QUEENSLAND COURTS

CORONERS COURT OF QUEENSLAND

FINDINGS OF INVESTIGATION

CITATION:	**Non-inquest findings into the death of RJH**
TITLE OF COURT:	Coroners Court
JURISDICTION:	BRISBANE
DATE:	13/08/2024
FILE NO(s):	2021/5874
FINDINGS OF:	Ainslie Kirkegaard, Coroner
CATCHWORDS:	CORONERS: health care related death; complex cardiac history; intravenous flecainide; small regional hospital; cognitive bias; lack of cardiology consult; hospital dispensary phone consultation service; guideline for intravenous flecainide prescribing & administration

Table of Contents

Background

1. RJH a 70-year-old woman who died at a small regional hospital on 27 December 2021.

2. Her death was reported to the coroner because it was thought to be health care related.

RJH's medical history

3. RJH's medical records show she had a significant cardiac history with heart failure, cardiomyopathy, coronary artery calcification, and paroxysmal atrial fibrillation. She also had hypertension, dyslipidaemia, ankylosing spondylitis, resolved colonic fistula, osteoporosis, and was a smoker. She was known to be anaphylactic to iodine. Her regular oral medications included flecainide 150mg daily (an antiarrhythmic medication), and rivaroxaban.

4. She had been treated by the relevant Hospital & Health Service cardiology service for her complicated atrial fibrillation and atrial flutter in the past, with difficulties maintaining rhythm control despite trialing multiple agents including metoprolol, digoxin, bisoprolol, and amiodarone. She had been treated with electrical cardioversion on two occasions and was referred to the Heart Failure Service with an ejection fraction of 40%, which improved to 60% in 2019.

5. RJH presented to the local hospital emergency department in rapid atrial fibrillation in October 2020 and was successfully reverted with two intravenous flecainide 150mg infusions. The treating Senior Medical Officer commenced her on oral flecainide and referred her for formal cardiology follow up. When reviewed by cardiology in December 2020, the oral flecainide was identified as a new medication. RJH had not had any recent symptomatic episodes of rapid atrial fibrillation and was in normal sinus rhythm. Given the challenging history of maintaining rate control, she was continued on oral flecainide as she was tolerating it well.

6. RJH was seen at further cardiology outpatient appointments noting she had no symptomatic episodes while on oral flecainide, was in sinus rhythm and recommended no changes.

7. She was discharged from the cardiology service in March 2021.

RJH's presentation to the small regional hospital emergency department on Christmas Day 2021

8. RJH presented to the local hospital emergency department on Christmas Day 2021 with nausea and fever with urinary symptoms. She was diagnosed and commenced on intravenous antibiotic therapy for urinary tract infection. She was also noted to be in atrial fibrillation, considered to have been triggered by the urinary tract infection, and was admitted for cardiac monitoring and electrolyte replacement. She was very teary when discussing the need to remain in hospital.

9. Blood test results from samples collected the following morning, 26 December 2021, showed an elevated white blood cell count with neutrophilia, indicative of an acute infection. RJH was medically reviewed at around 11:00am and assessed as having a urinary tract infection precipitating her atrial fibrillation. The treating team sought advice from the large regional hospital cardiology team regarding management of her atrial fibrillation. The Cardiology Advanced Trainee recommended RJH be given a further dose of her regular oral flecainide to attempt reversion and continue to treat the underlying cause. This was administered with little effect.

10. RJH's daughter visited her during that morning, noting she was feeling much better and hoping to be allowed to go home that day.

11. A blood culture collected at 10:20pm that evening showed no evidence of bacteraemia.

12. When medically reviewed the following morning, 27 December 2021, RJH remained in atrial fibrillation. Chest x-ray showed evidence of congestive cardiac failure with mild interstitial oedema. Blood test results showed the white cell count had returned to normal with evidence of a mild neutrophilia remaining. The results showed a B-type Natriuretic Peptide (BNP) of 644, which can occur in heart failure. RJH reported some shortness of breath when going up stairs. The treating

Senior Medical Officer decided to proceed with chemical cardioversion with intravenous flecainide, ordering intravenous flecainide 150mg x two doses that day, with a plan to rerefer RJH for consideration of ablation and rediscussion with cardiology if there was no improvement the following day.

13. RJH's daughter visited her that morning. She was feeling much better, back to her bubbly old self and making jokes with the staff.

14. There was limited pharmacy cover at the small regional hospital over the Christmas holiday period, so staff liaised with the after-hours nurse manager to source the intravenous flecainide from pharmacy stores.

15. RJH was transferred to the Short Stay Unit for more intensive monitoring during the flecainide infusion with more frequent vital signs and ECGs. The first intravenous flecainide infusion was commenced at 10:55am. RJH was happy to see her heart rate dropping with the first infusion. An ECG was taken. Nursing staff confirmed with the treating team that the second infusion could commence. It commenced at 11:16am. Within minutes and at the conclusion of the second infusion, RJH was noted to have an increased heart rate and she complained of tingling lips. A Code Blue was initiated. RJH was in cardiac arrest with ventricular fibrillation and ventricular tachycardia noted on cardiac monitoring. Unfortunately, despite emergency resuscitation efforts, RJH was unable to be revived.

16. The treating team attributed the death to an acute myocardial infarction but also queried the possibility of flecainide toxicity.

Autopsy findings

17. Autopsy revealed significant natural disease with emphysema, heart failure and at least moderate (borderline severe) coronary atherosclerosis of the circumflex artery and the moderate coronary atherosclerosis of the right coronary artery with microscopic evidence of chronic heart muscle. The pathologist identified hypertension, dyslipidaemia, obesity, and smoking as risk factors for coronary atherosclerosis, which in combination with obesity increased RJH's risk of cardiac arrest both independently and in the setting of heart failure and chemical cardioversion with flecainide. There was no strong evidence of anaphylaxis with no microscopic evidence of established oedema or mast cell degranulation in the upper airway. Toxicological analysis of hospital admission blood samples taken approximately 45 minutes before to the first flecainide infusion show RJH had flecainide in her blood at a therapeutic/non-toxic concentration. The post-mortem sample showed a concentration in the overlapping ranges of therapeutic/non-toxic and a potentially toxic concentration, raising the possibility that flecainide toxicity contributed to the death, though the pathologist observed that flecainide may exhibit post-mortem redistribution meaning postmortem blood samples may show an artefactually elevated result due to redistribution of the drug from the tissues into the blood following death.

18. Having regard to these findings in the documented clinical context, the pathologist determined the cause of death to be heart failure due to paroxysmal atrial fibrillation (treated with flecainide cardioversion) due to urinary tract infection against a background of coronary artery atherosclerosis, emphysema, and obesity.

Preliminary independent clinical review

19. An independent doctor from the Department of Health Clinical Forensic Medicine Unit reviewed the patient record and provided preliminary advice about the appropriateness of the decision to administer intravenous flecainide therapy.

20. The independent doctor noted RJH's fast atrial fibrillation had an identified precipitant in the form of fever and infection. She remained haemodynamically stable, meaning there was no obvious indication for chemical cardioversion of her atrial fibrillation which the independent doctor considered would probably resolve as the infection resolved.

21. The independent doctor noted there was no documented discussion with RJH or her daughter

indicating she was consented for the intravenous flecainide with the benefit of information about its relative risks and benefits.

Hospital & Health Services (HHS) clinical review outcomes

22. The relevant HHS subsequently reviewed the care RJH received at the small regional hospital.

23. The review noted RJH's complex cardiac history influenced the decision to commence her on oral flecainide and continue its use. It was noted that while flecainide may not be considered first line treatment for atrial fibrillation in a patient with a history of left ventricular function, given her left ventricular function had recovered on subsequent echocardiograms it wasn't an entirely unreasonable choice given RJH's history not being able tolerate other more favourable rate control agents. The review considered the decision to continue her on the flecainide given her tolerance and positive response was justifiable.

24. The review identified that historical successful use of flecainide to revert RJH's atrial fibrillation created an 'outcome bias' for the locum Senior Medical Officer who prescribed the intravenous flecainide as they had treated RJH previously with the same medication regime with a positive outcome. The review identified this cognitive bias led to a lack of appreciation of the current clinical picture, new contraindications and the risks associated with intravenous flecainide use.

25. The review team was critical of the advice given by the Cardiology Advanced Trainee on 26 December 2021 to give a further dose of oral flecainide 150mg when RJH's chest x-ray was reported as showing congestive cardiac failure with interstitial pulmonary oedema. It is not known what information the Cardiology Advanced Trainee was given about the chest x-ray findings or if they independently reviewed the imaging. While the decision to give this stat oral flecainide dose did not result in a negative outcome for RJH, the review team noted this this medication choice was likely not in her best interests at the time. The locum Senior Medical Officer was apparently not aware of the cardiology consult or advice that was followed. The review noted that junior medical officers at the small regional hospital are expected to communicate advice gained via consult and allow the Senior Medical Officer to make the clinical decision whether to follow the advice, as they are ultimately responsible for the patient. I am advised the medical officer orientation at the small regional hospital touches on clinical decision making and escalation for juniors and this instance was to be presented at a future Morbidity & Mortality meeting to discuss the potential impact of missed communication.

26. The review was critical of the lack of consultation with the regional cardiology service beyond this point, noting the decision to prescribe and administer the intravenous flecainide was made independently by the locum Senior Medical Officer. While there is no blanket expectation that cardiology will be contacted regarding all patients with a cardiac condition, or even prior to administering flecainide as a general rule, RJH's complex history was such it warranted a further cardiology consult call. The review recognised the locum Senior Medical Officer had successfully reverted RJH in the past with same medication and dose. It was also noted RJH had expressed a preference to avoid electrical cardioversion due to her previous experiences.

27. The recommended dose of intravenous flecainide is a single 150mg infusion and it is only the preferred agent in patients with normal left ventricular function. The review established that the locum Senior Medical Officer was not aware of the contraindication in prescribing intravenous flecainide in the setting of RJH's heart failure identified on recent chest x-ray. Nursing staff questioned the flecainide prescription, but the medical team gave the rationale the medication was safe as RJH had previously responded positively to the same dose.

28. There was limited pharmacy coverage at the small regional hospital over the four-day Christmas period. However, pharmacy advice was available via phone. Lack of pharmacy coverage meant a secondary safety net was not in place to independently assess the intravenous flecainide prescription. The review established that the small regional hospital clinicians did not use the phone consultation service from the large regional hospital's pharmacy dispensary due to limited knowledge of its availability. Had this service been accessed by them, the hospital pharmacist may have identified the unusual dose and instructions given for flecainide, combined with the lack of local protocol for its administration. This was a missed opportunity to have potentially changed the

outcome for RJH.

29. I am advised the locum Senior Medical Officer received feedback about this criticism of their clinical decision making and subsequently terminated their temporary contract with HHS.

30. The review established that in preparation for the infusion, nursing staff checked the monitoring required and appropriately recognised RJH required a higher degree of observation than could be achieved within the Acute Services Unit, so they negotiated a transfer to the Short Stay Unit.

31. The review noted, in hindsight, there was some ECG evidence that RJH's QRS was widening, and the QT segment was becoming more prolonged. This could have served as a potential red flag to clinical staff before commencing the second bag of flecainide. There was no documentation that the medical reviewed RJH between the two infusions. The prescriptions were written to given in succession. The dosage was unusual and there were no guidelines to prompt clinicians to assess RJH prior to the second infusion.

32. The review recommended promotion of the large regional hospital's Dispensary Consult Service at the small regional hospital.

33. The HHS subsequently developed and implemented a guideline for intravenous flecainide. The guideline makes it clear intravenous flecainide should be used with caution noting the various contraindications, adverse effects, and drug interactions; recommends discussion with a cardiologist prior to administration and if a repeat dose if required; carries a clear instruction to ensure it is administered only where cardiac monitoring and cardiorespiratory resuscitation equipment are available; and sets out requirements for ECG monitoring and nursing observations. The guideline took effect from 13 February 2023.

Expert cardiology review and opinion

34. Associate Professor David Colquhoun, private consultant cardiologist, reviewed the patient record and provided an independent expert opinion regarding the prescribing and administration of intravenous flecainide. In his opinion:

    1. urinary tract infection infrequently leads to more rapid ventricular rate of atrial fibrillation which in RJH's case was atrial flutter with 2:1 block;
    2. RJH's potassium was low, and lactate was present. Giving intravenous flecainide 300mg on top of background flecainide with an unknown serum level in a patient with atrial flutter significantly increased the risk of developing ventricular tachycardia;
    3. impaired left ventricular function is a contraindication to flecainide treatment and has been for decades;
    4. given RJH was haemodynamically stable with a blood pressure of 150mmHg systolic, it would have been useful to wait another 24-48 hours for her infection to come under control and in doing so, slow the heart rate down; and
    5. after three previous cardioversions, consideration should have been given to referral to a cardiac electrophysiologist with a view to radiofrequency ablation or the older treatments of AV node ablation and pacemaker insertion.

Findings required by s.45

Identity of the deceased – [deidentified]

How she died –

RJH died from complications of intravenous flecainide inappropriately administered for cardioversion in the setting of urinary tract infection. The locum Senior Medical Officer who prescribed this therapy did so without consulting the cardiology team and without understanding that RJH's congestive cardiac failure contraindicated the administration of flecainide therapy. The Senior Medical Officer had treated RJH with the same medication regime with a positive outcome

two years earlier. This cognitive bias likely led to them not appreciating her current clinical picture, new contraindications, and associated risks of pursuing the prescribed intravenous flecainide therapy at that time, despite nursing staff questioning the prescription. There was limited pharmacy coverage at the small regional hospital over the four-day Christmas period and local staff were not aware they could seek phone advice from the large regional hospital pharmacy dispensary. This situation created a missed opportunity for independent review of the unusual dose and instructions given for flecainide in the absence of a local protocol for its administration. I accept independent cardiology opinion that given RJH was haemodynamically stable, it would have been more appropriate to wait another 24-48 hours for her urinary tract infection to come under control.

I am satisfied the Hospital & Health Service has carefully reviewed the circumstances in which RJH received the intravenous flecainide therapy and since taken steps to provide its clinicians with guidance to its proper administration.

These findings have been shared with the Office of the Health Ombudsman.

Place of death – Small regional hospital.

Date of death – 27/12/2021

What caused her death - 1(a) Heart failure
1(b) Paroxysmal atrial fibrillation (treated with flecainide cardioversion)
1(c) Urinary tract infection
2 Coronary artery atherosclerosis, emphysema, obesity.

I close the investigation.

Ainslie Kirkegaard
Coroner
CORONERS COURT OF QUEENSLAND
8 August 2024