IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: 2009 / 0575

FINDING INTO DEATH WITH INQUEST

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

Inquest into the Death of: PENRIN JOHN MAXWORTH HALLIDAY

Delivered On:	2nd October 2014
Delivered At:	Level 11, 222 Exhibition Street Melbourne 3000
Hearing Dates:	13 August 2012
Findings of:	PETER WHITE, CORONER
Representation:	Mr D Wallis on behalf of Alfred Health
Police Coronial Support Unit	Leading Senior Constable Kelly Ramsey

I, PETER WHITE, Coroner having investigated the death of PENRIN JOHN MAXWORTH HALLIDAY

AND having held an inquest in relation to this death on 13 August 2012
at Melbourne
find that the identity of the deceased was Penrin John Maxworth Halliday
born on 27 January 1949
and the death occurred on 2 February 2009
at the Alfred Hospital, Commercial Road, Melbourne, Victoria
from:

1 (a) ISCHAEMIC GUT
1 (b) SUPERIOR MESENTERIC ARTERY OCCLUSION (DISSECTION)
1 (c) COMPLICATIONS OF INTRA-AORTIC BALLOON PUMP FOR HYPOTENSION
1 (d) CORONARY BYPASS SURGERY POST ACUTE MYOCARDIAL INFARCTION

in the following circumstances:

1. Having reviewed the relevant evidence I adopt the medical history provided by the examining senior pathologist Dr Michael Bourke.
2. *'Mr Penrin Halliday was a 60 year old man who, according to the medical records from the Alfred Hospital and from the Coroner's deposition presented to Sandringham Hospital on 19th January 2009 with an anterior acute myocardial infarction. He was transferred to the Alfred Hospital for urgent angiogram and was found to have an occluded left anterior descending artery with severe stenosis in the right coronary artery. Mr Halliday had stents (x 2) to the left anterior descending coronary artery. He had an intra-aortic balloon pump (IABP) inserted for hypotension post-stent insertion. The IABP was removed on the 21st January 2009. Mr Halliday was awaiting coronary bypass grafts as an inpatient when he developed chest pain with ST elevation inferiorly. An angiogram showed stent thrombosis and he was taken for angioplasty.*
3. *Mr Halliday underwent (urgent) coronary artery bypass surgery on the 30th January 2009, (carried out by Mr Michael Rowland). There were no surgical complications. Mr Halliday was returned to the intensive care unit with an IABP in situ. This had been re-inserted via the left femoral artery post repeat angiogram. He made good progress initially and was extubated and haemodynamically stable. However, on the 31st January in the afternoon*

there was an elevation of lactate from 2.3 to 4. At 1900 Mr Halliday developed severe abdominal pain with elevation of lactate from 7 to 9. A diagnosis of ischaemic gut was made and urgent surgical review organised. Mr Halliday was taken to theatre for a laparotomy.

4. *At laparotomy there was viable but ischaemic bowel. The superior mesenteric artery was pulseless and a superior mesenteric artery embolectomy was performed but revealed no thrombus. Vascular surgeon review demonstrated dissection of the superior mesenteric artery, secondary to IABP. A saphenous vein patch was placed with good SMA pulse after revascularization however the bowel was not perfused and was ischaemic. Following review by a general surgeon there was a remote possibility of some bowel surviving. Mr Halliday was returned to the intensive care unit and was profoundly acidoctic, anuric and hypotensive. He was supported with inotropes, hyperventilation, and intravenous bicarbonate. He was returned to the operating theatre where the bowel was shown to be profoundly ischaemic.*

5. *Following a family meeting palliative care was instituted.*

6. *The post mortem examination showed the venous graft to the superior mesenteric artery to be patent. However, thrombus was noted at the origin of the superior mesenteric artery with a 'flap' to the right renal artery. Further region of thrombus was noted and confirmed to the celiac axis and a third to the left renal artery. Microscopic and macroscopic examination of the aorta did not demonstrate any dissection. There was no mural thrombus seen within the heart.*

7. *Mr Penrin Halliday suffered dissection of the superior mesenteric artery resulting in ischaemic gut, which led to his death. There was no residual dissection demonstration on microscopic examination of the heart or superior mesenteric artery."*[1]

ISSUES

8. The family in written submissions following Inquest, and in their solicitors letter to the Court lodged prior to Inquest, have outlined a number of concerns:

   Concern one

   It is suggested that medical staff admitted that there was a late recognition of symptoms post the insertion of two stents and the balloon pump IABP (the second such IABP insertion), via the left anterior descending artery on 30 January 2011.

[1] See post mortem report of Senior Forensic Pathologist Dr Bourke at exhibit 2 tab 5, from page 8.

Concern two

It is also suggested that Alfred Hospital staff caused a tear to the superior mesenteric artery during the removal of the intra-aortic balloon pump, carried out on 31January 2011.

9. I note that the tear to the superior mesenteric artery occurred secondary to the presence or possibly the removal of the intra-aortic balloon pump on 31 January. (The Alfred acknowledges that this complication occurred). I also note that such a tear is a rare, but a known complication of this device, which is often used in connection with the most ill of intensive care patients. It is also relevant that Mr Halliday's survival was far from certain even in the absence of this complication.

Concern three

It was also suggested that the Alfred staff did not pay attention to the raised lactate levels caused by the tear to the superior mesenteric artery.

10. The first abnormal lactate was noted at 1600 hours on 30/1/2009. This was attributed to the commencement of an adrenaline infusion, which is known to cause elevated lactate levels. Other causes of an elevated lactate level were considered by Dr Deidre Murphy but no other causes were apparent to her. The balloon pump was removed at 1830 hours and Mr Halliday developed abdominal pain soon after.

11. The next lactate was measured at 1900 hours and was 7.1, suggesting the possibility of the onset of ischaemic shock.

12. A surgical referral was made shortly thereafter, and a laparotomy was performed at 2010 hours, with bypass grafts to six vessels. Mr Halliday's symptoms were attended to, and the lactate level was also addressed.

13. The tear in the superior mesenteric artery and subsequent ischaemic gut was located during this surgery.[2]

Concern four

The family also submit that Alfred staff failed to make a diagnosis of ischaemic gut at the earliest possible time. The family further contend that the Alfred failed to ensure that Mr Halliday underwent emergency surgery at the earliest possible time. [3]

[2] See discussion in findings section below

14. In addition to the evidence led at inquest I have now also reviewed the statements from Ms Diana Battaglia the manager of Legal Support Services at the Alfred, and Assoc Professor Marasco, which statements were provided to Mr Halliday's family in early September 2012, and relate to the care provided following a deterioration in his condition on 28 January 2011.[4]

15. Associate Professor Marasco [5] stated that,

'To my recollection, I was not involved in the care of Mr Penrin Halliday prior to the afternoon of the 28th of January 2009. I understand the patient had been referred to Justin Negri for surgery on the 27th of January 2009. [6] *(He) had operating sessions on the 27th (all day) and 28th (morning session only) 2009. I was not involved in the discussion or decision making around scheduling Mr Halliday to those lists.'* [7]

And further,

'In the early hours of Thursday morning (29/1) I commenced a transplant operation, which was obviously unscheduled. During that transplant operation, another donor referral was made which was accepted and I followed the heart transplant with a bilateral sequential lung transplant. The theatre time consumed by these transplants was approximately 6 hours for the heart transplant and approximately 7 hours for the lung transplant.

During the heart transplant, I received a phone call at approximately 8 am to state that Mr Halliday was unstable. As I was scrubbed and operating, I passed a message that both theatres were tied up with transplants and would be all day and could they attempt to stabilise the patient via percutaneous means, in the cardiac catheterisation laboratory.

I understand that Mr Halliday was stabilised in the cardiac catheterisation laboratory by insertion of an intra aortic balloon pump. After I completed my transplants, I rang Mr Michael Rowland who had operating time

---

[3] I further note that Dr Stephen Duffy reports that Mr Halliday was enrolled in a clinical trial during his attendance at the Alfred, but was randomised to the placebo arm, so it follows that there is no issue with an experimental treatment having any effect upon his progress.

[4] See discussion towards the end of the hearing (transcript 87) concerning further materials to be provided by the Alfred Hospital which were then distributed to the parties, and rights re the calling of those witnesses to further testify as discussed at transcript page 87. Ms Battaglia's statement so received with attachments set out documentary evidence concerning the four emergency transplant cases, which were performed at the Austin's cardiothoracic surgery theatres on the 28 and 29 January 2009, and will be exhibit 3.

[5] Associate Professor Marasco's statement, which becomes exhibit 4, deals with the work of the Hospitals cardiothoracic unit and the scheduling of Mr Halliday's surgery initially on Thursday January 29.

[6] At transcript page 53, Dr Duffy testified that the records indicate that the 'cardiothoracic team wrote on the 26th, in the notes that he wasn't to have surgery on the 27th.'
Dr Duffy further stated at transcript page 54, that Mr Negri was an experienced surgeon who was aware of Mr Halliday's case. On the 28th he accepted a patient, from Ballarat, not an organ transplant case, which he judged to be more urgent.
And further, *'Now in retrospect that may have been the wrong decision but never the less that was the decision he made at that time.'*

[7] See exhibit 4 page 2.

the following day and asked him to perform Mr Halliday's surgery the next day. I did not consider performing Mr Halliday's surgery myself that evening as I understood that he was now stabilised and I had been operating overnight for 16 hours and did not feel it would be appropriate to undertake another case at that time.[8]

FINDING

16. I find that Mr Halliday aged 60 years, had severe underlying cardiovascular disease and that all possible early therapeutic interventions were undertaken in a centre very familiar with that condition. I additionally find that he died of a recognised complication of IABP, which is often lethal.

17. I further find that the early management of Mr Halliday's case was appropriate with the matter discussed at the weekly Cardiology and Cardiothoracic Case Conference. Appropriately, inpatient Coronary artery bi-pass surgery (CABG) was recommended on 21 January.

18. I also note that the patient, who had significant co-morbidities together with severe coronary artery disease, re-infarcted and suffered cardiogenic shock while being prepared for CABG.[9]

19. Again allowing for the fact that the IABP procedure is often employed to assist the most gravely ill patients, I find that in this case the potential benefits of IABP were reasonably seen to outweigh the known risks.

20. Concerning the further family criticism relating to the failure to prioritise surgery on 27, 28 and 29 January 2009, I note that surgery planned for 27 Jan was cancelled in uncertain circumstances.[10]

21. I also note Mr Halliday was prepped for surgery by Mr Negri on 28 January, and when that surgery was also not undertaken, that Mr Negri contacted Associate Professor Marasco, who then scheduled surgery for the morning of the 29 January.

22. I further observe that the nursing notes for 29 January indicate that Mr Halliday suffered from chest pain,

    'similar to heart attack pain overnight'[11] ,

---

[8] See exhibit 4 page 2.

[9] On 20 January 2009, risk factors were noted as increased cholesterol, diabetes, hypotension, and a lengthy history of smoking.

[10] This particular delay appears likely to have been ordered to allow a full 7 days to pass before surgery, from the re-commencement of anti-coagulation medication. See f/n 6.

and that the cardiology registrar on call contacted the cardiothoracic registrar to seek to expedite by-pass surgery as an emergency the following morning that is during the am of 29 January.

23. It is also relevant that Mr Halliday was described as '*unstable*' at this time and that notwithstanding the apparent urgency, the planned bypass surgery could not proceed on 29 January because both cardiothoracic unit operating theatres and surgical staff had just completed an emergency transplant operation, and were shortly to be engaged on a further major organ transplant procedure.

24. Given that advice, Mr Halliday was re-commenced on anticoagulation medication and the cardiac catheterization emergency team, which included Dr Duffy, were notified.

25. In the meantime a MET call was activated on 29 January due to hypotension with a subsequent angiogram establishing a 100% occlusion of the left anterior descending coronary artery.

26. Multiple percutaneous balloon inflations were then performed by Dr Duffy's emergency team to help restore the patency of the artery. Mr Halliday continued to have a low blood pressure throughout this procedure and for this reason an IABP was (again) introduced by Dr Duffy, to help stabilise the patient, with blood pressure then improving.

27. Later on 30 January, following a referral by Associate Professor Marasco, Mr Rowland undertook urgent bypass surgery without apparent incident.

28. On 31January, the IABP earlier installed by Dr Duffy, was removed at 6.45 pm with chest pain recommencing just prior to removal. During this procedure evidence of bowel ischaemia was discovered. A general surgical consultation was then performed, with a further laparotomy planned for that evening.

29. Thereafter extensive areas of bowel ischaemia and resulting multi organ failure, were confirmed and in consultation with family members, palliative care was undertaken.

30. Mr Halliday later passed away on 1 February.

---

[11] See statement of Dr Duffy at exhibit 1 page 5. An ECG taken at this time showed that there was recurrent myocardial infarction, with hyperacute changes. In this regard I note that Dr Duffy's evidence was very thorough, providing a literature review of the indications for and the significant possible complications of aortic balloon pumping.

31. It was in these circumstances then that Mr Halliday suffered one of the known but uncommon risks of the IABP introduction/removal, which led to ischaemic damage to the gut, from which condition he ultimately died.

32. Having regard to the family's submission concerning delay in injury recognition, I further find that the evidence before me does not establish that the existence of the ischaemic gut condition, should have been earlier recognised. I am also satisfied that the use of the IABP was reasonably deemed necessary in this case and that its ongoing use was also needed to help support his heart which was deemed unlikely at that time, to be able to maintain circulation to an adequate degree.[12]

33. Rather on a review of the evidence and submissions from both the family and Alfred Health, I find instead that the recognition of Mr Halliday's several complications was timely, and further that the on referral to surgeon(s) within the unit, was consistent with then existing Cardiothoracic Unit policy.

34. In so finding, I note that the bank up of organ transplant cases on the 29th specifically, was highly unusual and that staff numbers within the unit were generally thought to be appropriate, at that time.

COMMENT

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

35. The need to delay increasingly urgent bypass surgery on the 28 and 29 January, was most unfortunate and both unusual and unexpected. On the evidence before me, I do not find however that an error in prioritizing occurred over this time, or that a different result would necessarily have been achieved had the planned surgery been able to be undertaken prior to 30 January.

RECOMMENDATION.

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

I recommend that the Alfred Hospitals clinical review team undertake a re-evaluation of staffing levels within the Hospitals Cardiothoracic Unit and seek to determine whether and

[12] By definition when the IABP is being used there is inadequate underlying perfusion of organs and that is why it is used.

if so how additional staffing and appropriate clinical support should be provided in circumstances where as in this case, there are insufficient resources available, to undertake an urgent non-elective surgical intervention.

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

The family of Mr Penrin Halliday

The Chief Executive Alfred Health

Associate Professor Silvana Moresco

Dr Stephen Duffy

Dr Justin Negri

Dr Deidre Murphy

Signature:

PETER WHITE
CORONER
2 October 2014