



LEARNING MATTERS

EDITION 24  
JANUARY 2024

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Acute Limb Ischaemia

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Management of Headache Presentation;  
Subarachnoid Haemorrhage

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Low Threshold for CT Scanning  
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**W**elcome to edition 24 of the Learning Matters Newsletter. Health and Social Care in Northern Ireland endeavours to provide the highest quality service to those in its care. We recognise that we need to use a variety of ways to share learning therefore the purpose of this newsletter is to complement the existing methods by providing staff with short examples of incidents where learning has been identified.

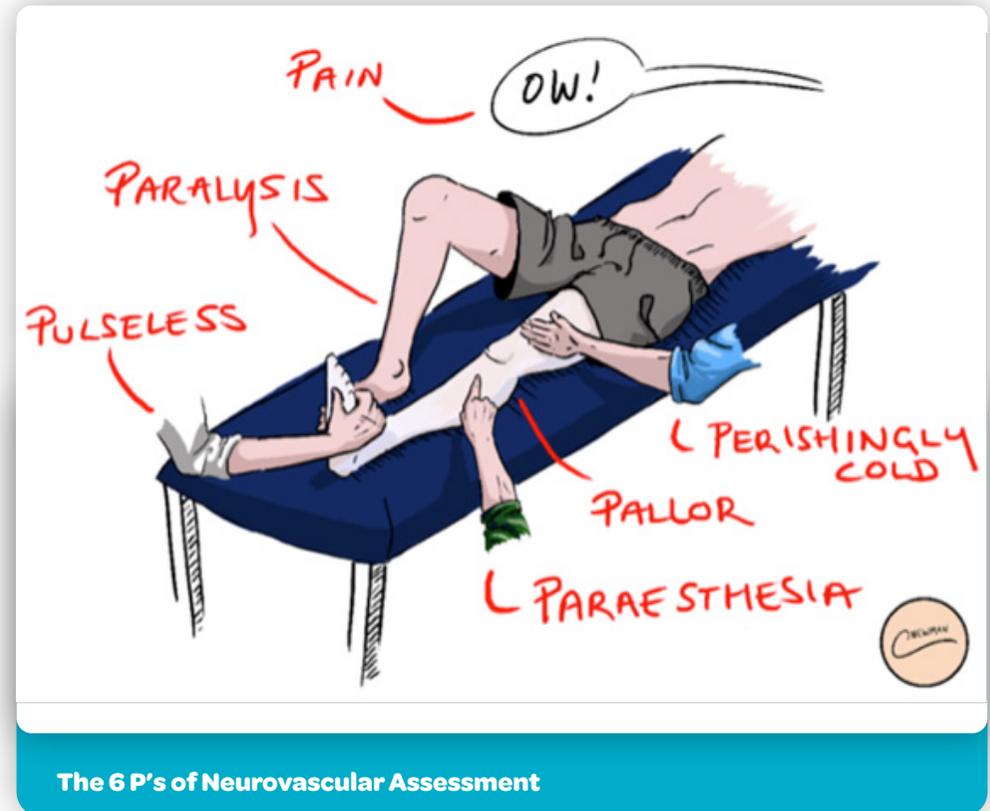


## Acute Limb Ischaemia

### Summary of Serious Adverse Incident (SAI)

A patient attended the Emergency Department (ED) complaining of pins and needles at the top of their leg, with grey discoloration and toes cold to touch. The patient had a history of disc prolapse and previous sciatica like symptoms. On examination by the ED doctor, a diagnosis of sciatica was made and the patient was discharged with analgesia and request for the General Practitioner (GP) to refer for neurological review.

Five days later the patient reattended the ED with an obvious cold white limb. They were referred urgently to the vascular service and had surgery for clot removal, however two days later they experienced a heavy bleed and further surgery was required for above knee amputation.



The 6 P's of Neurovascular Assessment

The findings from the Serious Adverse Incident (SAI) review confirmed the initial examining doctor recorded a thorough examination, however the previous history of disc prolapse influenced the differential diagnosis of referred pain and the possibility of a vascular cause of the symptoms was not explored.



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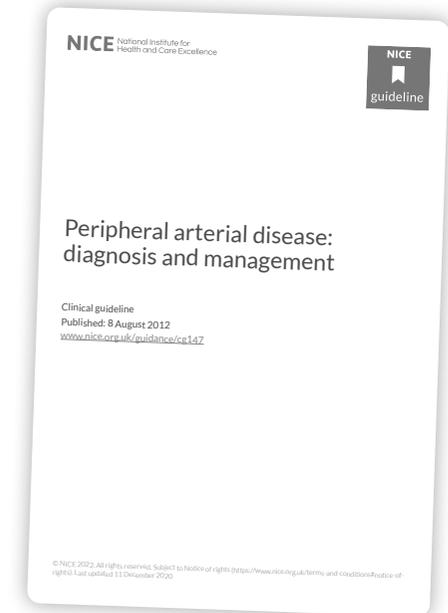
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## KEY LEARNING

**Key learning related to this SAI** is provided by the Royal College of Emergency Medicine; Acute Limb Ischaemia Guidelines (2022) available at: [Acute Limb Ischaemia - RCEMLearning](https://www.rcem.ac.uk/learning/acute-limb-ischaemia/).

- ✓ Acute limb ischaemia carries a high morbidity and mortality (level 4 evidence).
- ✓ Classical signs (6 P's) of acute limb ischaemia may be attenuated in a patient with pre-existing peripheral arterial disease and collaterals.
- ✓ Few patients present with simple embolus without underlying peripheral arterial disease (level 4 evidence).
- ✓ All patients with suspected acute limb ischaemia should have arterial Doppler examination performed (level 5 evidence).
- ✓ All patients with acute limb ischaemia should receive analgesia, heparin and oxygen (level 5 evidence).
- ✓ Assessment of sensorimotor deficit helps determine the urgency of intervention (level 4 evidence).
- ✓ Patients with no or mild sensory loss should proceed to formal imaging (usually angiography) prior to intervention (level 5 evidence).
- ✓ Patients with motor deficit may proceed to theatre for intervention with on-table imaging (level 5 evidence).
- ✓ Patients with fixed skin mottling and complete paralysis have signs of an unsalvageable limb: in these patients revascularisation is dangerous and the choice is between amputation and palliation (level 4 evidence).
- ✓ There is no evidence to support the use of thrombolysis over surgery in the management of the acutely ischaemic limb (level 1a evidence).
- ✓ Beware the patient with a popliteal aneurysm and a history of acute limb ischaemia: a thrombosed popliteal aneurysm carries a 50% risk of amputation (level 4 evidence).<sup>1</sup>



1 NICE guideline for peripheral arterial disease: diagnosis and management. Clinical guideline [CG147] 2012 (updated: 11 December 2020) - <https://www.nice.org.uk/Guidance/CG147>



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# Management of Headache Presentation; Subarachnoid Haemorrhage

## Case Studies

Three Serious Adverse Incidents (SAIs) were reported related to patient presentation of severe headache, where a subarachnoid haemorrhage (SAH) diagnosis was either not considered or delayed. A summary of the SAIs is provided below, for the purpose of sharing the current Guidance and key learning related to this important and often life-threatening clinical presentation.

**PATIENT A** was brought in by ambulance complaining of sudden onset headache, having vomited once, neck pain and heaviness in their legs. A locum middle grade doctor assessed the patient as FAST (Face, Arms, Speech, Time) negative, no photophobia and feeling very weak overall. The patient was alert and orientated, pupils equal and reacting to light, power 5/5, normal gait/coordination and no focal neurology. The doctor discharged the patient with safety net advice; advising GP review and to return if worsening headache, FAST positive or any further/new concerns.

The next day the patient attended by ambulance having been found unresponsive in bed. The patient was intubated and ventilated in ED and a CT scan was undertaken which showed a **subarachnoid haemorrhage** resulting from a 5mm anterior communicating artery (ACA) aneurysm.

The patient underwent emergency surgery and was managed post-operatively in intensive care and then transferred to a rehabilitation unit.

**PATIENT B** attended the ED by ambulance following referral by the GP out of hours, complaining of sudden onset of headache and vomiting, from the previous day. Following clinical assessment, investigations (including CT brain) and treatment by the emergency medicine, general medicine and acute medicine

teams, the patient was discharged home the following day with a diagnosis of migraine.

The patient re-attended the ED two weeks later having had a seizure in the context of a persistent headache. Following clinical assessment, investigations and treatment by the emergency medicine and critical care teams, the patient was transferred to the regional neurosurgical team with a diagnosis of an **extensive sub arachnoid haemorrhage with hydrocephalus** and underwent coiling of a left posterior communicating artery aneurysm.

**PATIENT C** presented to the ED following a collapse episode at home, loss of consciousness, seizure activity, incontinence of urine and faeces, persistent vomiting and headache. The patient was hypertensive in ED with no significant findings on examination. Given Patient C's history, a CT Brain, CT Spine and bloods were performed and reported as normal. The case was discussed with the ED consultant and given the history; a diagnosis was made of first seizure. The patient was discharged home with the GP to refer to neurology.

Eight days later Patient C re-attended the ED via ambulance following a collapse episode at home. A CT brain was performed which showed a **large volume sub arachnoid haemorrhage** and CT angiogram showed an **intracranial aneurysm**. Anaesthetics were present and Patient C was transferred to the regional ICU for neurosurgical opinion. No intervention was offered based on the radiological findings and clinical severity. Sadly, brain stem tests confirmed brain stem death.

**On subsequent review of the initial CT scans for patient B and C, there were subtle signs of subarachnoid haemorrhage.**



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### Current Guidance Related to these Case Studies

- ▶ The Royal College of Emergency Medicine (RCEM) [Guideline for the Management of Lone Acute Severe Headache](#)<sup>2</sup> (2009) is applicable to all three case studies. The RCEM also provide a very useful learning article on [Primary Headache](#)<sup>3</sup> (2022). The Primary Headache guideline highlights red flags and outlines that 90% of headaches presenting to ED are primary. If there are any significant findings in history or examination, further investigation is required. A table of Red Flag Symptoms is provided by the RCEM:

#### Red Flag Symptoms

Certain features of the presentation may be regarded as 'red flags'. These significantly increase the risk that there is a secondary cause for the headache and therefore, further investigation is warranted.

#### These are:

- ▶ Headache in someone >50 years
- ▶ Thunderclap headache (**headache reaching maximum intensity within 60 seconds of onset**)
- ▶ Headaches increasing in severity and frequency
- ▶ Headache with fever, neck stiffness, or reduced level of consciousness
- ▶ Focal neurological symptoms or signs
- ▶ Papilloedema
- ▶ Headache after trauma
- ▶ Loss of vision/amaurosis fugax
- ▶ Immunocompromised, Malignancy

#### LEARNING BITE

**The presence of any 'red flag' feature mandates further investigation of a patient presenting with headache.**

- ▶ The clinical history of sudden or abrupt onset severe headache in these case studies warrants further investigation to exclude serious underlying pathology. It should also be noted that a normal CT **does not** rule out SAH, so if clinically suspected a lumbar puncture should also be undertaken [Guideline for the Management of Lone Acute Severe Headache](#) (RCEM, 2009).
- ▶ The National Institute for Health and Care Excellence (NICE) provide guidance on [Headaches in over 12s: diagnosis and management \[CG150\]](#)<sup>4</sup> (2021). Sections on assessment i.e. 1.1.1 and 1.1.2 and management 1.3.2, are all of relevance to these case studies in the management of headache.

The National Institute for Health and Care Excellence (NICE) provide guidance on [Subarachnoid haemorrhage caused by a ruptured aneurysm: diagnosis and management \[NG228\]](#)<sup>5</sup> (2022). Section 1.1 assessment and diagnosis are relevant to all of these case studies and in particular sections 1.1.10 – 1.1.13 below: *It is worth noting that the study used in the NICE guidance regarding CT scan in 6 hours used neuroradiologist reporting the CT Scan. In current practice across the HSC, an out of hours Consultant Neuroradiology report is often not available as it is usual practice for the out of hours CT scan being reported on by a radiology registrar. A consultant review is then required and for that reason a lumbar puncture is often required, even if the CT is normal.*

2 [https://rcem.ac.uk/wp-content/uploads/2021/10/Lone\\_Acute\\_Severe\\_Headache\\_Flowchart\\_Dec2009.pdf](https://rcem.ac.uk/wp-content/uploads/2021/10/Lone_Acute_Severe_Headache_Flowchart_Dec2009.pdf)

3 <https://www.rcemlearning.co.uk/reference/primary-headache/#1643120419710-75c762da-adbc>

4 <https://www.nice.org.uk/guidance/cg150/resources/headaches-in-over-12s-diagnosis-and-management-pdf-35109624582853>

5 <https://www.nice.org.uk/guidance/ng228/resources/subarachnoid-haemorrhage-caused-by-a-ruptured-aneurysm-diagnosis-and-management-pdf-66143842385605>



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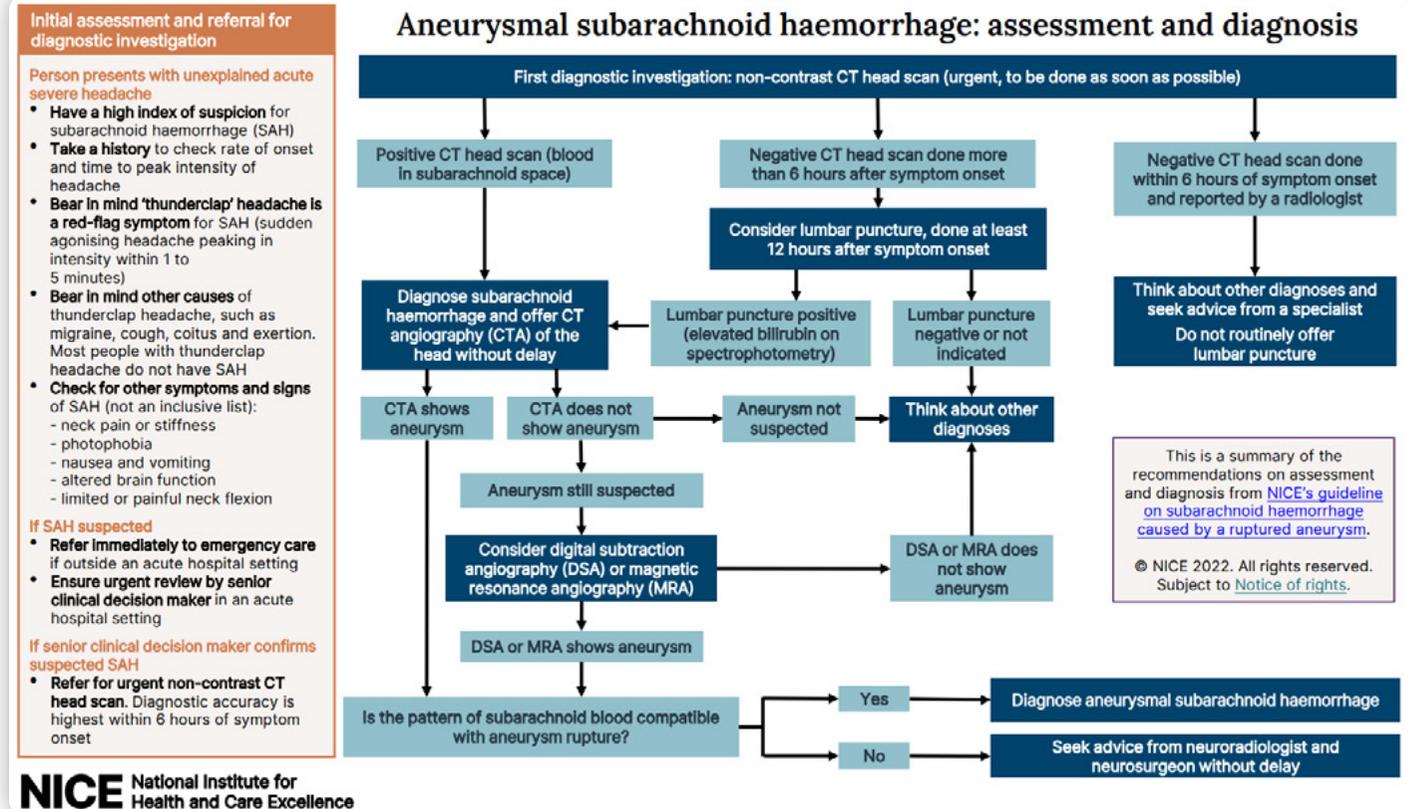
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### Diagnosing a subarachnoid haemorrhage

- ▶ Diagnose a subarachnoid haemorrhage if the non-contrast CT head scan shows blood in the subarachnoid space.
- ▶ Allow at least 12 hours after symptom onset before doing a lumbar puncture to diagnose a subarachnoid haemorrhage.
- ▶ If a CT head scan done more than 6 hours after symptom onset shows no evidence of a subarachnoid haemorrhage, consider a lumbar puncture.
- ▶ If a CT head scan done within 6 hours of symptom onset and reported and documented by a radiologist shows no evidence of a subarachnoid haemorrhage:
  - ▶ do not routinely offer a lumbar puncture
  - ▶ think about alternative diagnoses and seek advice from a specialist.

### NICE NG228 provides this useful summary of the recommendations on assessment and diagnosis of SAH caused by a ruptured aneurysm



Also available here: <https://www.nice.org.uk/guidance/ng228/resources/visual-summary-on-the-assessment-and-diagnosis-of-aneurysmal-subarachnoid-haemorrhage-pdf-11262251629>



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In addition to the NICE Guidance the SNOOPP10 list of red and orange flags for secondary headaches in clinical practice is used<sup>6</sup> in neurology, which are similar to the NICE [NG228] Guidance.

**Table 1: SNNOOP10 List of Red and Orange Flags**

|    | Sign or symptom   | Related secondary headaches (most relevant ICHD 3b categories)  | Flag colour                      |
|----|---|---|----------------------------------|
| 1  | Systemic symptoms including fever                                     | Headache attributed to infection or nonvascular intracranial disorders, carcinoid or pheochromocytoma   | Red (orange for isolated fevers) |
| 2  | Neoplasm in history   | Neoplasms of the brain; metastasis  | Red                              |
| 3  | Neurologic deficit or dysfunction (including decreased consciousness) | Headaches attributed to vascular, nonvascular intracranial disorders; brain abscess and other infections  | Red                              |
| 4  | Onset of headache is sudden or abrupt                                 | Subarachnoid hemorrhage and other headaches attributed to cranial or cervical vascular disorders  | Red                              |
| 5  | Older age (after 50 years)  | Giant cell arteritis and other headache attributed to cranial or cervical vascular disorders; neoplasms and other nonvascular intracranial disorders  | Red                              |
| 6  | Pattern change or recent onset of headache                            | Neoplasms, headaches attributed to vascular, nonvascular intracranial disorders   | Red                              |
| 7  | Positional headache   | Intracranial hypertension or hypotension  | Red                              |
| 8  | Precipitated by sneezing, coughing, or exercise                       | Posterior fossa malformations; Chiari malformation  | Red                              |
| 9  | Papilledema   | Neoplasms and other nonvascular intracranial disorders; intracranial hypertension   | Red                              |
| 10 | Progressive headache and atypical presentations                       | Neoplasms and other nonvascular intracranial disorders  | Red                              |
| 11 | Pregnancy or puerperium   | Headaches attributed to cranial or cervical vascular disorders; postdural puncture headache; hypertension-related disorders (e.g., preeclampsia); cerebral sinus thrombosis; hypothyroidism; anemia; diabetes | Red                              |
| 12 | Painful eye with autonomic features                                   | Pathology in posterior fossa, pituitary region, or cavernous sinus; Tolosa-Hunt syndrome; ophthalmic causes   | Red                              |
| 13 | Posttraumatic onset of headache                                       | Acute and chronic posttraumatic headache; subdural hematoma and other headache attributed to vascular disorders   | Red                              |
| 14 | Pathology of the immune system such as HIV                            | Opportunistic infections  | Red                              |
| 15 | Painkiller overuse or new drug at onset of headache                   | Medication overuse headache; drug incompatibility   | Red                              |

Abbreviation: ICHD-3b = International Classification of Headache Disorders 3b.  
An overview of signs and symptoms, their related secondary headache, and distribution in red and orange flags.

6 Do, T.P., Remmers, A., Schytz, H.W., Schankin, C., Nelson, S.E., Obermann, M., Hansen, J.M., Sinclair, A.J., Gantenbein, A.R. and Schoonman, G.G. (2018). Red and orange flags for secondary headaches in clinical practice. *Neurology*, [online] 92(3), pp.134–144. doi:https://doi.org/10.1212/wnl.0000000000006697.



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# Low Threshold for CT Scanning in Ongoing Headaches



A patient attended the Direct Assessment Unit (DAU) with a 2-week history of vomiting, diarrhoea and feeling feverish, with a headache, after returning from a foreign holiday. Following assessment, a diagnosis was made of travel related vomiting and diarrhoea, and the patient was treated and discharged with medication and advised to increase oral intake. The patient was treated and discharged with medication and advised to increase oral intake.

A plan was put in place to consider CT brain if the headache was non-resolving and there was ongoing vomiting. The patient subsequently attended the ED 3 days later with ongoing headache. The patient was given pain relief. Medical staff assessed the patient as having no features suggestive of raised intracranial pressure and therefore no requirement for an emergency CT brain scan. The patient was discharged into the care of the GP for follow up if required.

This patient had previously been treated for **left renal cell carcinoma** approximately 9 months prior to both these presentations. The patient sadly passed away 2 days after being discharged.

### The Autopsy Report identified cause of death as:

- ▶ Cerebral Oedema associated with cerebral metastasis of a renal cell carcinoma. Given the presence of a metastatic tumour within the left temporal lobe and cerebral oedema, it is obvious that this was the cause of the patient's headache and vomiting.

### Current Guidance Related to this Case

As per [NICE CG150](#) Headaches in over 12s: diagnosis and management:

- 1.1.1** Evaluate people who present with headache and any of the following features, and consider the need for further investigations and/or referral:
- ▶ worsening headache with fever
  - ▶ sudden-onset headache reaching maximum intensity within 5 minutes
  - ▶ new-onset neurological deficit
  - ▶ new-onset cognitive dysfunction
  - ▶ change in personality
  - ▶ impaired level of consciousness
  - ▶ recent (typically within the past 3 months) head trauma
  - ▶ headache triggered by cough, valsalva (trying to breathe out with nose and mouth blocked) or sneeze
  - ▶ headache triggered by exercise
  - ▶ orthostatic headache (headache that changes with posture)
  - ▶ symptoms suggestive of giant cell arteritis
- 1.1.2** Consider further investigations and/or referral for people who present with new-onset headache and any of the following:
- ▶ compromised immunity, caused, for example, by HIV or immunosuppressive drugs
  - ▶ age under 20 years and a history of malignancy
  - ▶ a history of malignancy known to metastasise to the brain
  - ▶ vomiting without other obvious cause [2012]

## KEY LEARNING

- ✓ Medical staff should have a **low threshold for CT scanning** ongoing headaches.
- ✓ Red flag symptoms of headache for those over 12 years of age are defined in [NICE CG150 Headaches in over 12s: diagnosis and management](#) and if present consideration should be given for further investigations.



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# Differential Causes of Elevated Troponin T: Unconscious Bias in Healthcare



haematoma and fall.

## KEY LEARNING:

- ✓ **Clinical decision making:** In this case the clinician made the diagnosis of Acute Coronary Syndrome (ACS) in a patient who presented to the ED following a fall and associated head injury despite there being no cardiac history. The elevated Troponin T was misinterpreted as ACS; importantly no other causes of an elevated Troponin T were considered and no other indicators of ACS were present.
- ✓ **Unconscious Bias:** Unconscious (or implicit) bias can have a life-or-death impact in a healthcare environment. Learning how to identify and overcome bias is essential to improving the delivery of healthcare to diverse populations. Your brain is able to process situations quickly because it relies on what it already knows - or *thinks* it knows. Your memories help your brain categorize and sort information so it can be quickly analyzed without your awareness. All of your experiences and impressions inform your current actions, and help your brain make automatic conclusions.

**Unconscious bias can lead to false assumptions and negative outcomes.**

### Summary of Event

A patient with a history of non-valvular atrial fibrillation presented to the ED following a fall at home. The patient was assessed and a Computed Tomography (CT) brain scan was performed as well as a chest and hip x-ray. All were reported as nothing abnormal detected.

A 6 hour troponin T level showed an increased troponin which was diagnosed and treated as an acute coronary syndrome (ACS). The patient was transferred to the cardiology ward.

The patient was later found to be non-responsive. An urgent CT Brain was performed which showed **a left sided subdural haematoma**. After discussion with the cardiology consultant and neurosurgeons the patient was diagnosed with a non-survivable subdural haematoma.

A Do Not Attempt Resuscitation (DNAR) order was discussed and agreed with the family. End of life care was initiated until the patient sadly passed away. The death certificate recorded cause of death as a subdural



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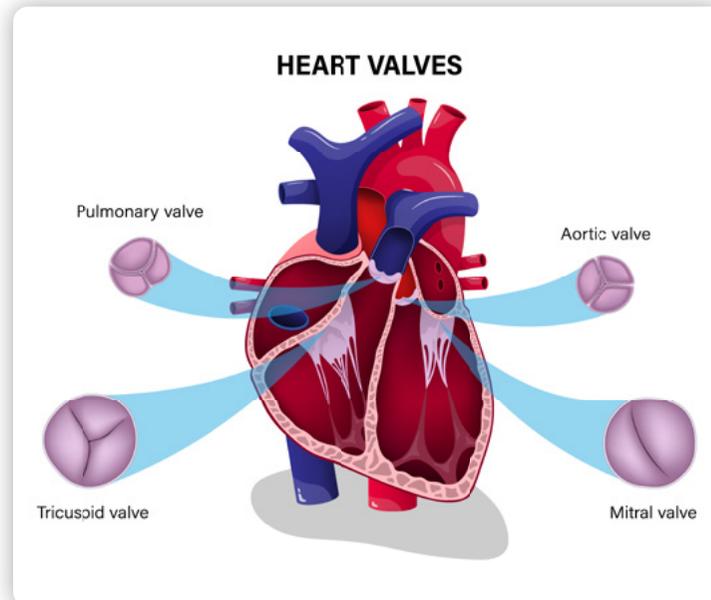
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# Loss of Audible Click in Mechanical Heart Valve

A patient who had previous aortic (single tilting disc) and mitral (bileaflet) mechanical valve replacement surgery 13 years previously, attended the Emergency Department (ED) complaining of chest pain, dyspnoea and not hearing their valve click. The patient was admitted and investigations including transoesophageal echocardiogram (TOE) and fluoroscopy showed both valves to be functioning normally. There was no obvious abnormal or reduced leaflet movement, but the aortic valve gradient was significantly elevated. The patient was discharged with a plan for a follow-up echocardiogram in 1 year.

The patient re-presented at ED three weeks post discharge with significant pulmonary oedema due to mechanical aortic valve obstruction. They were transferred for emergency cardiac surgery the following day, however died prior to surgery being undertaken.



## KEY LEARNING

- 1 Have a high index of suspicion of mechanical valve dysfunction in patients complaining of symptoms and **loss of audible click**, especially in single tilting disc valves.
- 2 Transoesophageal echocardiographic (TOE) and fluoroscopy (for at least 10mins to detect intermittent valve leaflet dysfunction) in addition to transthoracic echocardiography (TTE) should be performed early if a diagnosis of mechanical valve dysfunction is being considered.
- 3 Refer early to a heart team if a diagnosis of prosthetic mechanical valve dysfunction is being considered.
- 4 Early surgery (as urgent or emergency) should be performed if a diagnosis of mechanical valve leaflet dysfunction is confirmed, as delay results in poor outcomes.



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# The Importance of Maintaining up to date Patient Demographic Information

A Serious Adverse Incident (SAI) was reviewed which involved the stillbirth of a baby due to fetal sepsis.

The patient had a history of recurrent urinary tract infections, which were not documented by the Trust antenatal services at booking. Her original booking questionnaire completed at the time of GP attendance was completed using her maiden name. On the day of the hospital booking appointment a further questionnaire was completed and this recorded her married name with the maiden name in brackets. However, booking bloods and patient labels were completed under her maiden name as the HCN used matched the maiden name on the hospital system. Around one month after booking the patient requested her name be changed to her married name at the GP practice. At this point her hospital records were not updated.

During the antenatal course approximately nine urine samples were submitted by GP and maternity services. There were four episodes of infection with positive MSSU results and of these three were treated empirically.

She was prescribed antibiotics at 37+1 weeks gestation, the following day the patient attended the Admissions department Maternity Hospital with a history of uterine tightenings and reduced fetal movements. On auscultation, no fetal heart was heard and Obstetric staff confirmed intra-uterine death. The baby was delivered stillborn. The cause of death was noted as fetal sepsis.

The patient changed their surname following their antenatal booking. The GP Practice changed their patient records with the patient's new surname aligned to their Health and Social Care Number. However, the Trust's PAS system was not updated with the patient's new surname. Therefore, a contributory factor in this SAI was the fact that urine samples were sent from the GP Practice with labels with new surname and H&C number whereas the Trust sent urine samples with patient's old surname and H&C number; this led to delays in urine results being processed by the lab.

## KEY LEARNING

- ✓ [The Northern Ireland Management of Infection Guidelines for Primary Care provides guidance for treating Lower UTI in Pregnancy-Asymptomatic Bacteriuria and Lower UTI in Pregnancy-Symptomatic UTI](#)
- ✓ NICE CKS guidance [Scenario: UTI in pregnancy no visible haematuria | Management | Urinary tract infection \(lower\) - women | CKS | NICE](#) states seek urgent specialist advice on further management of pregnant women with recurrent lower UTI.
- ✓ All healthcare staff must check with antenatal patients if there are any changes to names or addresses and update their clinical systems appropriately.
- ✓ Patient test samples must always include the patient's H&C number.
- ✓ It must be emphasised to all antenatal patients at their time of booking that they need to carry their maternity hand-held record (MHHR) to all appointments with health professionals and ask that a summary of their visit is included their maternity hand-held record. Completion of the MHHR is the most effective way to keep all health professionals involved in the care of antenatal patients up to date.
- ✓ The maternity hand-held record (MHHR) needs to include the GP referral letter if available as CCG will include the most important facts of the patients past medical history from the computerised GP clinical record.



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## De-activation of Swipe Cards

In a recent Serious Adverse Incident, a former member of staff was observed accessing locked office premises without permission, the day after their employment ceased. The individual was able to access the premises as they had a number of swipe cards allocated to them. It was thought that previous cards had been lost over time; and as a result, replacement cards had been issued without the old cards being deactivated.

### KEY LEARNING

- ✓ Staff must only have one active swipe access card assigned to them at any given time.
- ✓ When a member of staff requests a new swipe access card, their previous card must be immediately deactivated.
- ✓ A robust record keeping and governance process must be place to ensure only the appropriate staff have active swipe access cards.



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