QUEENSLAND COURTS

CORONERS COURT

FINDINGS OF INVESTIGATION

CITATION:	**Non-inquest findings into the death of Mr M**
TITLE OF COURT:	Coroners Court
JURISDICTION:	Brisbane
DATE:	16 June 2016
FILE NO(s):	2015/2234
FINDINGS OF:	Ainslie Kirkegaard, Registrar
CATCHWORDS:	CORONERS: Investigation, apparent stroke presentation to emergency department; lysis therapy; changes to lysis protocol to prioritise notification of actual/potential stroke presentations to emergency department

Mr M was a 53 year old man who died at a tertiary hospital on 6 June 2015.

His death was reported to me by a tertiary hospital five days later after his case was examined at a multidisciplinary clinical meeting, the consensus of which was that his death did not need to be reported to the coroner. It was formally reported to me on 11 June 2015 on the decision of Deputy Director, Medical Services due to concerns that there was a missed opportunity to have administered lysis therapy.

Mr M's presentation to the tertiary hospital on 25 May 2015

Review of Mr M's medical records shows he presented to the tertiary hospital emergency department by ambulance on 25 May 2015 with an acute neurological event. His past medical history included squamous cell carcinoma removal from the left side of his neck with subsequent neck dissection in 2010. He was normally independent in his activities of daily living and had no other significant medical history.

At around 10:30am on 25 May 2015, Mr M collapsed after a sudden onset of dizziness and altered sensation in his left arm and leg. It took him half an hour to get to the phone to call an ambulance. The QAS records indicate the call was received at 11:03am, with an ambulance on scene at 11:49am. Paramedics were unable to access Mr M until 12:05pm as Mr M had to crawl to the door to let them in. On examination, Mr M had fluctuating symptoms which resolved spontaneously for approximately 15 minutes enabling him to follow commands and no speech problems.

Mr M was loaded into the ambulance at 12:53pm and transported to the tertiary hospital emergency department. Enroute to hospital, Mr M reverted to left sided hemiplegia and dysphasia with involuntary movements of primarily his right side. The ambulance arrived at the hospital at 1:05pm and was triaged in the emergency department at 1:15pm.

A CT head scan was ordered and was performed at 1:54pm. It was reported on by a radiologist at 2:46pm that there was no intracerebral bleed or cerebral lesion but suggested a MRI.

CT angiogram of the head and neck was performed at 3:01pm as the medical officer believed Mr M was exhibiting coordination problems and wanted to rule out possible posterior circulation issues or a dissection. This scan was reported on by a radiologist at 4:53pm noting blocked arteries within the brain (an ACA occlusion near the bifurcation of the superior and inferior branches) and unusual ACA anatomy.

At 3:09pm, the documented plan was for a CT head and Stroke Team referral. At this time, Mr M had showed positive cerebellar signs and decreased power on his left side. There was a concern that Mr M may be presenting with symptoms of a brain tumour given his history of neck cancer or a transient ischaemic attack (due to his fluctuating symptoms).

At 3:40pm, it was documented that Mr M's symptoms were improving, with only mild speech problems persisting (his limb function had returned) and ongoing frontal headache. There were no cerebellar signs at this time.

Mr M was reviewed by the neurology team at around 3:45pm who advised that based

on his signs and symptoms, he should be reviewed by the stroke team. The stroke team were contacted immediately. The stroke team registrar attended the emergency department and reviewed Mr M at approximately 4:00pm.

At 4:20pm, the stroke team documented their assessment in the medical record, identifying that the CTA had shown an ACA thrombus and outlining a plan to admit him under the care of Dr H for further management. He was placed on two-hourly observations and if there was any neurological change, to proceed to a perfusion scan for consideration of thrombectomy overnight. It was noted that Mr M was *"not in time limit. ACA thrombus quite high up. Can be reconsidered. L power 2/5"*.

The reference to intervention was a reference to lysis therapy, namely "clot busting" medication that can be used where there is a clinical diagnosis of stroke with measurable neurological deficits with an onset within the previous 4.5 hours.

At some stage the neurology consultant attended and reviewed the initial CT head scan and noted the presence of a clot on the scan which was identified on the subsequent CTA (performed an hour later).

At 4:45pm, the stroke team noted that Mr M's left and right power had improved to 4/5.

Mr M was admitted to the stroke unit at 9:00pm that evening and visited by his family. His left sided weakness continued to fluctuate.

Mr M's level of consciousness dropped at around 6:00am the next morning. A CT perfusion scan was performed which showed a fully formed ischaemic stroke in the ACA territory and possible embolic events. Neurosurgical intervention for clot retrieval was not possible and Mr M was to be managed medically.

Mr M's condition continued to deteriorate over the next few days with fluctuating neurology and ability to follow commands. An EEG confirmed status epilepticus which was treated with a variety of medications without improvement. After discussion with the family, Mr M's care was transferred to the palliative care team to commence comfort cares. Mr M died on 6 June 2015.

Delay in reporting Mr M's death to coroner

On 9 June 2015, an incident report was logged by a medical officer involved in Mr M's care identifying that Mr M potentially missed receiving lysis due to the Acute Stroke Team not being contacted in a timely manner.

This led to a multidisciplinary meeting being convened on 10 June 2015 involving medical officers from the emergency department, neurology, intensive care, general medicine and patient safety officers. The purpose of the meeting was to assess the severity of the reported incident. The meeting decided that the incident warranted formal clinical review to determine why Mr M was not referred to the Acute Stroke Unit in a timely manner as the referral process was considered to be normally done very well.

Mr M's case was then presented to the hospital's Clinical Governance Unit Complex Case meeting on 11 June 2015, the outcome of which was that the reported incident

should be classified as a serious clinical incident and Mr M's death should be reported to the coroner.

Preliminary independent clinical review

I arranged for an independent doctor from the Department of Health Clinical Forensic Medicine Unit to review the patient records and provide advice about the appropriateness of Mr M's clinical management.

The reviewing doctor noted there was no reference in the medical record to when Mr M arrived in the emergency department. Assuming he arrived prior to 1:00pm, there were 2.5 hours in which to decide to use lysis therapy, this period of time encompassing medical review, ordering the CT head scan and consulting the stroke team. This process appeared to have taken 3.2 hours instead.

Mr M was reviewed by the stroke team registrar at 4:20pm, with the 4.5 hour lysis "window of opportunity" ending at 3:30pm.

The reviewing doctor commented on the confounding issue of Mr M's improving symptoms as the exclusion criteria for lysis therapy indicate that "symptoms rapidly improving or minor symptoms" are clinical indicators not to administer lysis. The reviewing doctor acknowledged that Mr M did experience improved neurological symptoms but it was not clear how quickly his symptoms improved.

It was not clear from the medical notes what intervention was to be "reconsidered" by whom or what symptoms or signs would flag the need for this intervention.

The reviewing doctor concluded there was a missed opportunity to provide lysis therapy because although the lysis timeframe was exhausted by the time Mr M was reviewed by the stroke team, lysis therapy can still be used in the emergency department.

Inability to proceed with coronial autopsy

A coronial autopsy was not performed because Mr M's body was cremated on 12 June 2015 without coronial permission. This occurred due to a combination of the delay in Mr M's death being reported to the coroner the day before the funeral service, and the funeral director's error in proceeding with cremation despite being made aware of coronial involvement by both the hospital and the coronial counsellor. The independent doctor engaged by the funeral director issued a cremation permission under the *Cremation Act 2003* without being made aware of coronial involvement. This sequence of events caused significant unnecessary additional distress to Mr M's family.

The funeral director subsequently clarified the sequence of events and advised it had since reviewed its procedures for when after-hours staff deal with notifications from hospitals of coronial involvement.

Internal clinical review outcomes

The tertiary hospital undertook an internal clinical review of the care provided to Mr M on 25 May 2015.

The clinical review noted that:

- by the time Mr M was reviewed by the stroke team registrar at 4:00pm, the timeframe for the administration of lysis had passed (4.5 hours was up at approximately 3:00pm based on when Mr M reported his symptoms to have commenced)
- given Mr M's age and medical history, he would more than likely have received lysis if he was still in the timeframe and had met all other criteria
- Mr M was exhibiting rapidly fluctuating neurological symptoms which excluded him from receiving lysis under the Lysis Protocol
- the ACA thrombus was in a site that was difficult to access and the likelihood of success was reduced with a high risk
- it was uncertain if treatment with lysis would have changed the outcome for Mr M
- lysis is only ever initiated under advice from the stroke team and never by the emergency department doctors themselves (current practice undertaken at the tertiary hospital as per the hospital's Lysis Protocol)

The clinical review report outlined the normal process for presenting stroke patients as follows:

- in some cases, paramedics call ahead to notify the hospital that they have a potential stroke patient but this is only normally done if the patient is coming from out of the area – this is not a formally documented procedure
- on arrival, the treating doctor is alerted by the triage nurse that a potential stroke patient is in the emergency department
- if the patient meets lysis criteria, the stroke team is contacted immediately and an urgent CT head is performed to rule out haemorrhage
- the patient is generally reviewed by the stroke team while the CT head scan is taking place which allows them to review the scans at the same time – in Mr M's case, a CT head (?CVA noted on the request form) was performed soon after admission, followed by a CTA head and neck (?dissection on the request form)
- once it is determined that a patient is eligible for lysis, the stroke team takes over the patient's care, obtains consent and chooses the medication to be used. The lysis infusion is done in the emergency department but under the care of the stroke team

The clinical review concluded that Mr M experienced a delay in being referred to the Acute Stroke Unit upon presenting with fluctuating neurological symptoms. The initial emergency department opinion was that he was not a candidate for thrombolysis according to the hospital's lysis protocol. It appeared that his fluctuating symptoms meant that an early definitive diagnosis was not made and delayed a request for a consult by the Acute Stroke Unit. By the time the Acute Stroke Unit was called to review Mr M, the timeframe for potential lysis therapy had passed.

The clinical review recommended that a formal process be developed to ensure all actual or potential stroke patients (requiring lysis or not) are discussed with the Acute Stroke Team immediately on admission to the emergency department and that the possibility of lysis treatment can be potentially determined by telephone discussion with the Acute Stroke Unit.

Implementation of clinical review outcomes

On 8 June 2016, the tertiary hospital advised me of its progress in the status of its implementation of the clinical review recommendations. I note that the Director, Acute Stroke Unit is leading a review of the management of emergency stroke presentation and 'plans for improvement are progressing'. The Emergency Department and the Acute Stroke Team are working together to improve timely assessment and early management. The team is introducing a 'code stroke' initiative designed to streamline the admission of stroke patients through the Emergency Department. The Queensland Ambulance Service is also participating in this review process which is ongoing.

I was also provided with copies of the tertiary hospital Stroke Clinical Pathways: *Lysis Protocol and the Transient Ischaemic Attack and Acute Ischaemic Stroke < 4.5 hours (TIA/stroke)*. I note that both documents clearly outline the requirement to contact the Acute Stroke Team on the patient's presentation to the emergency department. At my request the independent reviewing doctor reviewed both documents and advised the clinical pathways were reassuring as they addressed issues around requesting appropriate radiological investigations (namely contrast studies/angiography) as a routine; immediate referral pathways and ongoing management and frequency of observation.

Conclusion

Mr M died from natural causes in circumstances where there was a missed opportunity for potential thrombolysis during the course of his emergency department management arising from a delay in referring him to the Acute Stroke Unit for assessment. However, even had Mr M been reviewed by the Acute Stroke Team earlier, his fluctuating neurological symptoms would likely have excluded him from lysis therapy and even had lysis therapy been instituted, it cannot be said with any certainty that it would have prevented his death. I am satisfied that the tertiary hospital has carefully reviewed Mr M's clinical management and is actively implementing changes in the emergency department to prioritise notification of all actual or potential stroke presentations to the Acute Stroke Unit for advice at the time of admission. I am satisfied these procedural changes will optimise opportunities for potential thrombolysis in patients who meet the clinical criteria for this therapy.

Findings required by s. 45

Identity of the deceased – Mr M

How the person died: Mr M died from natural causes in circumstances where there was a missed opportunity for potential thrombolysis during the course of his emergency department management arising from a delay in referring him to the Acute Stroke Unit for assessment. However, even had Mr M been reviewed by the Acute Stroke Team earlier, his fluctuating neurological symptoms would likely have excluded him from lysis therapy and even had lysis therapy been instituted, it cannot be said with any certainty that it would have prevented his death.

Place of death – A tertiary hospital, Brisbane

Date of death– 6 June 2015

Cause of death – 1(a) Bilateral ACA stroke

Ainslie Kirkegaard
Registrar
16 June 2016

Queensland Government

[redacted]

Enquiries to: Patient Safety & Quality Team
Attn: [redacted]
Telephone: [redacted]
Our Ref:
Date: 20 July 2017

Ainslie Kirkegaard
Coronial Registrar / Office of the State Coroner
Department of Justice and Attorney-General
GPO Box 1649
Brisbane QLD 4001

Dear Ms Kirkegaard

Re: Code Stroke Initiative
Mr [redacted] M[redacted] - Coronial Reference number: 2015/2234

Please find the additional information required to confirm completion of the recommendations from the clinical review for the care provided to Mr [redacted] M[redacted] as outlined in the attached letter sent by the [redacted] Hospital on the 7th June 2016.

The recommendation states:

That a formal process be developed to ensure all actual or potential stroke patients (requiring lysis or not) are discussed with the Acute Stroke Unit team immediately on admission to ED. Decisions regarding potential stroke patients and the possibility of lysis treatment can be potentially determined by telephone discussion with the Acute Stroke Unit.

I can report that the recent review of the management of emergency stroke presentations, led by the Director of the Acute Stroke Unit has been finalised. The Emergency Department and the Acute Stroke Team have worked together to improve timely assessment and early management for patients presenting with stroke symptoms. The team have introduced a "code stroke" initiative that will streamline the admission of stroke patients through the Emergency Department.

Please find a copy of the [redacted] Hospital Code Stroke Protocol attached. If you would like any further information please contact [redacted] - Patient Safety Advisor on [redacted]

Yours sincerely

[redacted]

A/Executive Director Medical Services
[redacted]

Queensland Government

[redacted]

Code Stroke Protocol

Triage Assessment or QAS Pre-notification

FACE	Is it drooping?
ARMS	Can they raise both arms?
SPEECH	Is it slurred, incorrect/jumbled words (dysphasia) or unable to speak?
TIME	Time of onset <6 hours

Check for Exclusion Criteria:

Unclear time of onset and last seen well ≥ 6 hours ago

Stroke while asleep and last seen awake and well ≥ 6 hours ago

YES

Non Contrast CT Brain
ED assessment and management and decision re referral to Stroke Team

No Exclusion Criteria

Notify ED Consultant (A1 or P1) on [redacted] to activate Code Stroke

Patient Registration:

Quick Registration (and HBCIS) process by Triage as patient moved to CT scanner table or Resuscitation Room

Triage Nurse to notify ED Resuscitation Coordinator [redacted] when complete – so medical officer can order CT (CT Brain – non-contrast, CT brain perfusion scan and CTA of head and neck)

DO NOT WRITE IN THIS BINDING MARGIN

- ED Consultant activates CODE STROKE via:
    - Call to Switch [redacted]'
    - States 'CODE STROKE – ETA x minutes'
    - CODE STROKE Group Page to – Stroke Consultant, Stroke Registrar, Stroke Nurse, Stroke Resident (all to attend), CT Radiographer (clear CT table), Radiology Reg on call.
    - ED Consultant to ensure Triage and ED Resuscitation Coordinator aware of impending arrival
- From Triage patient progresses to the following as an ATS Category 2:
    - CT scanner table if available (off-loaded from QAS to scanner table)
    - If CT scanner table occupied – QAS off-load to an available Resuscitation Room (preference for Room 1 or 2) – move to CT room as soon as becomes available
    - If immediate airway intervention is required – patient to progress to a Resuscitation Room for assessment and management of airway and breathing as indicated
- Patient assessment and management:
    - ED and Stroke Team in attendance (ED Consultant, Registrar, Resident, Resus Nurses, Stroke Consultant , Registrar and Stroke Nurse)
    - Stroke Team to clarify history and conduct neurological examination (NIHSS)
    - Stroke Reg to check that CT table is cleared and to order CT brain. CTA head and neck, and CT perfusion.
    - Stroke Resident to collate as much collateral information as possible by searching ieMR, the Viewer, AUSLAB. If no information is available attempting to contact the GP and acquire a health summary (verbal as well as written) and/or patient's pharmacy to clarify if the patient is taking any anti-coagulants (if the patient is unable to communicate this).
    - ED Team to place patient on cardiac monitoring, check BSL, obtain IV access x2 18G (avoid right cubital fossa if possible) (Bloods sent for FBC, CHEM20, INR, Group and Hold, βHCG for females of childbearing age), Resus Nurse to bring Stroke Kit box to CT scanner room
- CT Brain, CT perfusion, and CT Angio of head and neck: Stroke Team to make decision re thrombolysis based on the non-contrast CT Brain images, whilst the perfusion images are being processed and patient to follow one of the 3 following care pathways:
    1. Patient not for Thrombolysis or Endovascular Clot Retrieval (ECR)
    2. Patient for Thrombolysis
    3. Patient for Endovascular Clot Retrieval (ECR)

1. Patient not for Thrombolysis or Endovascular Clot Retrieval (ECR)

- This may be due to contraindications, resolution of symptoms, or alternate diagnosis reached.
- Code Stroke Terminated
- Patient continues with usual ED assessment and management.

2. Patient for Thrombolysis

- Verbal consent for thrombolysis obtained from patient / family by Stroke Consultant
- Thrombolysis commenced in CT room (patient to remain on CT table):
  - Alteplase prescribed by Stroke Reg
  - Alteplase bolus dose drawn up by Stroke Nurse
  - Alteplase infusion, giving set,& infusion pump prepared by Resus Nurse

- **If the patient requires Endovascular Clot Retrieval please progress directly to box below.**

- **If the patient does not require ECR:**
- Patient moves to ED Resuscitation Room and continues Alteplase infusion
- Admission completed by Stroke Team
- Bed Booking form completed by Stroke Resident
- Stroke Nurse to phone bed manager ([redacted]) to notify requirement of 2C HDU bed
- Patient suitable for transfer to Neurological HDU one (1) hour post completion of Alteplase infusion (Patient needs to remain in resus for minimum 2 hours post Lysis commencing).
- Patient receives post thrombolysis cares as per [redacted] thombolysis protocol: http://[redacted]

3. Patient for Endovascular Clot Retreival (ECR)

- If there is evidence of a clot amenable to ECR the results of the CTA brain and CT perfusion scan to be discussed with Interventional Radiologist by Stroke team and decision made regarding progression to ECR from the CT room (or resuscitation room if delays)
- For patients suitable for proceeding to ECR:
  - Interventional Radiologist notifies IR Team and Anaesthetist ([redacted] from 8am to 5pm Monday to Friday, after hours call [redacted]).
  - Stroke Reg to do ECR consent form with patient/family.
  - Stroke Resident to submit electronic request for AF clot retrieval
  - Patient transferred by ED staff and Stroke Team to IR for hand-over to Anaesthetic Team
  - Stroke Nurse to phone bed manager ([redacted]) to notify requirement of 2C HDU bed versus ICU bed (to be determined post ECR) and notify ED team leader.
  - Anaesthetist to notify ICU if ICU bed required post ECR (ICU SR 7185)

DO NOT WRITE IN THIS BINDING MARGIN