitals offering stroke services and which KPH does not have. Nor is there any evidence that if those facilities referred to by Professor Chambers are not grouped together within a specific area of the hospital that this makes a hospital not suitable to treat stroke victims.[46]

44. Healthscope submitted that KPH is a suitable hospital for treating stroke victims today due to the following;

    a. It has 9 consultant neurologists accredited and available to consult with and to admit and treat patients.[47]

    b. It has 5 consultant neurosurgeons accredited and available to consult with and admit and treat patients.[48]

    c. For the ED, KPH has an on call roster of medical and surgical specialists which includes general physicians and neurosurgeons as well as orthopaedic surgeons, plastic surgeons, general surgeons, urologists and more.[49]

    d. 24 hr a day radiology services. Outside of these hours a radiographer is on call within 30 minutes and radiologists are available online.

    e. Operating theatre is available 24 hrs a day and there are 10 theatres.

    f. There is a 24 hour CATH lab.

    g. There is a 10 bed ICU with 2 hour on site medical coverage.

    h. There is a 24 hour pathology service with two laboratories on site.

    i. There are 299 beds.

    j. There is physiotherapy services 7 days a week.

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[42] TS at pg 166

[43] Submissions on behalf of Healthscope Operations dated 11 August 2014 at pg 12

[44] TS at pg 167

[45] TS at pg 167

[46] Submissions on behalf of Healthscope Operations dated 11 August 2014 at pgs 12-13

[47] TS at pg 93

[48] TS at pg 93

[49] TS at pg 88

k. There is speech therapy services 7 days a week

l. There is a MET call system in place

m. There is ability to deliver thrombolytic therapy if required

What should have happened when Mrs Dammers deteriorated around 10.30 pm?

45. Following notification at 11.00 pm, Dr Dupuche made an urgent decision that further management was required based on what he perceived to be the following factors;[50]

    a. There was rapid neurological deterioration despite the use of Clexane;

    b. An earlier brain scan had shown no haemorrhage;

    c. Further brain scanning would have required a further significant delay or possibly 1-2 hrs in the management of Mrs Dammers and this was considered unacceptable;

    d. Mrs Dammers was not hypertensive at that time;

    e. Whilst haemorrhaging transformation of ischaemic stroke was possible, this was a relatively rare event, being 1-6% of cases and therefore statistically very unlikely to be a factor in Mrs Dammers at that time.

46. Professor Brew indicated that a lumbar puncture to exclude an infection and subarachnoid haemorrhage should have been considered. Furthermore, a MRI brain scan should have been arranged more expeditiously. From a treatment perspective, it would have been better for Mrs Dammers to have had '*further symptomatic treatment and close observation rather than anticoagulation. The reason for this is that there is no definite evidence at this point that she had had a stroke.*'[51] Further, Professor Brew indicated that it was not appropriate to increase the dose of Heparin at 11.00 pm following the finding of a homonymous hemianopia. He stated, '*once there was the development of a homonymous hemianopia, a more appropriate response would be to urgently re-scan the patient to determine exactly the cause of the new deficit.*' He also indicated that the Heparin should have been discontinued when the development of the new deficit was discovered. Urgent imaging should then have been obtained.[52]

47. Professor Chambers agreed with Professor Brew that Mrs Dammers should have had a further CT brain scan and this should have then prompted transfer to a hospital with a neurology/stroke service. He believed it was inappropriate to escalate anticoagulation treatment without a scan.

48. Professor Braitberg at inquest agreed that ideally Mrs Dammers should have had further neuro-imaging but acknowledged that due to the time of night that may have been difficult and supported the clinical judgment in commencing anticoagulation treatment.[53] He believed that Dr Dupuche and Dr Bloom acted in a manner that was widely accepted in Australia by a significant number of respected practitioners in the field as competent practice in the circumstances at the time. This is due to;

    a. Dr Bloom came to a reasonable diagnosis based upon his history and examination and corroborative diagnostic imaging interpretation.

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[50] Letter of Dr Rene Dupuche to the Coroners Court dated 13 March 2008

[51] Report of Professor Bruce Brew dated 5 June 2013 at pg 2

[52] Report of Professor Bruce Brew dated 5 June 2013 at pg 3

[53] TS at pgs 140-141

b. He referred appropriately to the inpatient physician in the correct 'referral up' manner

c. He instituted anticoagulation at the request of the treating physician at a time when this therapy was still in use.

d. The definitive care of stroke patients in present times is not universally accepted by all clinicians.[54]

49. Professor Chambers's final opinion was that '*the doctors involved in providing direct patient care responded quickly. The unfortunate outcome was a result of poor treatment decisions. I agree that once Mrs Dammers displayed problems with her vision, this should have been a trigger for another scan and not for commencement of a heparin infusion.*'[55]

50. Professor Brew also believed that other aspects of management that would have prevented her death would have been the more prompt attention to her change in neurological state on the night of 16 June 2007. If the anticoagulation had been ceased at that point and further imaging arranged, the more definite diagnoses of the haemorrhage and supportive management could have been instituted.[56]

When should Mrs Dammers have been transferred?

51. Professor Chambers expressed the view that Mrs Dammers should not have been admitted to KPH to begin with as she was suffering from an acute severe neurological problem and KPH had no neurology service or acute stroke service. He stated that patients with neurological problems presenting to hospitals who do not have these facilities should be transferred to hospitals that do have them.[57] He believed the transfer to the Alfred Hospital was effected quickly following the second CT brain scan; however, Mrs Dammers should '*really have been transferred earlier the previous evening from the Accident and Emergency Department to the Alfred or another hospital with a neurology service.*'[58]

52. Professor Brew considered that a transfer was appropriate when Mrs Dammers' condition deteriorated at 10.30 pm and she complained of a new visual field defect. Transfer was necessary to a hospital which had a specialist stroke unit. This was because '*If she had been transferred to a stroke service, then she would have been - she would have had access to more sophisticated imaging; MRI if need be, angiography if need be, and more importantly, neurosurgical intervention if required.*'[59] Although Dr Bittar was the available neurosurgeon on call, Professor Brew considered this to be only one component of the recommendation and by being transferred to a specialist stroke unit, better imaging may have been conducted which would have allowed the capacity to consider '*whether there was carotid disease, blood vessel disease that could be implicated in the cause of perhaps a haemorrhagic stroke. A haemorrhagic transformation. That then would have perhaps impacted upon management and prognosis.*'[60]

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[54] Report of Professor George Braitberg dated 8 February 2013 at pgs 11-12

[55] Report of Associate Professor Brian Chambers dated 1 August 2012 at pg 2

[56] Report of Professor Bruce Brew dated 5 June 2013 at pg 4

[57] Report of Associate Professor Brian Chambers dated 14 July 2008 at pg 3

[58] Report of Associate Professor Brian Chambers dated 1 August 2012 at pg 2

[59] TS at pg 131

[60] TS at pg 132

53. He also indicated that the transfer to the Alfred Hospital was '*inappropriately delayed*'[61] as Mrs Dammers should have been urgently reassessed and reimaged at 10.35 pm. This would have shown a haemorrhage and she should have then been transferred to the Alfred. He also agreed with Professor Chambers that Mrs Dammers' subsequent transfer to the Alfred Hospital was timely, however remained concerned at the delay between the neurological deterioration at 10.35 pm and the lack of any definitive intervention until 1.00 am.[62]

54. Professor Braitberg did not discuss this point specifically but stated that given both Dr Bloom and Dr Dupuche agreed that Mrs Dammers' provisional diagnosis was that of stroke with no focal neurological signs, a stroke unit may not have accepted Mrs Dammers based upon Professor Chamber's own conclusion that '*there was insufficient evidence to diagnose an ischaemic stroke at the time of admission, as the patient had no focal neurological signs.*'[63]

What was the cause of death?

55. The autopsy by Dr Parsons demonstrated Mrs Dammers died of a large left parietal haemorrhage with widespread sub-arachnoid haemorrhage and signs of raised intracranial pressure causing brain herniation and secondary haemorrhages. The autopsy did not reveal evidence of underlying cerebral infarction (although it is possible that haemorrhage may have obliterated any evidence of an underlying stroke), arterial occlusion, venous occlusion, ruptured aneurysm, arteriovenous malformation, arteritis, encephalitis or brain tumour.

56. Professor Brew and Professor Chambers agreed with Dr Parsons that Mrs Dammers died of intracerebral haemorrhage secondary to anticoagulation. Professor Braitberg felt that she died of haemorrhage into a cerebral infarction, pointing out that haemorrhagic transformation occurs in a proportion of patients with acute ischaemic stroke, even without anticoagulant treatment.

Findings:

a) Cause of death:

57. I am satisfied that Mrs Dammers died from intracranial haemorrhage whilst undergoing intravenous heparin therapy. The evidence does not permit a finding as to the origin of the intracranial haemorrhage, be it transformation of an ischaemic stroke, haemorrhage initiated by anticoagulation or some other cause. Speculation is not a basis for making findings of fact.

b) Diagnosis of presenting illness:

58. The evidence satisfies me that there was insufficient basis for Dr Bloom to elevate ischaemic stroke over migraine or some other cause. This diagnosis together with the radiologist's report was discussed with Dr Dupuche who accepted it as reasonable. However, the weight of evidence satisfies me that it was not reasonable. There was insufficient evidence to conclude that the CT scan was revealing an ischaemic area and, accordingly, further investigation was required. The diagnosis of ischaemic stroke led to a treatment regime that culminated in Mrs Dammers' death.

c) Treatment with anticoagulant therapy:

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[61] Report of Professor Bruce Brew dated 5 June 2013 at pg 3

[62] Report of Professor Bruce Brew dated 5 June 2013 at pg 3

[63] Report of Professor George Braitberg dated 8 February 2013 at pg 11

59. The evidence supports a finding that anticoagulation therapy was still practiced in Victoria in 2007 for treatment of ischaemic stroke. In these circumstances Dr Dupuche and Dr Bloom should not be criticised for implementing the anticoagulation therapy.

60. However, following Mrs Dammers' neurological deterioration at 10.30 pm, despite the use of Clexane, Dr Dupuche should have immediately ceased treatment and arranged for an urgent CT scan. The evidence suggests that had this been done, a small intracerebral haemorrhage would have been identified. This was the opinion of Professor Chambers and I accept his evidence that '*The commencement of full dose intravenous anticoagulation shortly after that probably accelerated the intracerebral haemorrhage and caused her rapid demise.*'[64]

61. The evidence does not permit a finding, however, that had anticoagulant therapy ceased at 10.30 pm, the tragic outcome would have been prevented.

d) Management at KPH

62. It was appropriate for KPH to accept Mrs Dammers for treatment as the hospital was entitled to rely on the clinical judgment of Dr Bloom and Dr Dupuche.

63. Their decision to assess and subsequently admit Mrs Dammers to KPH was reasonable given the facilities available at the hospital. I am satisfied that KPH had specialist consultants, staff, diagnostic resources and allied health services to adequately and appropriately manage and treat stroke patients.

64. On this occasion however, the fact that emergency surgery could not be undertaken at the hospital and that it was necessary to transfer Mrs Dammers to the Alfred Hospital, is alarming. No explanation was forthcoming as to why a neurosurgical nurse was unavailable. Nevertheless, whilst the failure to have appropriate staff available is indicative of suboptimal staffing management, the evidence does not permit a finding that had surgery taken place at KPH, the death would have been prevented.

65. In addition, the evidence does not permit a finding that had Mrs Dammers been transferred to a facility with a dedicated stroke unit following her deterioration at 10.30 pm, the outcome would have been a more favourable.

COMMENTS

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

66. As indicated previously, the diagnosis of stroke should not have been made given Mrs Dammers' presenting symptoms and in the absence of further investigations. I adopt the concluding comment made by Dr O'Donnell in his report:[65]

> *"This case exemplifies the excessive reliance of clinicians on CT scanning for neurological diagnosis. In all clinical scenarios, especially in relation to stroke, the CT findings in the brain* ***must*** *be correlated with the patient's clinical signs and symptoms. In my reading of this case, BD did not have neurological deficit, rather headache (not a typical feature of stroke). On that basis the original CT findings as reported by Dr Stubbe are not relevant to the presenting symptoms. Follow-up imaging including MRI as indicated by Dr Stubbe in his report was entirely appropriate in order to confirm or*

[64] Report of Associate Professor Brian Chambers dated 14 July 2008 at pg 3

[65] Dr Christopher O'Donnell report, Ex 18 pg 3

dispute the original CT findings and determine if there was in fact a pathological process present that was responsible for BD's symptoms."

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

Mr Johannes Dammers

Mrs Mirella Roberts

Mr Michael Regos, DLA Piper Australia

Ms Judy Segal, Alfred Hospital

Mr Brian Chambers

Ms Deborah Jackson, MDA National Insurance

Ms Kerri Thomas, Sparke Helmore Lawyers

Ms Lara Larking, TressCox Lawyers

Signature:

IAIN WEST
DEPUTY STATE CORONER
Date: **29 July 2015**