



▶ Case based learning

▶ Addisonian crisis

▶ Mental health ACPs

Clinical

update

Have you seen?

Medical Director's bulletins:

MDB 117: Revisions to the airway management manual

MDB 118: Missing diagnostic equipment

MDB 119: Emergency arrhythmia centres

MDB 120: Disposable laryngoscopes

MDB 121: Change in presentation to atropine sulphate

Stroke and STEMI on scene times

Important message

Staff are reminded of the importance of **minimising on scene times as much as possible for stroke and STEMI patients.** At present, average on scene times for both are well in excess of 30 minutes. PRFs should not be filled in until you are en route to hospital and interventions for stroke patients should be kept to a minimum in order to ensure these patients receive definitive care at the earliest opportunity.

Major trauma care: update

Major trauma is a rare event. Surprisingly, ambulance crews attend relatively few major trauma patients with some reports suggesting that on average an ambulance crew will attend around one major trauma patient per year. Differentiating the patient with significant injuries from those patients with relatively minor injuries at the road side can be challenging for even the most experienced pre-hospital practitioner. In addition to the environmental factors such as poor light, noise and limited space that can constrain the patient assessment, often traumatic injuries take time to manifest and may not become apparent until further into the patient's care. This combined with the body's ability to try to ensure physiological normality post injury by compensatory mechanism often results in the patient in the immediate post injury phase displaying normal or only subtle changes to their vital signs. The combination of major trauma being a rare event and the challenges in assessing the trauma patient pre hospital has led to the development of triage tools to guide pre hospital triage decision making.

To ensure the safe and effective running of a trauma system, accurate pre hospital triage to a major trauma centre (MTC) is vital. The risk of under triage, where a patient with significant injuries is conveyed to a non major trauma centre, can lead to delays in patient care as a secondary transfer to definitive care is often required. There are also risks of over triage where a patient with relatively minor injuries is conveyed to an MTC stretching the resources of the major trauma system potentially impacting on the care of other patients. The use of a triage tool minimises these risks and aims to ensure consistency of decision making.

The current London 'major trauma decision tool' was developed by the Healthcare for London Major Trauma Programme Pre-Hospital Care Group in 2010. The London tool was adapted and anglicised from the then American College on Surgeons Committee on Trauma Field Decision Tool. The American tool is in its fifth edition. Using Trauma Audit and Research Network (TARN) outcome data the London Trauma Office in partnership with the Service have undertaken a detailed review of the accuracy of the triage tool. This has involved identifying the pre-hospital trigger and then matching this with the patient's ultimate injuries and outcome. This work has a total data set of over 4,000 patients and data completeness in excess of 95 per cent. This has consistently shown that circa 30 per cent of patients who trigger the trauma tree go on to have an injury severity score (ISS) greater than 15.



In addition to this, around another 10 per cent have an injury severity score between nine and 15, indicating serious injury. In addition to this work, again in partnership with the Service, the London Trauma Office follows up patients who have an ISS greater than 15 but who are not conveyed to a MTC. It is worth noting these are small numbers. If the patient has not triggered the trauma tree tool the clinical themes are identified and captured and these can be used to further enhance future editions of the triage tool.

The triage data was presented to an expert clinical working group containing pre-hospital specialists, representatives of most clinical specialities involved in pre-hospital care and senior and operational ambulance staff. This group reviewed the data and a number of recommendations were made suggesting minor revisions of the triage tool. This updated tool has been approved by the London Trauma Board and the team leaders and clinical tutors are currently being familiarised with the new tool and will disseminate it to frontline staff.

Summary of changes to major trauma tool

- Introduction of a specific child (under 12) triage tree printed on the back of the tool will improve triage to this age group (this has been developed with the input of a number of paediatricians).
- Penetrating trauma – the threshold has been increased to include patients **stabbed between the knees and the head**. This is to allow triage of patients with potentially significant femoral and buttock wounds to the MTC.
- The tree now includes **open fractures to the lower limbs** – there is a widely accepted view that these patients benefit from management in a MTC as they need combined ortho-plastic care. It must be emphasised that these do NOT include 'open scratches'.
- **Burns/scald greater than 30 per cent**; this percentage has been increased having reviewed all the burn patients conveyed to a MTC.
- **Circumferential burns from a flame injury**; this has been updated to improve the sensitivity of the triage tool.
- **Facial burns with complete skin loss to lower half of face**; on advice of leading international experts on burn management this has been refined to ensure that appropriate patients are conveyed to a MTC in view of potential airway injury.
- **Bullseye of the windscreen or damage to the A post of the vehicle**; this has been further defined to specifically reference patients who were **external to vehicle** on impact such as cyclists, pedestrians and motorcyclists.
- Emphasises that **patients who are anti-coagulated (Warfarin and novel anti-coagulants** – please note these do NOT include aspirin and clopidogrel) are at significant risk from bleeding if they suffer major trauma and may benefit from conveyance to a MTC (discuss case with the trauma paramedic in EOC via PD09 or by calling the HEMS desk directly).
- Where a patient does not trigger the tree but **the crew still have significant concerns** they should **discuss the patient with the trauma paramedic in EOC**.
- The trauma tool – now references the **CATMIST** handover tool which should be used in **ANY** handover:
 - C AD
 - Age of patient
 - Time of injury
 - Mechanism of injury
 - Injuries found and suspected
 - Signs (vital)
 - Treatment given and required

Major trauma reminders

If the patient triggers the London major trauma tool – a pre alert (blue) call **MUST** be placed via PD09

If you are transferring a patient to an MTC from another hospital a pre alert (blue) call must be placed via PD09 even if the transferring hospital have informed the MTC of the patient's imminent arrival.

If the airway is compromised and cannot be managed (having considered and attempted all airway manoeuvres and adjuncts available) – divert to the nearest Trauma Unit with a pre alert call – remember to consider HEMS/BASICS. Do not wait on scene with patients who have an unmanageable airway.

Minimise time on scene for penetrating trauma; perform only essential lifesaving interventions and observations, target on scene time **less than five minutes**.

Remember in major trauma to examine at skin level – packaging should be skin to scoop whilst keeping the patient warm – remember cold blood does not clot as quickly

Remember to ensure the patient is always secured to scoop with straps; this should be simple and rapidly undertaken – patients should not be conveyed on extrication boards

Remember to document on the PRF at which step the patient triggered on the major trauma tree

Remember that splinting and anatomical re-alignment of fractures reduces bleeding and therefore minimises shock as well as reducing pain and requirement for analgesia.

Mark Faulkner, Paramedic Advisor to London Trauma Office

Should the Kendrick Extrication Device have a place in pre-hospital care? An observational and evidential perspective.

Introduction

The Kendrick Extrication Device (KED) is described as an 'emergency patient handling device designed to aid in the immobilisation and short transfer movement of patients with suspected spinal / cervical injuries' (Ferno-Washington, 2001). The device which evolved in the late 1980s was originally intended to assist with the immobilisation and extrication of NASCAR racing drivers from their cockpit (Kelly-Chasse, 2012). Since then it has become adopted by many ambulance services as a tool intended to assist in the immobilisation and extrication of patients from road traffic collisions (RTCs) and is a familiar piece of equipment amongst paramedics. However, its assimilation into the pre-hospital environment and appropriateness in patient care could be viewed as questionable. This article comments on the potential adverse risks associated with employing the device and seeks to highlight the current lack of evidence to support its use.

Background

Essentially the KED is a flexible mini back board that when in position on the casualty extends from their lower back to above their head. It also extends laterally to encompass the flanks and head leaving the arms free to move. It is used in conjunction with a cervical collar – three torso straps, two leg straps a forehead and chin strap to hold the patient into the device, three lifting handles facilitate moving and handling (Ferno-Washington, 2001).



Fig 1: Component parts of a KED

Context

Most paramedics will be familiar with the classification types of extrication summarised below (Fisher, Brown and Cooke,

2006) (Calland, 2005). Indeed, they can be useful in offering clarity in prioritising treatment and establishing timeframes relative to the clinical findings or likelihood of injury.

Summary:

Immediate / snatch rescue – For patients whose status is life threatening. For example; airway obstruction, failing ventilations or hypovolaemia.

Rapid extrication – Primary survey concerns falling short of the above. For example; dyspnoea, external haemorrhage, reduced level of consciousness or suspected bleeding into a body cavity (not always obvious and often well compensated for (Calland, 2005)).

Controlled extrication – A suspected spinal injury which outweighs any other suspected clinical concern.

With regard to these classifications and the patient conditions they highlight it is not unreasonable to identify areas where KED use may conflict with certain patient's needs.

Observation

Delay in extrication due to application

The KED takes time to apply and will likely cause a delay in the extrication of the casualty to definitive care (hospital). Repeated practice and tight governance helps make efficient practitioners. However, the KED is likely to be a device that is rarely used (let alone under experienced supervision) and the risk therefore is that it won't be applied in an expert and timely fashion. Within the context of extrication classifications, by definition the KED should probably not be used for patients who have immediate or rapid needs. It is widely recognised that patients who have airway, breathing, circulatory or disability problems swing the risk / benefit equation in favour of 'priority' needs over a potential spinal issue (Fisher, Brown and Cooke, 2006) (Calland, 2005). It can also be useful to think about whether the patient requires a hospital pre-alert. If so, should time be spent applying an additional immobilisation device and / or removing a car roof if there is another extrication option that balances the patient's needs better?

Impact on respiratory function

There is acknowledgement within the user manual that the KED can restrict respiratory function (Ferno-Washington, 2001). The correct method of application involves fastening the top torso (chest strap) last to maximise the time the patient can 'breathe more freely' (Ferno-Washington, 2001). Although it could be argued that the middle and lower straps that lay over the lower chest/abdomen may also (by way of splinting lower chest and diaphragmatic movement) restrict tidal volumes. All of this could well be true of physiologically normal patients let alone in those patients where oxygen demand is higher and/or an injury exists (eg involvement in a RTC).

Practitioners need to consider whether the potential for impeding 'B' (breathing) should weigh higher than using the KED over other methods of spinal care / extrication (for example – extricating a patient on a rescue board and then placing them onto an orthopaedic stretcher / vacuum mattress). Regardless of the clinical urgency of the situation it is difficult to ever justify increasing the respiratory effort required of a patient.

Paradoxically greater movement of the casualty

The application of the KED involves sliding / pushing the device between the casualty and the car seat either at an angle of 45 degrees through the door or (more realistically allowing for manoeuvring space and avoiding the 'B pillar') from above with the roof removed (as demonstrated in the KED User Manual). There will inevitably be casualty movement whilst sitting the device, applying and tightening the straps, moving the casualty

via the carry handles (which may often require other emergency service personnel not trained in the use of the KED) and in the subsequent supine packaging of the patient suitable for easy transfer from the ambulance trolley onto the emergency department trolley.

Anecdotally it has been noted that if the device is well tightened then breathing can be impaired. If the device is less firmly applied allowing the patient to 'breathe more freely' then there can be considerable movement (sag) of the casualty when lifting / handling. Additionally, the application can vary significantly depending upon the seat type and the position of the casualty, as well as their anatomy. Indeed, it can be hard to accomplish a text book application often only achievable with someone of average build sitting bolt upright in a classroom chair whilst adjusting their own body position to accommodate the device and in assistance to those applying it. Remarkably, many of the ad-hoc instructional videos available to view on the internet demonstrate exactly this (YouTube, 2012).



Fig 2: A correctly applied KED

Minimal patient movement is not only a reasonable concept when considering a spinal injury but is clearly imperative for those patients who may be bleeding. Blood loss through pelvic injury can be devastating and therefore minimising patient movement to maximise clot preservation in the early stages is essential (Clamp and Moran, 2011). It is not certain how the pressure transferred from the KED leg straps during casualty movement and lifting impact on pelvic stability.

Additionally, once the patient is supine it is unclear how the optimal body position is affected from both a neurological (spinal alignment) and haemorrhagic (pelvic alignment) point of view. A well-practiced method of patient packaging once rescue has taken place with a rescue board involves the supine patient undergoing two very minimal lateral rolls (to the left and right) facilitating simultaneous removal of cut clothing, insertion of a pelvic splint and the application of an orthopaedic stretcher. This ensures minimal patient movement and a packaged state that allows easy transfer onto an emergency

department trolley and aids with any rapid onward movement to imaging and theatre. No official guidance was found surrounding removal of the KED ensuring minimal patient movement.

Evidence

As well as reviewing product information, a literature search was undertaken using CINAHL Plus (EBSCO) to examine the evidence for the use of the KED with 'Kendrick Extrication Device' as the search term. Only 10 articles were found. No data relating to any clinical trials and the safety and efficacy of the device before it was marketed was found.

Most of the literature found focused on the range of spinal movement once the KED had been applied to volunteers or mannequins. None addressed the issue of patient movement during the application of the device. One very small study from the late 1980s concluded that rotational movement only was limited versus a short board and collar. Other articles found other methods more effective, did not cite any specific study or merely expressed an opinion. From the evidence available it is uncertain what region of the spine and what range of movements the KED is most effective at dealing with. Also, any additional benefit it has over a rescue board, cervical collar and orthopaedic stretcher / vacuum mattress is equivocal. No literature was found relating to the wider effects of movement, ie bleeding. Notably, the most recent article from Turkey does evidence impaired respiratory function. Unfortunately none of the articles or evidence looked at real patient outcome data – highlighting the need for further study.

Conclusion

For the pre-hospital care provider, the KED may be one of several pieces of equipment available to assist in the management of trauma patients. However, no equipment should ever be applied in a default manner and without appreciation of its likely impact on the patient's condition; otherwise the potential exists to do more harm. We must avoid a formulaic approach to every trauma patient where we become overzealous about a possible c-spine injury at the expense of other crucial elements of management – an A to D problem, exposure to the elements and associated coagulopathy (Walfaisade, Wultzer, and Lefering et al., 2010), rapid transport to definitive care or scene safety. Even in the presence of a likely spinal injury we should adopt the least complex and most familiar and timely methods of extrication and avoid techniques with doubtful efficacy and with the potential to do harm.

With the real possibility of prolonging on scene time, increasing patient movement and impairing respiratory function; until the evidence suggests otherwise careful consideration should be given by practitioners to the application of a KED onto patients involved in trauma. Additionally, with the risk of inappropriate application and when considering financial constraints, consideration should be given to the continued carriage of Kendrick Extrication Device's on ambulances.

References

- Calland, V. (2005). Extrication of the seriously injured road crash victim. *Emergency Medical Journal* 2005(22): pp. 817-821.
- Clamp, J. and Moran, C. (2011) Haemorrhage Control in Pelvic Trauma. *Trauma* 13(4): pp. 300-316.
- Ferno-Washington (2001) Model 125 KED Users' Manual 234-1754. London: Ferno-Washington, Inc.
- Fisher, J., Brown, S. and Cooke, M. (Eds) (2006) UK Ambulance Service Clinical Practice Guidelines. London, ASA.
- Kelly-Chase, C. (2012) Rick Kendrick Demonstrates the Kendrick Extrication Device [online]. Available at: <http://solosoutheast.com>

[Accessed November 2012].

Wafaisade, A., Wutzler, S., Lefering, R., Tjardes, T., Banerjee, M., Paffrath, T., Bouillon, B. and Maegele, M., (2010) Drivers of acute coagulopathy after severe trauma: a multivariate analysis of 1987 patients. *British Medical Journal* 27 (12): pp. 934-939.
 YouTube (2012). 'Kendrick Extrication Device' [online]. Available at: <http://www.youtube.com> [Accessed November 2012].

Nick Brown (Paramedic Team Leader and HEMS Paramedic)

KEDs – message from the Medical Directorate for frontline staff

This article makes a number of very useful points, highlighting that the evidence for the use of the KED is minimal, it remains nevertheless an accepted method of performing non time critical controlled extrication in the Service and the rest of the UK. However, very careful consideration should be given to the risk / benefit of using this device where the patient has the potential to deteriorate as extrication maybe considerably protracted.

of care plans that can be uploaded by the patient's GP or other care teams to a secure server, once the patient has consented to information being shared. The programme has been rolled out across London with GPs and other healthcare professionals being trained in all London boroughs. Each group is now adding their own records to the system as new plans are created, or old ones updated. This will in time replace the paper copies of the care plans that are currently stored in filing cabinets in EOC.

This will further enable frontline staff to ensure that the care that they offer to a patient is in line with that agreed by the clinicians looking after that patient, and we do not add further distress to the patient or their family with avoidable hospital admissions. Statistics show that in London around 60% of patients are dying in hospital against their wishes – for the patients with care plans recorded on CMC this is reduced to 17 per cent, with the majority dying where they had expressed a wish to die – normally in the comfort of their own home and with their family close by.

So what does it mean to me? The key point is to discuss with the clinical support desk (CSD) the appropriate management of the patient. As some of these plans change on an almost daily basis it is impractical to have all of the relevant info on a flag. At call taking family / carers may refuse resuscitation advice. This should be documented in the normal way. Allocators should ensure that the crews attending are aware of this. It is important that the patient is not conveyed until there has been a discussion with the CSD. CSD Advisors will access the patient's care plan on the CMC system and ensure that ambulance staff are able follow it where practical. This may include advice on resuscitation and if / where the patient should be conveyed in certain situations.

Care of patients that have life-limiting conditions is an important part of the care that we are, as an ambulance service, capable of offering. A lot of focus is given in training in attempts that can be made to save life. It is a much harder job to recognise and respect that for some patients further clinical interventions may not be appropriate. For these patients the focus is on respecting their wishes, and ensuring that they are treated in comfort and dignity. This will often involve other care providers (and rarely the ED), to ensure that optimum treatment can be given.

For further information please contact **Stephen Hines** or **David Whitmore**

Compassion in practice

A new three-year vision and strategy, aimed at building a culture of compassionate care for nursing, midwifery and care staff was recently launched by the Department of Health (DH).

Called 'compassion in practice', the vision is based around six values – care, compassion, courage, communication, competence and commitment. The vision aims to embed these values, known as the six cs, in all nursing, midwifery and care giving settings throughout the NHS and social care to improve care for patients.

To access the document, 'compassion in practice', please follow the link below:

<http://www.dh.gov.uk/health/2012/12/nursing-vision/>

Emergency arrhythmia centres in North London

Emergency arrhythmias are defined as:

- **Complete heart block (3rd degree heart block)**
- **Ventricular Tachycardia (VT)**
- **Multiple device (implantable cardioverter defibrillator - ICD) activations**

Patients 'North of the River' presenting with any of the above arrhythmias should be conveyed to one of the following Emergency Arrhythmia Centres:

- **The Royal Brompton**
- **Bart's Hospital**
- **Hammersmith Hospital**
- **The Heart Hospital (UCLH)**

In addition:

- All patients must be ≥ 16 years old
- The decision to go direct to an arrhythmia centre must be that of a paramedic only
- Arrhythmias will be based on a full 12 lead ECG being acquired
- Should the GCS decrease en route continue to centre updating EOC
- Paramedics arriving at an Emergency Arrhythmia Centre must hand over a completed (full) PRF and 12 lead ECG

For full details of inclusion and exclusion criteria please see the Medical Director's bulletin, 'Emergency arrhythmia centres' (MD 119 7 Feb 2013).

Coordinate my care (CMC)

Coordinate my care (CMC) records are care plans for those with a short life expectancy.

Many of you will have seen locality information flags that state that a named patient has a CMC record and to contact clinical support for further details. So what is a CMC record and why is it relevant?

CMC is an NHS project led by the Royal Marsden Hospital to try and improve the quality of life for patients with life-limiting conditions. It allows secure web based access to a database

Mental health appropriate care pathways

Mental health (MH) is a priority for the Service and in 2011 it was specifically highlighted in the NHS Operating Framework. As part of the CQUIN scheme agreed with our commissioners in 2011/2012 mental health appropriate care pathways (ACPs) have been developed for use by frontline crews.

The use of ACPs aims to offer patients the most appropriate service at time of presentation. At present, the majority of mental health calls are routinely conveyed to the emergency department (ED), however, it has long been evidenced that this is not always the best place to convey someone experiencing a mental health crisis. This is considered poor clinical practice unless there is a particular reason such as the ED being the designated base for the specialist mental health crisis team ie MH liaison teams, the designated access point for that team out of hours, an urgent physical health need or to exclude physical risk.

The Service has successfully negotiated ACPs with all 10 MH trusts providing acute mental health care across London. It is anticipated that these ACPs will allow for continuity of care and will avoid the practice of patients experiencing a mental health crisis being unnecessarily conveyed to the ED. Therefore improving links with MH trusts to ensure that patients are taken to a familiar place, as much as is reasonably possible.

Although the ACPs will be different for every trust, they are all based on the same generic principles:

1. Patients who present with MH issues complicated by intoxication (drugs/alcohol), injuries of any severity including self harm or medical illnesses should be conveyed to the local ED as per current practice.
2. Patients who present with MH issues with none of the above complications but with:
 - **no known MH diagnosis** / not under a local MH team should be conveyed to the nearest ED as per current practice
 - a **known MH diagnosis** / local care plan; staff should liaise with the local MH teams and decide on a management plan. This may include transfer to a specific named location, or left at home for later contact/visit by a MH professional.

How it will work?

Each MH trust will have a separate ACP which local complexes will be informed of. In addition, the Clinical Support Desk (CSD) will hold information relating to individual ACP criteria and this will also be made available on *the pulse*. Staff will be informed once these ACPs are live.

If the patient meets specific ACP criteria (ie they are known to a particular MH team), the crew should call the **designated catchment area contact number** where they can discuss with a MH clinician within the relevant trust the patient's condition and develop a treatment plan. If the crew are unsure of local arrangements CSD may be contacted for advice and to obtain relevant telephone numbers.

Kudakwashe Dimbi, Mental Health Clinical Advisor to the LAS

Case based learning

Diabetic patient scenario

There is a degree of emphasis at present regarding non conveyance of patients; however the following case illustrates the need to consider the patient in a holistic manner and not just from the aspect of their presenting symptoms.

A 44-year-old insulin dependent diabetic (IDDM) with multiple complications of his disease, including renal function compromise, visual problems and neuropathy resulting in relative immobility developed vomiting which was quite severe, preventing him from keeping food or drink down. The vomiting continued for two days and resulted in his partner calling 999. The crew assessed the patient thoroughly and attributed his vomiting to food poisoning. His observations were as follows:

Respiratory rate 18
Oxygen saturations 98%
Blood pressure 146/95
Temperature 37.7
GCS 15
Pulse 108
Blood sugar 18.9

His examinations were unremarkable and he was not in obvious pain. His abdomen was soft and non tender.

A decision was taken not to convey and he was advised to drink water and that this may be a short lived infection.

Throughout the night he developed pain and this continued along with the vomiting. A second 999 call was made and a fast response paramedic attended the patient recording similar findings on measuring physiological parameters and checking the abdomen. The patient's blood sugar had increased to 19.1. The paramedic made a decision not to convey; advised the patient to take fluids and reassured him that this would probably settle within 24 hours.

A third ambulance arrived late evening and transported the patient who was admitted to the ED with diabetic ketoacidosis (DKA).

Learning points:

- This patient was an insulin dependant diabetic with renal problems and high blood pressure. His likelihood of developing DKA was high and indeed, his vomiting may even have been due to that.
- Both vomiting and abdominal pain can be linked to DKA.
- The absence of diarrhoea made this unlikely to be food poisoning.
- The concern in a patient with impaired renal function is that dehydration is less well tolerated and can further damage the already struggling kidneys
- Enquire (and document) as to whether the patient is taking their insulin as prescribed as this is an absolute requirement for this group of patients.

An overview of this patient reveals a man who is relatively young but has quite advanced IDDM.

This should have driven the decision to convey him on both the first and second call.

Dr Peta Longstaff, Assistant Medical Director, West.

The injured patient who is on anticoagulation therapy

Staff are advised of the need to convey a patient who has sustained what might initially appear to be a relatively minor wound, and who is also on anticoagulant therapy to an emergency department (ED), rather than a walk in centre / minor injuries unit. This warning is particularly relevant where the injury is a head injury and / or a wound that is failing to respond, (starting to clot off), within normal timeframes and with normal pressure and dressing techniques.

Case study

A patient who stumbled and fell just outside their house sustained a deep laceration to their forehead. They did not lose consciousness, but the bleeding could not be stopped by a neighbour who was applying direct pressure and first aid bandages. An ambulance was called, and on their arrival it was elicited that the patient had a history of atrial fibrillation (AF) and was on warfarin.

The patient also handed the crew their Anticoagulation therapy book, (which carries information regarding the need to transport patients to an ED if injuries are sustained). There were no other distracting injuries, and the patient was FAST-ve. The reason for the fall was established as a straight forward trip with no prodrome of headache or chest pain. The patient was able to mobilise all four limbs and walk unaided.

The crew was not able to fully control the bleeding with ambulance dressings and decided to convey the patient to the local walk in centre (WIC), handed the patient over to the WIC staff and then departed. The WIC concerned treated the wound, closing it with steri strips. However, some six days later the Service was called back to the patient who was exhibiting signs and symptoms of a stroke.

There are further aspects to this case which resulted in a complaint to this trust, the WIC and also the hospital trust involved. The complaint to the Service regarded the first crew's decision not to convey to an ED.

The Service has met with the patient and agreed that they should have been conveyed to an ED where the patient's anticoagulation state could be fully checked and the wound properly cared for. Staff are cautioned that even seemingly minor wounds in the anticoagulated patient, in particular those involving head injuries, must be seen in an ED.



Staff are also reminded of the valuable advice and guidance that is contained in therapy booklets (left) carried by patients. These booklets cover a range of conditions such as anticoagulation therapy, steroid dependant, sickle cell and asthma patients to name a few, and very often have specific advice to ambulance crews.

Novel anticoagulants

There are a number of novel anticoagulants coming into use for the treatment of atrial fibrillation, as well as warfarin. These new drugs such as dabigatran (direct thrombin inhibitor), rivaroxaban and apixaban (factor Xa inhibitors); Whilst working in a different way to warfarin they should still be regarded as carrying the same risks in the scenarios discussed above. Please note that Clopidogrel and aspirin are antiplatelet agents, not novel anticoagulants.

David Whitmore, Senior Clinical Advisor to the Medical Director

Diazepam case study

A paramedic crew was called to a 10-year-old female fitting. On arrival a paramedic single responder was already on scene. The patient was sitting on the sofa, alert, orientated with a GCS of 15. The patient's parents stated that she had been diagnosed with epilepsy around the age of three and had only ever had these 'blinking episodes' which she was currently having that day. These episodes would normally only last a total time of approximately 30 seconds to a minute and during these episodes she could be incontinent.

On this occasion she had been having 'blinking' episodes for almost one hour and had been incontinent once. The patient was alert, answering questions and was able to walk around as normal. Every one to two minutes the patient would blink quickly and look up for a few seconds before returning to her normal self. Diazepam was considered, however the patient was GCS 15 and otherwise well aside from these brief episodes so was withheld as according to the JRCALC guidelines diazepam is not indicated for such a patient.

A pre alert call was placed and IV access gained on route. The patient had a second episode of incontinence en route to hospital during a 'blinking' episode. On arrival at hospital the doctor in the resuscitation room questioned why diazepam had not been administered for the focal seizures the patient was having.

Claire Maloney, Paramedic, Greenwich Complex

Medical Directorate view:

The crew were correct to withhold diazepam in this situation. Current JRCALC guidance for diazepam administration suggests that diazepam should only be administered to patients suffering generalised, not focal seizures.

Management of patient notes

Staff are reminded that patient notes, in particular district nursing files, **should not be removed from the scene** of an incident. These notes form part of the patient's medical notes, and are not always replaceable.

Staff should continue to use these notes for information gathering, but they should remain on scene. There have been incidents where district nursing files were taken to the hospital with the patient for assisting at handover, but subsequently the notes were lost which impacted on the patient's treatment once discharged.

Staff should continue to take patients' medication to the hospital.

Alison Blakely, Staff Officer to the Medical Director

ECG quiz

ECG 1: This ECG belongs to an 81-year-old male who was complaining of a one hour history of chest tightness and a feeling that his 'heart was racing'.

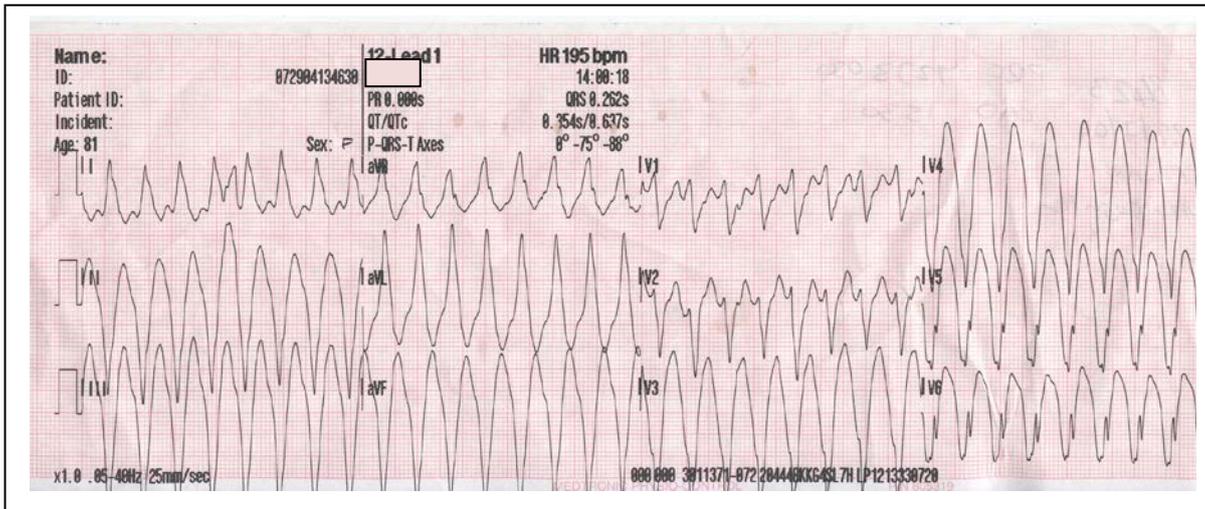
Past medical history: x1 myocardial infarction five years ago, hypertension and arthritis.

Patient observations: HR 195 and regular, RR 22, SpO2 95% on air, BP 75/59, Temp 36.9C, GCS 15.

What does this ECG show?

What treatment would you deliver?

Where would you take this patient?



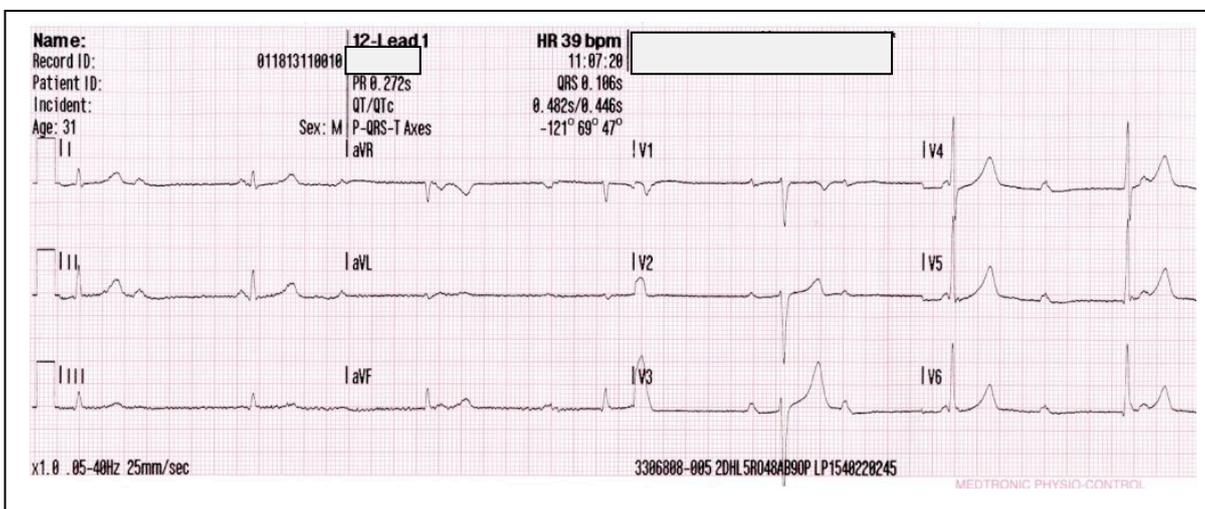
ECG 2: The following ECG belongs to a 31-year-old male with no significant medical history who was complaining of feeling dizzy and weak. Five minutes prior to the ECG being taken the patient had suffered a short syncopal episode at home. The patient was not suffering from chest pain or difficulty in breathing but did feel slightly nauseous.

Patient observations: HR 39, RR 20, BP 85/55, SpO2 96% on air, Temp 37.0C, GCS 15.

What does the ECG show?

What treatment would you provide?

Where would you take this patient?



Answers on page 12.

Clinical Audit and Research focus

Service library resources

Did you know as an NHS employee you are entitled to an NHS Athens account? Athens allows you to gain free electronic access to a range of medical journals, healthcare databases and electronic books. This includes resources such as the British National Formulary (BNF) app on your smartphone.

You can register for Athens at this address:
<https://register.athensams.net/nhs/nhseng/>

Which electronic journals allow me to access the most up to date medical evidence?

- Annals of Emergency Medicine
- British Medical Journal (BMJ)
- Circulation
- Emergency Medicine Journal (EMJ)
- Heart
- Prehospital & Disaster Medicine
- Prehospital Emergency Care
- Stroke
- Journal of Trauma and Acute Care Surgery
- The Lancet

This is not an exhaustive list of journals available to NHS employees. More journals can be accessed on NHS Evidence (<https://www.evidence.nhs.uk/>), Ovid (<http://ovidsp.ovid.com/autologin.cgi>) and My Athens (<auth.athensams.net/my>).

Further information on where these journals can be accessed can be found on *the pulse*: [Home](#) > Clinical > [Clinical Audit & Research Unit](#) > [Library Services](#)

What happens if I can't access journals electronically?

The Clinical Audit & Research Unit (CARU) also subscribe to a number of paper only subscriptions. The contents pages of the journals below are placed on the Clinical Audit & Research Unit folder on the X drive on a monthly basis:

- Academic Emergency Medicine
- Ambulance UK
- Health Service Journal
- Journal of Emergency Medicine (JEMS)
- Journal of Paramedic Practice
- Resuscitation

You can request a journal paper from CARU by completing a journal copy request form, which can be accessed on *the pulse* here: [Home](#) > Clinical > [Clinical Audit & Research Unit](#) > [Library Services](#) > [The London Ambulance Service Library](#)

CARU events

CARU run a number of events throughout the year offering free learning and development opportunities to all members of staff including:

Journal club

Journal club is run four times throughout the year and is open to any member of Service staff. Certificates of attendance are issued to supply evidence of continued professional development.

Journal club aims to provide an informal environment to discuss journal articles related to prehospital care, recent clinical audit & research findings and an opportunity to discuss topical issues with Fionna Moore who usually chairs the sessions.

Journal club provides a great introduction to the world of prehospital research. Previous sessions have discussed trauma triage, quality of advance life support and paediatric admissions. The future dates for journal club are:

- Tuesday 4 June 2013 (14.00-16.00)
- Tuesday 3 September 2013 (14.00-16.00)
- Tuesday 3 December 2013 (14.00-16.00)

Clinical Audit & Research advice surgeries

These advice surgeries aim to provide friendly advice and guidance once a month for staff who have ideas for clinical audit or research projects. The Clinical Audit & Research Unit also provides help and guidance on developing project proposals, applying for Trust approval, ethical approval and even identifying possible sources of funding.

Future dates for Clinical Audit & Research Advice Surgeries are:
 Wednesday 27th March 2013 (13.00-16.00)
 Monday 29th April 2013 (13.00-16.00)
 Tuesday 28th May 2013 (10.00-13.00)

If you have any questions about Service library resources or CARU events, please contact Sara Evans on 020 7783 2518 or sara.evans@londonambulance.nhs.uk.

Pre-hospital current awareness update

The below link will direct you to the National Ambulance Research Steering Group 'Pre-hospital emergency services current awareness update'. The update provides a digest of information supporting evidence based practice in pre hospital care and is published every two to three months:

<http://www.networks.nhs.uk/nhs-networks/nwas-library-and-information-service/documents/Emergency%20Services%20Current%20Awareness%20Update%20-%20Issue%20-%201.pdf>

STEMI care

The Clinical Audit & Research Unit released the latest STEMI Annual Report (2011-12) in December 2012. The report demonstrates the continuing high level of care provided to STEMI patients by our staff.

Overall STEMI patients received a prompt response with the time from the 999 call to arrival on scene averaging seven minutes. On arrival at scene, staff provided a thorough assessment, performing especially well in undertaking two pain assessments (the highest level ever at 91 per cent). Additionally, the majority of patients received aspirin and GTN (95 per cent and 97 per cent of patients respectively). However, the level of provision of analgesia to patients requires further improvement – with only 76 per cent of patients either receiving analgesia or having a valid exception to its administration. There remains a significant proportion of patients who are not receiving pain relief despite reporting some degree of pain. Staff should follow a 'step-wise' process of pain management based upon the patient's experiences and assessing whether Entonox, morphine, or a combination of the two is the most appropriate form of treatment.

ECG electrodes

Staff are reminded that when applying the new style ECG electrodes it is only necessary to **press on the white edge of the electrode** to secure it to the patient. Pressing on the blue centre of the electrode will force the wet gel onto the adhesive surface and make them less sticky.



Hand held pulse oximeters

Over the coming week a hand held pulse oximeter will be rolled out to every frontline vehicle. This comes with an adult and child probe. The unit comes in a bright yellow bag to make it as obvious as possible, this should be carried in the current response bag. The unit is clearly marked as property of the London Ambulance Service and will asset tracked through vehicle preparation.



Adjustable c-spine collars

Staff are reminded that the new adjustable c-spine collar must be measured and adjusted prior to application the size must not be adjusted once on the patient.



Drug pack reminders

Paramedic drug packs:

Paramedics are reminded that when working as part of a double paramedic crew they **should only draw one paramedic drug pack between them**. This allows a greater availability of drugs packs for your colleagues.

Paramedics should **draw morphine individually** and **both personal issue paramedic bags** should be carried.

Drug packs on vehicles:

All staff are reminded that it is unacceptable to leave a drug pack on a vehicle at the end of a shift. **Drug packs should be returned to the locker or handed over to the oncoming crew**. Leaving it on the vehicle presents legal issues and may result in the drugs leaving complex if the vehicle is moved.

Addisonian crisis

Addison's disease is a rare chronic condition brought about by failure of the adrenal glands. Life-long, continuous treatment with steroid replacement therapy is required. This aims to replicate the necessary amounts of the missing hormones (cortisol and aldosterone) that the individual can no longer produce from the adrenal glands. With the right balance of daily medication, most people with Addison's disease are able to continue life much as it was before their illness. However, if a person with this condition becomes very unwell (serious infection or injury) extra steroid medication should be taken. Without this extra medication, potentially life threatening symptoms known as **Addisonian crisis** may be experienced. All Addisonians are recommended to have an emergency injection kit at home and to wear a MedicAlert tag.

An Addisonian crisis occurs when an Addisonian faces extreme physical stress and does not get the extra steroid cover their body needs to meet that stress.

The causes of an Addisonian crisis

- Physical shock, eg a car accident
- Infection, eg flu with a high temperature
- Dehydration, eg stomach bug with vomiting

Both paramedics and EMT level 3 and 4 can administer an emergency hydrocortisone (100mg) injection in cases of Addisonian crisis. However, information is not widely available regarding how Addisonian crisis presents clinically; the following information should offer some guidance.

The symptoms of an Addisonian crisis:

- Extreme weakness
- Mental confusion
- Extreme drowsiness, in advanced cases slipping towards a coma
- Pronounced dizziness
- Nausea and / or vomiting
- Severe headache
- Abnormal heart rate – either too fast or too slow
- Abnormally low blood pressure
- Feeling extremely cold
- Possibly a fever
- Possibly abdominal tenderness

All of the above symptoms **do not** need to be present to administer hydrocortisone 100mg. In particular, vomiting needs very careful management and **after just two periods of vomiting the emergency injection should be given**. Hypotension is common and should be managed with fluid replacement in line with JRCALC guidelines.

More information on Addisonian disease / crisis can be obtained at the Addison's Disease Self Help Group website www.adshg.org.uk

Key clinical messages

Nebulisation and COPD

Staff are reminded that nebulisation in **known COPD patients** (and other patients at risk of type II respiratory failure) should be **limited to six minutes** once only (as per the British Thoracic Society Emergency Oxygen guidelines 2008 and Medical Director's bulletin dated 17 March 2010 regarding oxygen alerts cards). This will deliver most of the nebulised drug dose but limit the risk of hypercapnic respiratory failure. **COPD patients should also be transported to the centres at which they are receiving treatment if this is the primary problem.**

Speed of morphine administration

Paramedics are reminded that morphine should be given by slow intravenous injection over a period of minutes (some texts recommend a milligram per minute). Fast injection of morphine can result in an increased chance of side effects including histamine / urticarial rash and nausea / vomiting.

High risk ACS terminology

Staff are reminded when placing a pre alert call on PD09 to ensure they use the correct terminology. There are now three different cardiac pathways which require pre alert calls (emergency arrhythmias, STEMI and high risk ACS). If clear terminology is not used confusion may arise.

For patients presenting with ongoing ischaemic pain AND ST depression/T wave inversion, it is vital that the term '**HIGH RISK ACS**' is used so that the emergency medical dispatcher in EOC knows which speed dial option to use. Failure to use the correct terminology may result in delays to definitive care.

Importance of peak flow measurements

It is vital that where possible, peak flow readings are obtained in asthmatic patients (both before and after treatment). These measurements inform the clinician about airway calibre as influenced by bronchoconstriction and inflammation in the lining of the airway and is **one of the most important measurements of the severity of asthma.**



When the patient arrives in the emergency department the level of severity of the asthma attack will inform where the patient is managed e.g. in resus or majors and will also inform the treatment they are given thereafter.

ECG answers

ECG 1:

What does this ECG show?

This is a 12 lead ECG of a broad complex tachycardia, most probably ventricular tachycardia (VT). Note that the QRS complexes are broad (>120msecs in width).

What treatment would you deliver?

There are no antiarrhythmics indicated by JRCALC in this situation.

Where would you take this patient?

This patient should be conveyed to an emergency arrhythmia centre (provided they were picked up North of the Thames) with a pre alert call.

To qualify for conveyance to an emergency arrhythmia centre the following criteria must be met:

- ≥ 16 years old
- GCS >8
- Heart rate ≥ 120 bpm
- QRS width ≥ 150 msecs (in at least one lead)
- Rhythm **MUST** be regular
- No obvious evidence of STEMI/ACS

At present, this triage decision should only be made by a HCPC registered paramedic.

ECG 2:

What does the ECG show?

This 12 lead ECG shows complete heart block (CHB) also known as (third degree heart block). Most commonly CHB will present with a broad QRS complex. However, this ECG proves that the QRS does not need to be wide to diagnose CHB.

The way to identify CHB is by looking at the P waves and then looking at the QRS complexes. See how they are completely 'dissociated', i.e. the P waves are firing off at a steady rate and the QRSs are appearing at a steady regular rate yet they are completely dissociated i.e. there is an absence of a normal PR interval for each ECG complex.

This happens because there is a complete 'block' between the atria and the ventricles just below the AV node.

What treatment would you provide?

This patient should receive atropine 0.5mg (or 0.6mg – depending on the presentation available in the paramedic drug bag at the time (see Medical Director's Bulletin 121: Changes to the presentation of atropine sulphate). Further doses may be given in line with JRCALC guidance if the first dose is not effective.

Where would you take this patient?

This patient should be conveyed to an emergency arrhythmia centre (provided they were picked up North of the Thames) with a pre alert call.

To qualify for conveyance to an emergency arrhythmia centre the following criteria must be met:

- ≥ 16 years old
- GCS >8
- No obvious evidence of STEMI/ACS
- Response to atropine not important

At present, this triage decision should only be made by a HCPC registered paramedic.