Lessons for Learning
Chest Pain

Background

The Clinical Excellence Commission (CEC) Serious Incident Review (SIR) Sub-Committees consist of multidisciplinary clinicians who review serious incidents to identify key learnings, emerging risks, and patient safety issues with broader implications. One of their key roles is to recommend actions to mitigate potential patient safety risks.

What reviews are telling us: System-level challenges involving chest pain presentations

The Clinical Management SIR Sub-Committee has identified recurring themes involving the **assessment, diagnosis and management of chest pain** in adults. This resource has been developed to support clinicians and healthcare services by sharing learnings, case insights, and practical strategies to strengthen clinical responses and promote system improvements. Serious incident reviews have identified the following learnings:

Structured assessment and risk stratification: Using the Pathway for Acute Coronary Syndrome Assessment (PACSA) and the Emergency care assessment and treatment (ECAT) protocols support systematic assessment of chest pain, ensuring critical conditions such as acute coronary syndrome (ACS), pulmonary embolism, pleural effusion, and aortic dissection are considered. Structured history-taking, timely electrocardiogram (ECGs) and assessment, timely troponin testing, and the need to reassess when symptoms persist or recur are essential during assessment and diagnosis processes.

Timely investigation and escalation: Rapid acquisition and review by a clinician who can interpret the ECG within 10 minutes of clinical contact and repeating tests when clinically indicated are essential for detecting evolving ACS. Senior review and escalation pathways should be activated when symptoms persist or deteriorate, ensuring timely intervention.

Broad differential diagnosis: The presence of chest pain requires maintaining a wide differential beyond ACS, including pulmonary embolism, aortic dissection, pericarditis, pneumonia, musculoskeletal and gastrointestinal causes. It is imperative to initially exclude acute coronary occlusion (MI), given the potential for rapid deterioration. Considering patient risk factors and using clinical decision-making tools can guide appropriate investigations and reduce diagnostic error.

Safety-netting and discharge planning: Providing clear, understandable information on red flags, symptom monitoring, the importance and timeliness of any recommended outpatient assessment and when to return to hospital, is critical to preventing harm and is important to include in discharge and follow-up instructions for patients.

Standardised pathways: Factors such as cognitive biases toward non-cardiac causes and pressures in busy clinical environments contribute to diagnostic error, missed deterioration and delayed treatment. System design that embeds standardised pathways, clear escalation pathways, education on atypical presentations and promote reflective practice when things go wrong are essential to support safe practice.

Key messages for safer practice

- **Utilise the PACSA to assess chest pain systematically**
- **Ensure timely 12-lead ECG and clinical interpretation within 10 minutes of first clinical contact for suspected ACS, and repeat as indicated if symptoms persist**
- **Maintain a broad differential diagnosis for chest pain**
- **Reassess and escalate when patients re-present with persistent or worsening symptoms or when clinical conditions change**
- **Provide clear safety-netting and discharge instructions, ensuring patients understand when to return to hospital if symptoms persist or worsen**

Case 1: Missed cardiac risks factors resulting in STEMI

A patient presenting with headache radiating to their jaw and feeling of chest pressure was placed on the 'cardiac pathway'. An ECG was performed, which was assessed as normal sinus rhythm with no acute changes and troponin within normal limits. Following this incomplete assessment they were discharged within one hour of presentation. Two days later the patient represented with central chest pain and the pre-hospital ECG showed evidence of an anterolateral ST-segment elevation myocardial infarction (STEMI). The patient went into cardiac arrest and was unable to be resuscitated.

Repeat ECG and troponin levels when indicated

Lesson: Use the PASCA to guide clinical decision-making, risk assessment, and management of patients presenting with cardiac symptoms (including chest pain). Repeat ECGs at 2 hours and more frequently if symptoms persist or there is haemodynamic instability. Repeat troponin testing at 2 hours for high-sensitivity tests or at 6 hours for standard point-of-care tests. These serial assessments support safe discharge decisions.

Case 2: Pulmonary embolism post viral infection

A patient presenting with chest tightness, breathlessness, and low oxygen saturations after a recent viral infection, had an ECG and chest X-ray which were unremarkable. The patient's symptoms were attributed to post-viral respiratory effects, and they were discharged. Over the following days the patient continued to experience ongoing breathlessness and chest discomfort. The patient suffered a collapse at home and resuscitation attempts were unsuccessful. Cause of death was identified as a pulmonary embolism secondary to deep vein thrombosis.

Maintain a high index of suspicion for VTE in post-viral patients

Lesson: Maintain a high index of suspicion for venous thromboembolism in post-viral patients with persistent dyspnoea, the limitations of single-point assessments, and the need for clear, documented safety-netting (red flags, symptoms to monitor, when to represent to hospital) and escalation advice.

Case 3: Progression from pericarditis to empyema

A young patient presenting with sharp, pleuritic chest pain was diagnosed with pericarditis, commenced on colchicine and discharged with outpatient follow-up. The patient re-presented multiple times over the next week with worsening chest pain and breathlessness. Repeat assessments noted ongoing symptoms and increasing chest X-ray opacities. They were managed with analgesia and outpatient care. On the patient's third presentation, they were found to have a large pleural effusion which was diagnosed

Re-evaluate diagnoses when symptoms persist or worsen

as pneumonia complicated by empyema requiring intercostal catheter drainage and surgical decortication.

Lesson: Re-evaluate diagnoses when symptoms persist or worsen. Consider the potential for progression to secondary infections and the necessity of timely escalation to advanced imaging and specialist review in young patients with persistent chest pain.

Reflective prompts for teams and services

Consider these prompts during clinical governance meetings, Safety Huddles, Morbidity and Mortality Meetings, and local quality improvement planning:

How do we ensure the consistent use of the PACSA in assessing all patients presenting with chest pain?	Recognise that the PACSA will reduce cognitive load and potential for diagnostic error, support robust clinical decision making, and standardise practice across all NSW health services.
When might we need to broaden our differential diagnosis for chest pain beyond ACS, and what clinical features prompt this?	Consider differential diagnoses when symptoms fail to improve as expected, patients re-present or investigations are inconclusive. Consider repeating investigations when clincally indicated.
How do we ensure repeat ECGs and troponins are performed when symptoms persist or clinical conditions change?	In line with the PACSA, perform second troponin test for point-of-care testing and repeat ECGs if ongoing symptoms and prior to decision to discharge.
What processes are in place to provide clear, understandable discharge advice and safety-netting to patients with chest pain?	Provide clear safety-netting and discharge instructions, ensuring patients understand when to return to hospital if symptoms persist or worsen.
How do we support clinicians in managing cognitive load and maintaining structured assessment during busy periods to reduce diagnostic oversight?	Be aware of personal and system factors that increase your cognitive load. Use appropriate clinical tools and ask for a senior colleague to review for a second opinion to help reduce load.

Resources

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