CORONERS ACT, 2003

SOUTH *AUSTRALIA*

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide in the State of South Australia, on the 17th and 18th days of August 2011 and the 19th day of September 2011, by the Coroner's Court of the said State, constituted of Mark Frederick Johns, State Coroner, into the death of Susan Jane Ferme.

The said Court finds that Susan Jane Ferme aged 47 years, late of Section 62 Hundred Wandearah East, Port Broughton Road, Wandearah East, South Australia died at Wandearah East, South Australia on the 29th day of April 2007 as a result of acute subendocardial septal myocardial infarction complicating hypertension and left renal atrophy. The said Court finds that the circumstances of her death were as follows:

1. Introduction and cause of death

1.1. Susan Jane Ferme died on 29 April 2007 at the age of 47 years. She was at home at the time of her death. An autopsy was conducted by Dr Ross James, forensic pathologist, who prepared a report of his examination[1]. Dr James reported that the cause of death was acute subendocardial septal myocardial infarction complicating hypertension and left renal atrophy and I so find.

2. Background

2.1. 29 April 2007, the date of Ms Ferme's death, was a Sunday. On the preceding Friday she had presented to her general practitioner's surgery complaining of stomach pain. Her general practitioner, Dr Kajani, recorded her presenting history as epigastric pain and vomiting. Her blood pressure was measured at $^{170}/_{110}$ and she admitted to Dr Kajani that she had failed to take her blood pressure medication in accordance with

[1] Exhibit C3a

his directions. Dr Kajani ordered some further blood tests and counselled Ms Ferme quite firmly about the need to take her blood pressure medication in accordance with his prescription. He does not appear to have provided any other treatment for her presenting complaints.

2.2. The following day Ms Ferme was watching her daughter play netball when she experienced an acute episode of chest pain. She attended the first aid room at the netball courts and was seen by a paramedic who recorded her blood pressure as being $^{160}/_{110}$. An ambulance was called at 1456 hours, from which I infer that she experienced the chest pain at approximately 2:45pm. The ambulance arrived at the netball courts at 3pm and delivered Ms Ferme to the Port Pirie Regional Health Service Hospital at 3:24pm. Ms Ferme was recorded as informing the ambulance officers who transported her to the Port Pirie Hospital that she had first experienced the chest pain on Thursday. On the Saturday she said that she had experienced several short episodes of chest pain and then the long episode which precipitated her attendance at the first aid room. The pain was recorded as 10/10 and she was noted to be sweating. She did not complain of being short of breath and described the chest pain as burning and centrally located[2].

2.3. On arrival at the Port Pirie Hospital Emergency Department Ms Ferme was seen by registered nurses Mr Wright and Ms Sergeant. Ms Sergeant gave evidence at the Inquest. She explained that the Emergency Department at Port Pirie Hospital is staffed by nurses and there are no employed doctors. Instead, the Emergency Department uses local general practitioners on a roster basis.

2.4. Ms Sergeant said that she took a history from Ms Ferme and that Ms Ferme was unable to provide a good description of the chest pain. Instead, Ms Ferme said that she felt as though her chest was 'going to fall out'. Ms Sergeant prompted Ms Ferme for more detail and asked whether the pain felt burning or crushing and, with that prompting, Ms Ferme described it as crushing in nature[3].

2.5. Ms Sergeant performed a 12 lead ECG investigation, a printout of which can be found in the Port Pirie Hospital notes[4]. The printout records the time as 4:28pm but Ms Sergeant explained that it was in fact an hour earlier and that the machine had not been adjusted for daylight saving. I accept therefore that the correct time was 3:28pm

[2] Exhibit C5, SA Ambulance Patient Report Form
[3] Exhibit C7
[4] Exhibit C5

and this accords reasonably well with the evidence of the time of Ms Ferme's admission. Ms Sergeant formed the opinion that the ECG result was normal and there was no sign of myocardial infarction[5]. Ms Sergeant said that she had some years of experience in interpreting ECG results[6].

2.6. Ms Sergeant contacted the on-call doctor, Dr Martin, at 3:30pm. The telephone conversation was recorded by the hospital's telephone system and a record of the conversation between Dr Martin and Ms Sergeant was admitted[7] and a transcription was also admitted[8].

2.7. Ms Sergeant told Dr Martin that she had Ms Ferme, who was a 47 year old patient of Dr Kajani. She related that Ms Ferme had been experiencing niggling episodes of chest pain for the last week and that Dr Kajani had run some blood tests the previous day and had reassured Ms Ferme that he did not think it was cardiac related. Dr Martin was informed of the acute episode of central chest pain at the netball match which was rated as 10/10. Ms Sergeant related the difficulty in obtaining a description of the pain and that, without prompting, Ms Ferme had described it as feeling as though her chest was about to fall apart and that it really hurt. With prompting she was able to describe it as crushing in nature and that it radiated across the chest but did not go down into the arms. Ms Sergeant informed Dr Martin that Ms Ferme complained of feeling quite short of breath but not nauseated and that she was sweaty.

2.8. Ms Sergeant then informed Dr Martin that the South Australian Ambulance Service had arrived approximately 20 minutes after the pain had commenced and that they had administered a couple of sprays of GTN[9] and oxygen with no relief. By the time Ms Ferme had arrived at the hospital she had a pain score of about 8/10 and after some rest at the hospital the pain score at the time of the telephone conversation was reported as 4/10. Ms Sergeant related the observations as blood pressure $^{132}/_{87}$ and pulse rate 58 with good oxygen saturation. Ms Ferme was afebrile and an ECG recorded a t-wave inversion through lead 3 and V1 and a flattened one in VF, otherwise no problems. Ms Sergeant added that the pain was still present and that Ms Ferme was not tender to palpate in the epigastric area and had not eaten that day. She

[5] Transcript, page 19
[6] Transcript, page 20
[7] Exhibit C7
[8] Exhibit C7a
[9] Glyceryl trinitrate which is a coronary vasodilator

did not think it could possibly be reflux type pain because that could not possibly account for the amount of pain she was in. Ms Sergeant related that Ms Ferme suffered from hypertension and had not been taking her medication and that Dr Kajani had given her 'a bit of a lecture yesterday'[10]. Ms Sergeant had the blood results from the tests ordered by Dr Kajani the previous day and was able to relate to Dr Martin that they showed a cholesterol level of 6.7. Ms Sergeant informed Dr Martin that she believed that Ms Ferme was particularly frightened because of the family history that her father had died at 63 from heart disease and that both of her brothers had heart disease as well.

3. Dr Martin's response to Ms Sergeant

3.1. Dr Martin responded in what appears to be a rather casual manner. He said that Ms Sergeant could:

> '…do a serum troponin but I mean it is going to turn out to be a furphy.'

He said that if she has a normal ECG and a normal Troponin then there would be no grounds to treat it as cardiac. He said he would probably give her a couple of Capadex and a Nexium[11] 20 milligrams. He added this would be just in case it was 'acid pain' but added 'it is going to be sort of a psychogenic furphy' and:

> 'I don't really see the point in wasting ay time over it.'

He then asked Ms Sergeant to send off the Troponin test, provide the Capadex and Nexium and:

> '…try and sort of convince her to go home. Otherwise she is just going to become a cardiac neurotic.' [12]

3.2. Ms Sergeant proceeded to take blood for a Troponin test. She also provided Ms Ferme with Capadex and Nexium tablets. She said that Ms Ferme complained that she felt like the Capadex and Nexium tablets were stuck in her throat and that she felt nauseated. Indeed, she vomited some fluid but did not actually bring up the tablets[13].

3.3. This occurred at 4:20pm.

---

[10] Exhibit C7, page 2
[11] Nexium is a treatment for excessive gastric acidity
[12] Exhibit C7, page 2
[13] Transcript, pages 28-29

3.4. The Port Pirie Hospital notes[14] show that Dr Martin attended to examine Ms Ferme at 5:10pm. By that stage, the Troponin results from the blood taken at 3:45pm had been reported. Dr Martin noted in the hospital medical record his examination as follows:

> 'Deep burning retrosternal chest pain after $^{2}/_{7}$ (2 days) of some intermittently.
> No cardiac sounding features.
> Non pleuritic.
> Obs stable.
> 2 HS (heart sounds) nil added
> ECG (N) (normal)
> Cardiac enzymes (N)
> A (assessment) - probable ? ulcerative esophagitis + spasm + anxiety
> P (plan) - for IV Nexium 40mg + Maxolon 10mg + Tramadol 100mg IM'

3.5. Dr Martin gave evidence at the Inquest and was, of course, questioned extensively on the telephone conversation with Ms Sergeant and his examination of Ms Ferme that afternoon.

3.6. Dr Martin frankly acknowledged that his handling of Ms Ferme's case involved a lapse of judgment on his part[15]. He said that at the time he was overburdened in his professional and personal life and had been not only rostered as the on-call medical doctor, but also as the on-call anaesthetist at the hospital. He had been awakened in the very small hours of the morning that day for a potential intubation of a patient[16]. He also said that he was of the belief that it was very, very uncommon for women in the 40 year old range to experience coronary syndromes[17].

3.7. Dr Martin said that his suspicion of a possible cardiac cause was downgraded in his mind as a result of learning that the GTN spray administered by the ambulance officers did not have any effect[18] and further as a result of the normal ECG trace[19].

3.8. Dr Martin acknowledged that by the end of his examination of Ms Ferme he had officially discounted the possibility that her symptoms related to a cardiac cause[20] and that the Tramadol was prescribed as being for musculoskeletal or oesophageal muscle spasm pain[21].

---

[14] Exhibit C5
[15] Transcript, page 88
[16] Transcript, page 83
[17] Transcript, page 88
[18] Transcript, pages 60-61
[19] Transcript, pages 83-84
[20] Transcript, page 72
[21] Transcript, page 73

3.9. Dr Martin did not recall, but accepted Ms Sergeant's recollection as correct, when she said that following his examination of Ms Ferme he told Ms Sergeant that Ms Ferme's pain was not cardiac related[22] and that Ms Sergeant should administer the Nexium and Maxolon[23] and if that did not relieve the pain then she was to use the Tramadol. He accepted also that he told Ms Sergeant that if Ms Ferme's pain went away she could go home but that, if it did not, then he would see her again[24].

3.10. In the result, the Nexium and Maxolon did not have any effect upon the pain being experienced by Ms Ferme[25] and Ms Sergeant administered the Tramadol at 6pm[26] and by 6:40pm Ms Ferme reported that she was free of pain[27]. Ms Sergeant discharged Ms Ferme at 6:45pm telling her that if the pain returned overnight or during the weekend that she should return to Accident and Emergency at the Port Pirie Hospital for investigation[28].

4. Expert opinion of Dr Zimmet

4.1. Counsel assisting obtained a report from consultant cardiologist, Dr Leon Zimmet[29] and Dr Zimmet gave evidence. Dr Zimmet said that, in his view, the information imparted to Dr Martin by Ms Sergeant was significant and it was necessary to rule out acute cardiac syndrome as a result of that information[30]. In particular he noted the information relating to the severity of the pain at 10/10, that it was described as being crushing in nature and that there was shortness of breath and sweatiness[31]. Dr Zimmet discounted the significance of the fact that Ms Ferme had to be prompted in order to describe the pain as crushing[32].

4.2. Dr Zimmet said that the risk factors including family history with father and brothers, high cholesterol of 6.7 and hypertension were important matters also. Dr Zimmet said that the normal ECG result soon after Ms Ferme's presentation in the hospital was not persuasive. In particular, he noted that a negative ECG does not exclude a heart attack[33].

---

[22] Transcript, page 74
[23] Maxolon is a treatment for nausea
[24] Transcript, page 74
[25] Transcript, page 30
[26] Transcript, page 30
[27] Transcript, page 30
[28] Transcript, pages 31-32
[29] Exhibit C11
[30] Transcript, page 105
[31] Transcript, page 101
[32] Transcript, pages 129-130
[33] Transcript, page 103

4.3. Dr Zimmet described the significance of the biomarker Troponin: that it is not present in a normal person's blood but will be present if there is damage to the heart or a lack of oxygen to the heart. Dr Zimmet commented that the Troponin T enzyme is probably the most sensitive marker we now have of cardiac disease. He said that a normal Troponin T result for blood taken approximately 1 hour after the acute episode at the netball courts was not reliable to discount an acute cardiac syndrome[34]. Dr Zimmet said that the Troponin investigation should be repeated 6 hours from the time of the first test[35].

4.4. It was Dr Zimmet's opinion that Ms Ferme's infarct probably was taking place at the netball courts when she described the acute pain[36]. Dr Zimmet postulated that the probable mechanism or cause of Ms Ferme's death sometime in the early morning of Sunday 29 April 2007 may have been that her heart experienced an arrhythmia following what did not appear to have been a massive heart attack, but which nevertheless caused some damage to the heart leaving the heart 'irritable' and:

> '… she may have developed what are (sic) ventricular fibrillation, which would have produced no output to the heart and subsequent death.' [37]

4.5. Dr Zimmet said that has Ms Ferme been in hospital on cardiac monitoring he would expect that, in the event that she experienced an arrhythmia, she would have been defibrillated and that would have reverted her to normal rhythm[38]. Dr Zimmet said that Ms Ferme's prospects, had the acute coronary syndrome been detected and appropriate treatment administered, would have been reasonable provided that she obtained treatment for her blood pressure and cholesterol and took aspirin[39].

5. Conclusion

5.1. Dr Martin agreed that he should have ordered a second ECG and a second Troponin test and that in fact this was his usual practice. He was unable to explain why he did not do so, suggesting that it was human error. It was clear that he was under a great deal of pressure with heavy professional responsibilities at that time and was 'wearing too many hats'[40], as he termed it. I am also aware of the enormous strain under which

---

[34] 'No, it's too early, Troponin usually takes about 4 to 6 hours before it is present in the blood of a patient with some form of cardiac event' - Transcript, page 104
[35] Transcript, page 104
[36] Transcript, page 109
[37] Transcript, page 110
[38] Transcript, pages 111, 118-119
[39] Transcript, page 111
[40] Transcript, page 88

country doctors in general practice are required to work and I commend Dr Martin for having made a commitment to the stressful career of country medical practice.

5.2. It is clear that, had the appropriate tests to exclude acute coronary syndrome been undertaken on 28 April 2007, and particularly had a second Troponin test been taken on bloods drawn at around 8:30pm to 9pm, a positive Troponin T result would have been returned and appropriate treatment could have been administered with good prospects of recovery. In short, Ms Ferme's death was preventable.

6. Recommendations

6.1. By virtue of section 25(2) of the Coroners Act 2003 the Court may add to its findings any recommendation that might, in the opinion of the Court, prevent, or reduce the likelihood of, a recurrence of an event similar to the event that was the subject of the Inquest.

6.2. I recommend that the Department of Health reissue instructions to all medical staff working in country hospitals that:

a) The requirements and protocols set out within the ICCnet[41] SA Management of Chest Pain/Suspected Acute Coronary Syndrome Guideline[42] should be strictly adhered to and, in particular, that staff should be directed to strictly adhere to the requirements of the low risk protocol and;

b) That regardless of whether the low risk protocol criteria are satisfied, medical staff should only discharge patients where there is in existence an alternative explanation for their chest pain and where that explanation has a high degree of certainty.

Key Words: Hospital Treatment; Country areas - medical services; Heart Disease

In witness whereof the said Coroner has hereunto set and subscribed his hand and Seal the 19th day of September, 2011.

State Coroner

[41] Integrated Cardiovascular Clinical Network
[42] Exhibit C9