



CORONERS COURT OF QUEENSLAND

FINDINGS OF INVESTIGATION

CITATION: **Non-inquest findings into the death of Lenore**

TITLE OF COURT: Coroners Court

JURISDICTION: BRISBANE

DATE: 22 April 2024

FILE NO: 2022/573

FINDINGS OF: Ainslie Kirkegaard, Coroner

CATCHWORDS: CORONERS: health care related death; venous thromboembolism (VTE) risk assessment and management; standardised VTE risk assessment tool & practice; multidisciplinary safety net for VTE risk assessment and prophylaxis; rural and regional referral hospital

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Background

1. Lenore was a 48 year old woman who died at a Brisbane tertiary public hospital on 4 February 2022. She lived in a rural town.
2. Lenore's death was reported to the coroner as a potentially health care related death due to concerns about the management of her risk of developing venous thromboembolism (deep vein thrombosis/pulmonary thromboembolism).

Lenore's medical history

3. Review of Lenore's medical records shows she had a complex medical history including hypertension, irritable bowel syndrome, morbid obesity, chronic lower back pain, anxiety, depression and smoking. Lenore also had previous psychogenic nonepileptic seizures with left sided weakness and was known to a tertiary public hospital neurology team. She had been wheelchair bound for three years but with multidisciplinary treatment and support including neuropsychology she was able to walk again. Lenore was taking a number of regular prescription medications.
4. Her father had died recently.

Lenore's presentation to the rural hospital on 30 January 2022

5. Lenore played a round of golf on Sunday 30 January 2022. She was standing at the end of the game when she suddenly felt intense pain from her lower back radiating down her left leg to the knee causing her to drop to the ground. She was unable to move her left leg which felt numb. She was transported by ambulance to the local rural hospital emergency department. Her pain was such she required the 'green whistle' in the ambulance.
6. Lenore described intermittent waves of burning pain radiating to the entire thigh, which was causing her to cry out loudly while in the emergency department. Lenore had experienced a similar exacerbation of non-traumatic lower back pain three years earlier which responded to oxycodone and diazepam. Neurological assessment of her lower limbs noted full power on the right side but reduced power of the left lower leg with intermittent return to full power, not consistent with true weakness. Lenore was unable to walk. She received oxycodone and diazepam in the emergency department and was admitted to the ward for pain management pending x-ray of her hip and pelvis in the morning.
7. X-ray revealed no acute abnormality. When medically reviewed on Monday 31 January, Lenore was still experiencing constant sharp/shearing left hip pain radiating to the knee. Consideration was given to the possibility of nerve impingement or a musculoskeletal cause. Lenore was reporting 6/10 pain, requiring Endone 10mg with some relief in combination with hot and cold packs for temporary pain relief. She could only take a few steps due to increased pain on mobilising. CT scan of her lumbar and sacral spine revealed broad-based posterior bulging of the L3/4 disc and central board-based posterior protrusion of the L4/5 disc. The treating team spoke with the regional hospital orthopaedic team who initially recommended analgesia and physiotherapy and referral for follow up outpatient review in a fortnight's time.
8. A rectal exam performed that evening noted voluntary anal contraction and deep anal pressure. Lenore's pain worsened overnight requiring buprenorphine 200mcg with some effect. She mobilised to the toilet at around 3:00am and was given diazepam afterwards to help her sleep. Come the morning, Lenore told nursing staff she could no longer feel her legs and could not get up out of bed. She told the treating team she had sleep paralysis overnight. Neurological examination performed that morning identified a sensation deficit. Lenore was incontinent of urine, reporting she could not feel herself needing to urinate. The treating team were concerned about the possibility of cauda equina though Lenore's presentation wasn't really fitting that clinical picture. She did not feel it was the same as her functional neurologic disorder (FND). After further discussion with the regional hospital orthopaedic team. Lenore was transferred to the regional hospital emergency department for further investigation as the orthopaedic team were not yet willing to accept her for admission.

9. Lenore was transferred to the regional hospital the following day, Wednesday 2 February. Before leaving the rural hospital, her lower limbs were noted to be extremely heavy, she was reporting 6/10 pain and she continued to be incontinent of urine. She had no sensation at all when voiding her bladder.
10. When medically examined in the regional hospital emergency department, Lenore described sharp pain across her lower back radiating down both legs, worsened by movement. The pain resolved if she lay in bed, and she was unable to move either leg at all. Both legs felt numb compared to her upper body. Lenore reported normally having urinary incontinence but now she had no sensation when needing to urinate. She could not feel her lower abdomen. She was otherwise noted to be systemically well.
11. MRI scan of the lumbosacral spine performed that day reported mild intervertebral changes at L3/L4, L4/L5 and L5/S1. There was no substantial disc herniation, spinal canal or neural foraminal stenosis. The cauda equina had a normal appearance. No convincing cause was identified to account for Lenore's clinical presentation.
12. Lenore was still unable to move her legs at all. While her symptoms had not progressed, they had not improved. Lenore was admitted under the medical team with a suspected FND flare in the context of her recent bereavement. She was charted for simple analgesia with an instruction to avoid opiates. Lenore agreed to be seen by the consultation-liaison psychiatry team.
13. When reviewed by the medical team the next morning, Thursday 3 February, Lenore described her left knee having given away as pain shot through her body while she was talking with a friend. She reported the same thing had happened to her right leg a few days earlier. She felt numb from the umbilicus down. Lenore felt the pain she was now experiencing differed from that during her previous FND episode. However, after performing a neurological examination, the medical team felt her presentation was likely a relapse of her FND, noting that her positive moments of power and movement were promising for a good recovery. Given the rural hospital had a good physiotherapy team, it was considered reasonable for Lenore to return there for inpatient physiotherapy. Lenore was noted to be keen for this to occur.
14. Lenore was transferred back to the regional hospital that afternoon. She was admitted to the ward with the aim of getting her home as soon as she was able to mobilise again. She was charted for anti-inflammatory medication and paracetamol with heat packs for breakthrough pain. Lenore was wanting to avoid opiate medications. No observations were taken before she was transferred to the ward. She was planned for physiotherapy review in the morning.
15. Lenore was alert and sitting up in bed when she buzzed for nursing assistance at around 10:50pm asking to go to the toilet. She was assisted into a shower-chair and taken to the bariatric bathroom. Lenore asked to sit for a while, so the nurse left her in the toilet, checking on her periodically until Lenore indicated she was finished at around 11:15pm. Lenore asked for a new pad. The nurse went to get one but heard what sounded like Lenore dry retching or vomiting. The nurse immediately returned to the bathroom where she saw Lenore had stood herself up and pulled a bin over towards her. The nurse left to get a sick bag and Lenore continued dry retching for several minutes before becoming vague and then dropped forwards, unresponsive. The nurse immediately activated a Medical Emergency Team call. Lenore regained consciousness after supplementary oxygen was applied. She was transferred back to the bed, able to stand up and be helped back onto the bed before deteriorating acutely with respiratory arrest. Before becoming unresponsive again, Lenore indicated she was experiencing chest pain and shortness of breath. ECG showed no ischaemic changes. Lenore's pupils were dilated. CPR was commenced with multiple periods of return then loss of spontaneous circulation. More staff arrived to assist in the emergency resuscitation. Lenore was transferred to the emergency department where it was felt pulmonary embolism was the most likely cause of her collapse. She was administered clot-busting medication, tenecteplase, after which there was a return of spontaneous circulation. A bedside echocardiogram showed spontaneous heart movement and no obvious tamponade. Lenore was accepted for transfer to a Brisbane tertiary public hospital intensive

care unit for further management.

16. Lenore's body habitus meant she could only be transported to Brisbane by road. The plan was for emergency retrieval staff to be flown by helicopter to the rural hospital to facilitate the road transfer. However, the helicopter was diverted to a large motor vehicle accident, so the retrieval staff had to come by road instead.
17. Lenore arrived at the Brisbane tertiary public hospital on Friday 4 February and was admitted to the intensive care unit in a significantly shocked state requiring triple inotropes to support her blood pressure. She also had multiorgan failure. CT imaging showed multiple pulmonary emboli. Echocardiogram showed severe right ventricular failure resulting from the pulmonary emboli. Lenore was placed on VA-ECMO but her condition continued to deteriorate. Following discussion with the family about her poor prognosis, Lenore was transitioned to comfort measures. She died in the intensive care unit at 10:52pm on 4 February 2022.

Autopsy examination

18. Autopsy revealed pulmonary thromboemboli within small vessels of all lung lobes and deep vein thrombi within vessels of the left and right legs. Microscopic examination of the clots identified the pulmonary thromboemboli as acute and the clots within the left and right leg muscle as subacute. Neuropathology examination confirmed the clinical diagnosis of recent hypoxic ischaemic encephalopathy. Haematology testing did not identify any known prothrombotic genetic variant. Having regard to these findings in the context of the documented clinical history, the pathologist attributed the death to hypoxic ischaemic encephalopathy as a consequence of pulmonary thromboembolism originate from deep vein thrombosis against a background of obesity and smoking.

Preliminary independent clinical review

19. An independent doctor from the Clinical Forensic Medicine Unit within the Department of Health reviewed the patient records and identified that Lenore's risk of developing venous thromboembolism (VTE) appeared not to have been considered or managed by any of the treating teams at the rural and regional Hospitals over the five day period of her admissions between the two facilities prior to collapsing on her return to the rural hospital.
20. The independent doctor explained Lenore had multiple risk factors predisposing her to the risk of venous thromboembolism including morbid obesity, smoking and an ill-defined functional neurological disorder reducing her mobility to the point of becoming largely bedbound. There appeared to be no contraindication to commencing Lenore on VTE prophylaxis with low molecular weight heparin.

Regional Hospital & Health Service (HHS) clinical review outcomes

21. The HHS commissioned a root cause analysis (RCA) of the care Lenore received at the rural and regionals hospital preceding her death. This is a systemic analysis of what happened and why and is designed to make recommendations to prevent adverse health outcomes from happening again, rather than to apportion blame or determine liability or investigate an individual clinician's professional competence. It was conducted by a review team who had no involvement in the patient's care and informed by expert medical opinion.
22. The coroner received the RCA report on 2 August 2022.

VTE risk assessment was not performed at any stage during Lenore's three admissions

23. The review team recognised that while Lenore had a number of VTE risk factors including immobility, obesity and smoking which should have been appreciated by those caring for her at both facilities. There were three missed opportunities across the two hospitals for VTE risk assessment on admission as well as two additional missed opportunities at the time of each interhospital transfer to have actively considered and communicated Lenore's VTE risk.

There is no documentation to suggest this occurred at any stage in Lenore's clinical journey.

The efficiency of medical assessment at the rural hospital was prioritised over thoroughness due to high workloads

24. The RCA process identified that at the time of Lenore's initial admission to the ward to the regional hospital on 31 January 2022, the rostered medical team (comprising a single Senior Medical Officer and an intern) were required to review 21 patients on the ward in addition to being responsible for six patients in ambulatory care. This also coincided with the first day at the hospital for the new rotation of medical interns who have limited experience of clinical work and require close supervision and support. The RCA team recognised this combination of factors likely compromised the thoroughness of the medical team's patient review in order to ensure all 21 patients were medically reviewed that day.

No single standardised VTE risk assessment tool was implemented as standard practice within the HHS

25. The RCA review also highlighted two risk stratification tools in the then current HHS VTE procedure for medical officers assessing VTE risk, which when applied to Lenore's presentation, reached two different risk profiles. One tool assessed her as 'lower risk', not recommending thromboprophylaxis except where additional VTE risk factors are present (namely immobility, obesity and smoking) though there was no specific guidance on recommended thromboprophylaxis for patients with Lenore's risk profile. The other tool stratified Lenore as "low VTE risk" in which case "no VTE prophylaxis is indicated". This tool did not consider smoking or the expectation of significantly reduced mobility as risk factors. A third tool, the Padua VTE risk assessment model, was identified as being used by HHS clinicians but not mentioned in the clinical procedure document. Had it been used, it would have recommended pharmacological thromboprophylaxis be prescribed for Lenore. Consultation with medical officers at all experience levels across the HHS found that no VTE risk assessment tools were being used as part of daily practice; rather clinical judgement was being applied leading to unintended and undesirable variability in practice. Further, it was recognised that medical officers received minimal education about how to perform a VTE risk assessment, document the findings and manage a patient's VTE risk. This, in combination with variability in VTE risk assessment practice and the clinical procedure providing multiple tools to choose from, was considered to contribute to no VTE risk assessments having been undertaken and Lenore not receiving any VTE prophylaxis.

The multi-disciplinary safety net was hampered by staffing resources and care plan design

26. The RCA process identified that nursing staff and hospital pharmacists provide an informal multidisciplinary safety net for VTE risk assessment and prophylaxis. Hospital pharmacists review medication prescriptions and form medication action plans which position them to identify missed VTE risk assessments or inappropriate VTE prophylaxis. However, it was recognised that the pharmacy staffing models at many rural facilities do not allow all admitted patients to be seen by a pharmacist for medication review; rather admitted patients are seen on a risk basis according to their age, polypharmacy, high risk medication and comorbidities.
27. Nursing staff are required to review a patient's care plan and medication chart every shift. The RCA team noted that while the care plan template includes a section on cardiovascular assessment that addresses VTE prophylaxis, the design of the section could be improved to make it clearer for nursing staff to easily identify VTE prevention strategies in use (mechanical or chemical) or if a risk assessment has been completed.
28. The RCA review team and medical experts considered that had each of these factors been mitigated, it may have been outcome changing for Lenore.

Actions taken since Lenore's death

29. Following Lenore's death there was concerted effort made at the rural hospital to ensure the VTE prophylaxis section in the medication chart was completed and a deliberate decision

regarding VTE prophylaxis was made and clearly documented by the treating team. This was coupled with toolbox education sessions conducted by the hospital pharmacists. Nursing staff were supported and empowered to bring charts back to the admitting doctor for this to be completed if it was found to have been overlooked. Chart review audits undertaken at the hospital over 2022-2023 identified 90%-100% compliance with VTE risk established and recorded in the medication chart.

30. The HHS subsequently convened a multidisciplinary VTE working group to review its VTE risk assessment procedure with the objective of identifying an agreed risk assessment tool and when the assessment should be conducted and formalising the multidisciplinary team role in safety netting VTE risk assessment. A revised and updated Venous Thromboembolism Prophylaxis procedure has been developed which:
 - requires individual VTE and bleeding risk assessments to occur for all patients who present to the emergency department with lower limb injuries and for all medical, surgical, mental health, rehabilitation, maternity and palliative care patients within 12 hours of admission to hospital by a medical officer from the admitting team;
 - links clinicians to the interactive Queensland Health VTE risk assessment tool and other relevant resources via a single web page on the HHS intranet and the Med App for medical officers;
 - makes clear the admitting medical officer's responsibility for prescribing the required thromboprophylaxis in the VTE prophylaxis section of the patient's medication chart and for the risk assessment outcome and VTE prophylaxis plan to be documented in the patient flow system or EDIS;
 - requires nursing staff to discuss VTE risk and prophylaxis during clinical handover to ensure that thromboprophylaxis is being administered as prescribed;
 - requires patients to be monitored daily for signs and symptoms of DVT;
 - requires medical officers to review pharmacological VTE prophylaxis daily; and
 - requires reassessment of VTE and bleeding risk regularly as clinically appropriate as the patient's clinical condition or goals of care changes, at the patient or their carer's request, at transfer of care and on discharge.
31. The HHS Medication Safety Advisory Group has also implemented stickers being applied to charts to highlight when a patient's VTE risk assessment has not yet been completed.

Findings required by s.45

Identity of the deceased:

[deidentified]

How she died:

Lenore died from complications of venous thromboembolism over the course of five days following her initial admission to a rural hospital with sudden onset severe hip and leg pain with associated lower limb neurology on the evening of 30 January 2022, transfer to a regional hospital for MRI scan and return to the rural hospital for inpatient physiotherapy. There was no documented assessment of Lenore's risk of developing venous thromboembolism at any stage despite her multiple risk factors of obesity, smoking and significantly reduced mobility. There were five missed opportunities for her VTE risk to have been assessed and reassessed before she collapsed suddenly in the bathroom on the evening of her return to the rural hospital on 3 February 2022. The Hospital and Service commissioned a root cause analysis of the care Lenore received over the course of her clinical journey which identified several factors which in combination contributed to the failure by those caring for Lenore to assess and actively manage her VTE risk. Those factors included significant workload pressure on the initial admitting medical team at the rural hospital, inadequate clinical documentation and the lack of a standardised VTE risk assessment tool and assessment practices across the Hospital & Health Service. I am satisfied that work undertaken by the HHS in response to Lenore's death to develop and implement a revised Venous Thromboembolism Prophylaxis

procedure and improve clinician education and understanding of their respective roles in assessing, safety netting, implementing and reassessing patient VTE risk has resulted in system improvements that would have ensured Lenore was appropriately assessed within 12 hours of her initial admission to the rural hospital. However, it must be acknowledged that while VTE prophylaxis with anticoagulation and/or mechanical compression can significantly reduce the risk of clot formation, it does not completely eliminate the risk. As such assessment, documentation, monitoring and reassessment of Lenore's VTE risk would have significantly optimised her care but was not guaranteed to eliminate the risk that ultimately manifested for her.

Place of death:

Brisbane tertiary hospital

Date of death:

04 February 2022

Medical cause of death:

- 1(a) Hypoxic ischaemic encephalopathy, *due to or as a consequence of*
- 1(b) Pulmonary thromboembolism, *due to, or as a consequence of*
- 1(c) Deep Vein thrombosis

Other significant conditions:

- 2. Obesity, smoking

I close the investigation.

Ainslie Kirkegaard
Coroner
CORONERS COURT OF QUEENSLAND
15 February 2024