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 20th, 21st, 22nd, and 23rd days of April 2015, the 21st day of May 2015 and the 18th day of September 2015, by the Coroner's Court of the said State, constituted of Mark Frederick Johns, State Coroner, into the death of Fiona Louise Selby-Fullgrabe.

The said Court finds that Fiona Louise Selby-Fullgrabe aged 35 years, late of 1153 North Terrace, Moonta Bay, South Australia died at Wallaroo Hospital, Ernest Terrace, Wallaroo, South Australia on the 12th day of May 2013 as a result of coronary artery dissection. The said Court finds that the circumstances of her death were as follows:

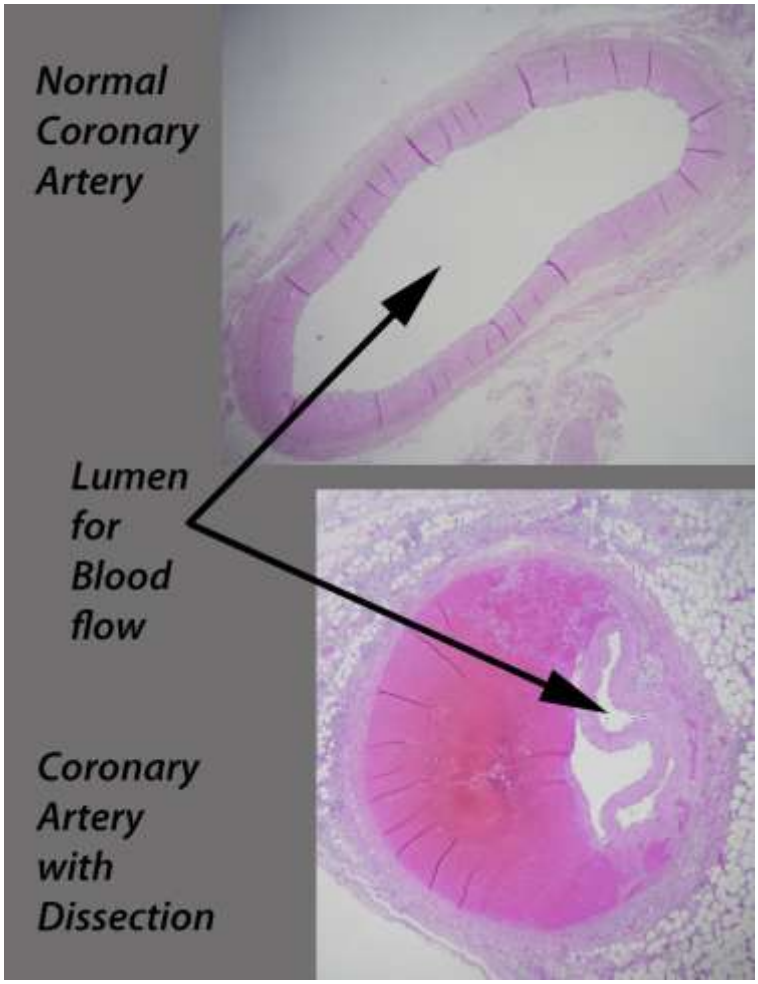
1. Introduction and cause of death

1.1. Fiona Louise Selby-Fullgrabe died on 12 May 2013. She was 35 years of age. An Autopsy was carried out by forensic pathologist Dr Langlois from Forensic Science South Australia who reported[1] her cause of death as coronary artery dissection, and I so find.

1.2. Dr Langlois reported also that coronary artery dissection is a rare phenomenon that occurs spontaneously without known cause. The dissection allows blood into the wall of the blood vessel, in this case the left coronary artery. The wall of a blood vessel consists of several layers. The dissection that occurs in these cases is not a complete tearing of the wall of the vessel from its innermost layer to its outermost layer. If that were to happen then obviously blood would escape the arterial system altogether and enter the surrounding tissue of the body. That is not what occurs in these situations.

[1] Exhibit C1a

Rather, there is a tear in the innermost layer of the wall of the artery which separates it from the next layer of the arterial wall. The separation enables blood to enter a space that is formed between the inner wall and the adjacent wall. This can then continue for some distance. The resulting cavity is then filled with blood and this creates what might be described as a pocket or a balloon which, as it expands, then causes a constriction or occlusion of the inside of the blood vessel which is referred to as the true lumen. The space that I have described between the layers of the arterial wall is described as the false lumen. As the false lumen expands, the true lumen narrows and is sometimes completely closed off or completely occluded. Because the coronary arteries supply blood to the muscles of the heart, those muscles are affected by an interruption to the supply of oxygenated blood and ischaemia, or death of the muscle tissue, may ensue. Dr Langlois helpfully provided in his supplementary report[2] photographs of slides of microscopic sections taken of Mrs Selby-Fullgrabe's artery which I have included below.



[2] Exhibit C16

Dr Langlois explained that the top slide shows a section of the normal area of Mrs Selby-Fullgrabe's coronary artery and a section from the dissected part of her coronary artery is shown at the bottom. It is clear from Dr Langlois' slide that the true lumen is patent in the upper slide, but is almost completely blocked or occluded in the lower slide at the site of the dissection.

2. The events of 11 and 12 May 2013

2.1. Mrs Selby-Fullgrabe contacted her husband on 11 May 2013 at around lunchtime by mobile phone to inform him that she was not feeling very well. Her husband was unable to speak to her immediately because he was at work. He rang her back 10 minutes later but she did not answer her phone. Suspecting that something was wrong, and knowing that their two small children were in her care, Mr Selby-Fullgrabe returned the short distance home to find his wife unconscious. He rang the South Australian Ambulance Service. The triple zero call is recorded in the ambulance records as having been received at 1307 hours. At 1312 hours the records shown that ambulance officers arrived at Mr and Mrs Selby-Fullgrabe's home and one minute later at 1313 hours they were attending to Mrs Selby-Fullgrabe. She was noted to be conscious at the time of their arrival with a Glasgow Coma Scale[3] (GCS) of 13. The ambulance patient report form[4] recorded that she 'had 8/10 pain in both arms and tightness in chest'. They went on to record that she 'was pale and sweaty, said was dizzy before collapsing'. The ambulance officers also took a first set of observations which, apart from the GCS, were normal. The ambulance officers placed Mrs Selby-Fullgrabe in the ambulance and took her to the Wallaroo Hospital. While they were on their way they took a second set of observations. These were taken at 1350 hours and were also unremarkable. They showed that the pain score had dropped to 3/10 by that time.

2.2. The ambulance arrived at the Wallaroo Hospital at 1400 hours and at 1415 a first set of observations were taken at the hospital by enrolled nurse Ms Whale, all of which were normal.

2.3. At 1420 hours Mrs Selby-Fullgrabe was seen by the triage nurse and assigned a Category 3. She was seen almost immediately by Nurse Whale who gave evidence at

[3] The Glasgow 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 (deep unconsciousness) and 15 (minor injury)

[4] Exhibit C4, page 11

the Inquest. Nurse Whale said that she activated the chest pain protocol upon learning of Mrs Selby-Fullgrabe's symptoms[5]. The chest pain protocol she referred to[6] is a document entitled iCCnet[7] SA Management of Chest Pain/Suspected Acute Coronary Syndrome and it was the protocol as it existed in May 2013. The protocol is in the form of a chart describing the various pathways and steps for treatment to be adopted in the case of a patient presenting to the Emergency Department with symptoms suggestive of acute coronary syndrome. Nurse Whale was required to follow the protocol because of Mrs Selby-Fullgrabe's reported chest pain.

2.4. As required by the chest pain protocol, Mrs Selby-Fullgrabe was given oxygen and she underwent an ECG test. A blood sample was taken for testing and she was also given some aspirin.

2.5. At 1450 hours the blood tests were reported as showing a troponin analysis with a reading of 121. Nurse Whale wrote this in the notes and underlined it. Nurse Whale anticipated that because of the elevated troponin Mrs Selby-Fullgrabe would be admitted to the hospital at least for a period of time sufficient for her to undergo a repeat troponin test. Nurse Whale anticipated that she would be at the hospital for at least 6 hours[8]. Accordingly, she obtained a hospital UR number and an ID bracelet and started the admission process. All of this was in accordance with the iCCnet protocol[9].

2.6. Nurse Whale was absolutely right to commence and follow the protocol. Had the protocol been followed thereafter Mrs Selby-Fullgrabe would have been admitted to the hospital and, in accordance with the protocol, an iCCnet cardiologist should have been contacted by telephone, this being the concept behind the protocol, namely that practitioners in regional areas will have ready access not only to a protocol to follow in case of the admission of patients with symptoms suggestive of acute coronary syndrome, but also that they will have ready electronic access to an on-duty cardiologist via the contact number provided. Not only will they have that contact, but the cardiologist will have electronic access to the ECG and blood results taken on site. This is an excellent system and has no doubt saved many lives during its existence. Under the protocol the on-duty cardiologist would have been contacted

[5] Transcript, page 60
[6] Exhibit C6
[7] Integrated Cardiovascular Clinical Network
[8] Transcript, page 62
[9] Exhibit C6

and would have had access to Mrs Selby-Fullgrabe's ECG results and her initial blood results, including the elevated troponin. They would have also had the ability to obtain from the doctor at Wallaroo Hospital - in this case Dr Marsh, of whom more will be said shortly - the relevant history and presenting signs and symptoms. The cardiologist would then have given consideration to the immediate transfer of Mrs Selby-Fullgrabe. Although the reader does not have Exhibit C6 to look at[10], I formally note that the relevant pathway in the protocol would have been the right-hand column of the centre pathway of the protocol which is applicable for a positive initial troponin. In the present case Mrs Selby-Fullgrabe also had experienced syncope and diaphoresis, both of which are mentioned in the first large box in that part of the protocol.

2.7. The iCCnet protocol is applicable to all persons coming through the Emergency Department, male or female, young or old, with the necessary presenting symptoms, particularly chest pain. The protocol is designed as a life saving aid for regional and remote practitioners such as those working in the Emergency Department at the Wallaroo Hospital in the manner I have already described. It also serves another purpose, namely to ensure that patients such as Mrs Selby-Fullgrabe who do not meet the typical profile of a cardiac patient, are not overlooked. Because she was young and female Mrs Selby-Fullgrabe did not fit that classic profile, and unfortunately this confounded Dr Marsh who was led into error by Mrs Selby-Fullgrabe's sex and young age.

2.8. Returning to the narrative, at 1500 hours Nurse Whale gave Mrs Selby-Fullgrabe 300mg of aspirin, again in accordance with the protocol. At 1522 hours Nurse Whale noted that Mrs Selby-Fullgrabe was still complaining of central chest tightness with a pain score of 1/10. At 1530 hours Dr Marsh attended upon Mr and Mrs Selby-Fullgrabe and commenced his assessment of her. By 1606 hours Dr Marsh had concluded his assessment of Mrs Selby-Fullgrabe and reached a decision that he was not going to admit her, but he was going to arrange further diagnostic tests to pursue a theory that her problem was neurologically based. He made a progress note remotely in the Kadina Medical Associates' computer system[11]. By 1614 hours Dr Marsh had completed his notes and closed his access to the computer system. I note that there

[10] It can be found at: http://www.iccnetsa.org.au/Data/Sites/1/protocols/clinicalpathways/cat1_blank.pdf
[11] Kadina Medical Associates being the GP practice at which he was based and which was providing his services to the Wallaroo Hospital on the relevant day

are some suggestions in the hospital notes that his assessment of Mrs Selby-Fullgrabe occurred later than described in the narrative above, however I am satisfied that the Kadina Medical Associates' computer records accurately disclose the time at which he made his notes and from there it follows that the timing is as described above. In any event, little of significance turns on this question of timing. At 1620 hours Dr Marsh attended in the theatre of Wallaroo Hospital and attended to a patient with a suspected shoulder dislocation. At 1625 hours Mr and Mrs Selby-Fullgrabe left the hospital. At 1706 hours Dr Marsh had completed his attendance in the theatre.

2.9. It has been conceded by Dr Marsh that there is no doubt he should have followed the protocol. If Dr Marsh had followed the protocol he would have admitted Mrs Selby-Fullgrabe and made contact with a cardiologist. His conversation with the on-duty cardiologist would have occurred, presumably, shortly after he concluded his examination and assessment of Mrs Selby-Fullgrabe at about 4pm, before he went to theatre to deal with the shoulder reduction. Certainly one would expect the contact with the on-duty cardiologist to take precedence over a shoulder dislocation which, although painful, is not potentially life threatening.

2.10. It is conceded by Dr Marsh that he made a serious clinical error and he has admitted his mistake. Dr Marsh considered that Mrs Selby-Fullgrabe's presentation to him on that afternoon was likely to be neurologically based rather than cardiac. The chest pain protocol had already been activated well before Dr Marsh saw Mrs Selby-Fullgrabe. It was he who altered the course of events by saying she should be discharged.

2.11. Dr Marsh explained his reasoning process. In large part it was the result of some further history taken by him from Mr and Mrs Selby-Fullgrabe. Dr Marsh said that Mrs Selby-Fullgrabe mentioned a previous episode several years prior when she had felt weak and tingly in both arms and not quite right in the chest. This condition went on for at least three months but got better by itself. Mrs Selby-Fullgrabe told Dr Marsh that she attended at a hospital on one occasion and saw a neurologist by the name of Dr Waddy. Dr Marsh recalled that it was considered at the time that Mrs Selby-Fullgrabe may have had multiple sclerosis and Dr Waddy did some tests but ended with the conclusion that she did not have multiple sclerosis. She got better after a few months and there was no further investigation done regarding that episode. Dr Marsh said that the diagnosis was not certain to him by any means, but given the

past history of a similar sequence of events his thinking focussed on a neurological cause for her presentation[12]. Dr Marsh said that he was aware that her troponin was elevated, but he did not believe that Mrs Selby-Fullgrabe seemed a likely candidate for acute coronary syndrome as she did not have the usual profile, being a fit and active young woman with no co-morbidities as distinct from the typical patient who is older, generally in his or her 50s or 60s and obese, hypertensive, diabetic and a smoker. Mrs Selby-Fullgrabe had none of these characteristics and, given her age and no significant familial cardiac history, Dr Marsh had a low index of suspicion for her having a cardiac condition. Accordingly, he prepared an order for her to have some further pathology tests and a CT head scan in the near future[13]. Dr Marsh advised Mrs Selby-Fullgrabe to stop driving a motor vehicle because of the danger to herself and other road users if she were to have a seizure leading to unconsciousness at the steering wheel. Dr Marsh said that he told them that they could leave the Emergency Department and that, in accordance with what he described as his invariable practice, he told them to come back if they were concerned.

2.12. Returning to the narrative, Mrs Selby-Fullgrabe returned home with her husband and she rested while her husband cooked dinner and attended to their young children. Once the children were asleep Mrs Selby-Fullgrabe also went to bed with her husband following shortly after. At approximately 0130 hours Mrs Selby-Fullgrabe woke her husband and asked that he put bed covers back on their youngest child which he did. He returned to bed and was again awakened at approximately 0345 hours by his wife who was groaning loudly. It appeared to him that she was having a seizure and at this time he placed her in the recovery position and, upon realising that she was not breathing, he contacted triple zero. The ambulance report form records that the call was received at 0352 hours with the ambulance arriving at 0412 hours. Resuscitative efforts were undertaken by ambulance officers upon their arrival and continued when the ambulance left the family home at 0518 hours. Once at the Wallaroo Hospital at 0532 hours Mrs Selby-Fullgrabe was assessed by Dr Marsh who declared her life extinct at 0535 hours.

2.13. It was submitted on behalf of Dr Marsh that although he should have directed that Mrs Selby-Fullgrabe be admitted to hospital and contacted a cardiologist, some level of responsibility should also be assumed by a member of the nursing staff at Wallaroo

[12] Exhibit C7
[13] Exhibit C7

Hospital, namely registered nurse Ms Crosby. I have already noted that Nurse Whale had activated the protocol and had anticipated that Mrs Selby-Fullgrabe would be admitted. She prepared the admission documentation for that to happen. The evidence shows that Nurse Whale spoke to Nurse Crosby three times[14]. She said Nurse Crosby told her that she, Nurse Crosby, would make Dr Marsh aware that a repeat troponin needed to be done[15]. Nurse Crosby never did this. Nurse Crosby did know that the decision to send Mrs Selby-Fullgrabe home was completely contrary to the protocol[16]. Nurse Crosby said that she really could not be sure whether she had raised with Dr Marsh the appropriateness of Mrs Selby-Fullgrabe's proposed discharge even though she, Nurse Crosby, had not expected that she would be discharged[17]. On the evidence as a whole I am not satisfied that she did raise it with Dr Marsh and I think it more probable than not that she did not do so.

2.14. Nurse Crosby said that she did attempt to speak to another doctor, Dr Blue, about Mrs Selby-Fullgrabe 'mainly because nothing had been documented on her notes'[18]. This is an odd passage of evidence. It relates to a time after Dr Marsh had examined Mrs Selby-Fullgrabe, but before he had made any note on the hospital records. In fact he made his notes predominantly on the Kadina Medical Associates' records shortly after 4pm as I have already recorded. It seems strange that Nurse Crosby would raise the matter of this patient with Dr Blue in the way she said she did. The effect of her evidence is as follows. Nurse Crosby said in speaking to Dr Blue just before he went to theatre, which must have been sometime after 4pm and before roughly 4:20pm, that she told him 'there was one more patient I wanted him to see'. She said that he responded that he was on his way to theatre and that there were only three patients left and that Dr Marsh could see those. She said therefore she 'didn't get to tell him any detail'[19]. Nurse Crosby acknowledged that she believed that Mrs Selby-Fullgrabe had already been seen by Dr Marsh[20]. Nurse Crosby said she made a further attempt to speak to Dr Blue after theatre even though Mrs Selby-Fullgrabe had then been discharged. However, she said that she was unable to speak to Dr Blue then as he had already left[21].

[14] Transcript, pages 72, 73, 86 and 92
[15] Transcript, page 72
[16] Transcript, page 142
[17] Transcript, page 125
[18] Transcript, page 126
[19] Transcript, page 126
[20] Transcript, page 127
[21] Transcript, page 131

2.15. It is surprising that Nurse Crosby was so focussed on speaking to Dr Blue about the matter but does not appear to have pressed with Dr Marsh her concerns about the decision to discharge Mrs Selby-Fullgrabe against the directions in the protocol. While there is no doubt that nursing staff are subordinate to doctors and would not normally be expected to question a medical decision, these were slightly unusual circumstances. The fact was that Dr Marsh was a junior doctor who was being supervised by more senior doctors at the Kadina Medical Associates clinic and Nurse Crosby was aware of this. There appears also to have been some tension between Dr Marsh and some of the other doctors and nurses in the clinic and at the hospital. It may be that these tensions prevented or inhibited an appropriately free and frank exchange of opinions. While in my opinion the primary responsibility for Mrs Selby-Fullgrabe's discharge in contravention of the protocol rests squarely with Dr Marsh, it does seem to me that an opportunity was lost when Nurse Crosby did not assume responsibility for either challenging him for his decision not to follow the protocol, or for elevating the matter to more senior nursing staff or, for that matter, to Dr Blue or one of the other doctors who were contactable by telephone.

3. Expert opinion

3.1. If the protocol had been followed and Dr Marsh had contacted the on-duty cardiologist, the question that then arises is what would the on-duty cardiologist advise. Expert opinions were obtained in this case from Dr William Heddle, cardiologist, and a second report by Professor Michael O'Rourke, also a cardiologist. Dr Heddle's evidence was that he would have ordered an immediate evacuation of Mrs Selby-Fullgrabe from Wallaroo Hospital to a tertiary hospital in Adelaide[22]. Dr Heddle acknowledged that another cardiologist might not do so, although it was his evidence that immediate evacuation would be best practice. On the other hand, Professor O'Rourke said that he would not have ordered immediate evacuation. Instead he would have arranged for Mrs Selby-Fullgrabe to be admitted to Wallaroo Hospital and observed with a second troponin test, repeat ECG and a telephone call back to the cardiologist with the results.

3.2. It was the common view of both Dr Heddle and Professor O'Rourke that clexane, an anticoagulant, would have been prescribed and administered. Note that this is also in

[22] Transcript, page 261

compliance with the protocol[23]. Repeat troponin tests and ECGs would have been performed every 4 to 6 hours with the results being conveyed by Dr Marsh to the on-duty cardiologist by telephone. The cardiologist would have advised Dr Marsh that Mrs Selby-Fullgrabe did not need to be evacuated provided the troponin level did not rise and the ECG remained normal.

3.3. It is quite clear that in the light of what happened at 0345 hours the following morning Mrs Selby-Fullgrabe's troponin level would have risen and/or the ECG would have become abnormal at sometime during the night prior to 0345 hours.

3.4. Both cardiologists acknowledged that Mrs Selby-Fullgrabe would have been retrieved to an angio suite at a tertiary hospital in Adelaide. She would have undergone an angiogram which may or may not have revealed the existence of the dissection. On any view though it would have revealed the existence of an occlusion of the left anterior descending coronary artery. There would then have been theoretically three treatment options. The first would be to conservatively manage her using medication. Both cardiologists dismissed that as a viable alternative. The second course would be to insert a stent by angioplasty. This was the option both cardiologists said would have been followed. The third option would have been to proceed straight to bypass surgery. Both cardiologists said that option would not have occurred.

4. Mrs Selby-Fullgrabe's prospect of survival

4.1. It is necessary to say something about Mrs Selby-Fullgrabe's prospects of survival had Dr Marsh implemented and followed the protocol. It was common ground that Mrs Selby-Fullgrabe would have been placed on the anticoagulant medication, clexane. As Dr Heddle pointed out, anticoagulation is difficult in a case such as this:

> 'If you have thrombus falling within the false lumen and you dissolve it by anticoagulation, that means you can get extension of the false lumen. Because you have narrowed the left anterior descending by the dissection, if you get thrombus in the true lumen, then anticoagulation is a good thing to do.' [24]

So at autopsy, according to Professor O'Rourke's interpretation of the supplementary report of the pathologist, Dr Langlois[25], there was no thrombis in the true lumen of the artery. All of the occlusion was coming from the protrusion of the space occupied by

[23] Exhibit C6
[24] Transcript, page 289
[25] Exhibit C14b (addendum statement of Professor O'Rourke) and C16 (supplementary report of Dr Langlois)

the false lumen and its contents into the true lumen. However, at the time that the protocol required the administration of the clexane, none of this could have been known. Thus, the administration of clexane would have complicated and made more difficult the treatment by angioplasty and stenting of the artery[26].

4.2. Professor O'Rourke said in his addendum statement:

> 'In my opinion the greater the involvement of the dissection in the process of occluding this artery, the poorer the outcome for Mrs Selby-Fullgrabe if the occlusion was found at diagnostic angiography. This is because there is a greater likelihood of doing harm when attempting to stent or attempting a bypass graft at open heart surgery. The presence of the false lumen makes it harder to locate the true lumen, in either procedure. The angioplasty balloon may mistakenly be passed into the false lumen. The pathologist Dr Langlois has referred to difficulty in distinguishing between thrombis in the true lumen from bleeding (dissection) in the arterial wall (page 1, paragraph 5 of supplementary report). Inflating the balloon in such circumstances will not reopen the occluded vessel and may cause extension of the dissection proximally (towards the aorta), or distally (away from the aorta). Extension of dissection proximally by just 2cm could occlude the circumflex artery and leave the small right coronary artery as the only source of blood to the heart. It is the friability of the vessel wall that leads to the formation of the dissection and such friability of the vessel will then permit the bruise to travel along (dissect) the wall of the vessel. Even if the balloon is correctly located in the true lumen, its inflation may partially puncture the already friable arterial wall. Any such puncture is likely to extend the existing dissection or create a fresh dissection. This will exacerbate the problem. An extended dissection will be harder to manage than the original dissection. Multiple dissections are harder to manage than a single dissection.' [27]

4.3. In Dr Heddle's first reported dated 13 November 2013 he put the question of survivability in this way. He said it was:

> 'Probable that she would have survived although … may have sustained substantial myocardial damage.' [28]

In Dr Heddle's oral evidence in May 2015 he referred to this assessment in his first report as follows:

> 'I was deliberately vague about prognosis in my report because the prognostic evidence for spontaneous coronary artery dissection is very limited at the present time.' [29]

Dr Heddle in his oral evidence made the following remarks about what might have occurred at angiography. It was possible that Mrs Selby-Fullgrabe's coronary artery could have been partially reopened (I assume he meant without stenting) and then a

[26] Transcript, page 288
[27] Exhibit C14b
[28] Exhibit C13
[29] Transcript, page 246

'medical approach to management' could have been adopted (I am assuming Dr Heddle was here referring to the use of medications rather than stenting or any other invasive medical procedure[30]). On the other hand, Dr Heddle said that if total occlusion was found at angiography and there was an area of ischaemia, it would be necessary to undertake either angioplasty and stenting, which he said was successful in two cases out of three, or a coronary artery bypass graft[31]. Dr Heddle made reference to an article reporting the result of a study by the Division of Cardiology at the Vancouver General Hospital, University of British Columbia, Vancouver[32] which is dated February 2015 and which Dr Heddle did not have when he wrote his first report in November 2013. Dr Heddle put the prospects of survival by reference to the Vancouver General Hospital study at 100%, but he qualified that by saying more likely 95% to 97%[33].

4.4. In cross examination Dr Heddle put the matter this way:

> '… my guesstimate, and it's only a guess … probably 90% chance of surviving.' [34]

The cross examiner pointed out to Dr Heddle that in his first report his opinion was only that survival was probable. Dr Heddle explained that when he wrote that report he did not have access to the latest information and added:

> 'It's highly probable that it would have been successfully stented, or two out of three chance anyway.' [35]

4.5. The Vancouver General Hospital study which caused Dr Heddle to express a more optimistic prognosis reported that:

> 'Initial mortality rates appeared to be over-estimated due to mainly post-mortem reporting and little ante-mortem data. A collection of case reports from 1980 to 2000 showed mortality rates ranging from 0% to 7%. More recent studies reported lower in-hospital mortality rates ranging from 1% to 5%. In our recent study, there was no in-hospital mortality in our 168 patient cohort. One-year mortality rates after discharge were similar, at 1% to 4%.'

I do note that the authors of the report say that female SCAD[36] patients potentially have a poorer prognosis. The report states under the heading 'Revascularization' that

[30] Transcript, page 262
[31] Transcript, page 262
[32] Exhibit C13a
[33] Transcript, page 264
[34] Transcript, page 297
[35] Transcript, page 298
[36] Spontaneous coronary artery dissection

in most cases conservative treatment is preferred for stable patients without ongoing pain. The report notes that in the authors' cohort, 80% were treated conservatively with good outcomes, that is without percutaneous coronary intervention. It also noted that the success rate with percutaneous coronary intervention for SCAD is poor compared with atherosclerotic lesions, and long-term durability with percutaneous coronary intervention was only approximately 30% in the authors' cohort. They note another study involving 43 SCAD patients who underwent percutaneous coronary intervention and that technical success was achieved in only 65% of those cases. The authors go on to note that percutaneous coronary intervention of dissected coronary arteries can be notoriously challenging and often terminate with suboptimal results. They note that it may be challenging to advance the coronary guidewire into the distal true lumen and that the intramural haematoma of the dissected segment can propagate antegradely or retrogradely with angioplasty, further compromising arterial blood flow and extending the dissection.

4.6. Professor O'Rourke expressed the opinion that Mrs Selby-Fullgrabe's prospects of survival were just below 50%, although he also expressed his agreement with Dr Heddle's opinion in his November 2013 report that she would 'probably' have survived. Assuming that Professor O'Rourke would accept a probability of survival of 50% and that Dr Heddle's first report in November 2013, where he expressed the opinion that Mrs Selby-Fullgrabe would 'probably' have survived, would place his then estimate at slightly above 50%, there is a significant difference between that estimation and Dr Heddle's opinion at Inquest. It will be recalled that at Inquest he spoke of figures of 95% to 97% in one passage[37], but in another he described a guesstimate, and only a guess, as 'probably 90%'[38].

4.7. It is clear that the high estimated percentage of survival in the Vancouver General Hospital report[39] included a wide range of patients including many who were conservatively managed. Dr Heddle himself drew a distinction between what might have been seen at angiography with the two possibilities being that Mrs Selby-Fullgrabe could have been conservatively managed if the occluded artery could be partially reopened on the one hand, and the need for stenting if there was total occlusion on the other. Conservative management may have yielded a higher

[37] Transcript, page 264
[38] Transcript, page 297
[39] Exhibit C13a

prospect of success according to the Vancouver General Hospital report, but it was common ground between Dr Heddle and Professor O'Rourke that angioplasty and stenting would have occurred – that is, she would not have been treated conservatively.

4.8. In the circumstances I am not prepared to accept that Mrs Selby-Fullgrabe's prospects of survival would, had the protocol been followed, have been as high as Dr Heddle estimated at Inquest. I would prefer to conclude that the chances of survival would have been at least more probable than not.

5. Conclusion

5.1. On any view Mrs Selby-Fullgrabe should have been treated according to the protocol. She should have remained at Wallaroo Hospital or been evacuated very shortly after approximately 4pm when the first opportunity arose to contact a cardiologist as required by the protocol. What is quite clear is that, on any view, Mrs Selby-Fullgrabe was deprived of the opportunity for survival that might have been available to her had the protocol been followed by Dr Marsh, or if Nurse Crosby had either persuaded Dr Marsh to recall Mrs Selby-Fullgrabe or procured the intervention of one of the other doctors, or even senior nursing staff who might have been able to put the situation back on track.

6. Recommendations

6.1. The iCCnet protocol is an excellent document and the system where remotely situated doctors can avail themselves of the advice of an on-duty cardiologist is excellent if it is duly implemented. I see no need to make any recommendations in this matter.

Key Words: Country Areas, Medical Services; Medical Treatment - Medical Practitioner

In witness whereof the said Coroner has hereunto set and subscribed his hand and Seal the 18th day of September, 2015.

State Coroner