



Have you seen?

Medical Director's bulletins

- **MDB 107:** SGA update
- **MDB 108:** Hospital trauma services update
- **MDB 109:** Changes to neuro surgical services in North London

Cardiac information
Circular: ROSC FAQs

ASCQI News

ASCQI is spreading, most of you should have received your pain tools by now or will do soon when the project launches on your complex. Some great crew ideas are being developed around the Service and we are seeing excellent improvements in the care bundle completion, as shown by CARU monthly care packs (March 2012), STEMI 77% (**don't forget two pain scores and analgesia in ACS**) and Stroke 97% - well done all!

Georgina Jones, Quality Improvement Fellow/End of Life Care Project Lead.

Caring for patients with a mental health disorder

In 2011, the Service identified improving mental health care as a priority. Patients with a mental health disorder make up approximately nine percent of the Service's workload, and improvements in this area have received wide spread support from patients.

In order to implement quality improvements, the Service needed first to identify the quality of the care currently being delivered to this patient group. Therefore a clinical audit was conducted which focussed on patients with a suspected or diagnosed mental health disorder. Results showed many examples of good practice including obtaining a general medical and past psychiatric history, recording allergies and medications, and assessing mental state. Crews appropriately described the patient's current condition, behaviour, ability to communicate and thoughts expressed on the majority of PRFs reviewed. A need for improvement was identified for some aspects of the care provided to this patient group which included: documentation of whether the patient is known to mental health services or has a care co-ordinator; the use of the capacity tool, and the completion of safeguarding referrals.

What care should be delivered to patients with a mental health disorder and what is the evidence?

1. It should be established whether the patient's condition has been diagnosed and if they are receiving care from any mental health professionals - this provides crews with a contact to get further information regarding potential risks and allows for the patient to be taken to a familiar place, with assessment being undertaken by familiar people.

If the patient is taken to A&E, this information can be used to inform the decision-making process regarding the patient's management. This may appear to be an obvious statement, but many clinical mistakes occur through failure to make use of available information. A patient with a newly diagnosed illness with psychotic symptoms and suspicious neurological or cognitive signs will require a variety of investigations to exclude organic disease. For example, acute changes in the mental status of elderly patients are often due to organic illness (eg UTI, pneumonia, CVA) and these should be reasonably excluded (eg urinalysis, chest x-ray, ECG, cerebral CT).

It will help the attending ambulance crew to know their patient's diagnosis as this may explain some of their presenting symptoms and inform how the crew should approach that individual.

2. The patient's medications should be documented - If a patient is aggressive this can sometimes be associated with the side-effects of medication. Therefore, it is important to establish what medication the patient is taking and its potential side effects.

3. The patient's mental state should be assessed - The purpose of a mental state examination is to assess the presence and extent of a person's mental impairment. This assessment should include a description of the patient's appearance. These features are significant because poor personal hygiene or grooming may reflect a loss of interest in self-care or physical inability to bathe or dress oneself. It can be useful to note things such as whether the patient is dressed appropriately according to the season. For example, note whether the patient has presented in the summer, with three layers of clothing and a jacket. These types of observations are important and may offer insight into the patient's illness.

An assessment of the patient's behaviour should be conducted. Behaviours to note may include patients talking to themselves in the ambulance/house or perhaps pacing outside the house or hospital.

4. The capacity tool should be used - To support conveyance decisions this tool should be used to assess the capacity of patients who present with a mental health disorder and refuse a specified course of action and/or treatment. If the capacity tool has not been used when a patient refuses treatment that the ambulance crew deem to be necessary, the Service has no evidence that the patient was able to understand and make an informed decision about that treatment.

5. A safeguarding referral should be completed - Patients with a mental health disorder may often be vulnerable. A safeguarding referral should be completed for all patients who are thought to be vulnerable, including where abuse or neglect is suspected. Safeguarding referrals must always be completed for those who have self-harmed or have attempted suicide. It is also important to complete safeguarding referrals for any children in the household who may be at risk of harm or neglect as a result of the patient's mental health disorder. See the 'Suspected Abuse of Vulnerable Adults Procedure' for more information which can be found on the pulse under Clinical > Safeguarding.

Kuda Dimbi, Clinical Advisor for Mental Health
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 Clinical Audit Officer, CARU.

Safeguarding

The case below is included as an addition to the case studies featured in March's issue of the Clinical Update.

One weekday early afternoon a friend of 66-year-old John called the Service expressing concern that his friend was threatening self harm and having angry outbursts. John lived alone and his past history included depression, alcoholism and chronic obstructive pulmonary disease. He took no regular medications, had normal observations, denied being suicidal and declined hospital conveyance. The attending crew believed he had capacity to make this decision and left him in the care of a friend. They were on scene for about an hour. About an hour later we received a second call that

John had had a knife (which the caller had removed) and was expressing suicidal ideation. When the second crew arrived John declined any observations to be taken. The crew documented he was alert, slightly agitated, looked well and was breathing normally. John again did not wish to be conveyed to hospital. The crew felt he had capacity to make this decision and he was left in the care of his friend. Three and a half hours later John was found hanged by the police and despite attempted resuscitation he remained asystolic and died.

This is a true case and highlights the safeguarding principle "to protect the vulnerable".

Vulnerable people may include those:

- With learning disabilities
- **With physical disabilities**
- With sensory impairment
- **With mental health needs**
- Who are HIV positive
- **Who misuse substances or alcohol**
- Who are recovering from substance misuse or with alcohol problems
- With dementia
- Who are sedated or anaesthetised

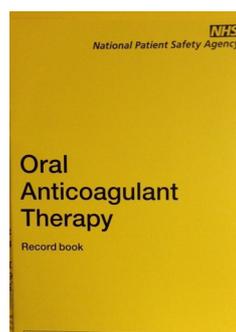
A combination of factors commonly exists (in John's case highlighted in red above) and increases the probability of the patient being vulnerable. If there are no or insufficient safeguarding provisions then a safeguarding referral is warranted. Furthermore recognising a vulnerable patient where concerns about suicidal ideation have been made may influence your immediate management and other options may arise. For example, calling his GP or a relative not only improves your background information but shares the problem and may open up other solutions. Additionally, the advisors on the Clinical Support Desk are available to discuss such cases.

Dr Daryl Mohammed, Assistant Medical Director, South.

A gentle reminder: action for patients on oral anticoagulants

What can you do to help?

When a patient on the oral anticoagulants warfarin, acenocoumarol or phenindione is coming into hospital for any reason (outpatient, elective, or emergency admission) please remind them to bring their yellow oral anticoagulant record book (or equivalent hand-held record) in with them in addition to their medication. This helpful step will improve care for the patient by ensuring that all the relevant information is available in the hospital setting and that appropriate decisions can be taken about ongoing anticoagulant care in a timely manner.



Oral anticoagulant record book

Background

Warfarin the most frequently prescribed anticoagulant, is classified as a high risk drug and is one of the leading causes of drug related hospital admissions. Characteristics of warfarin that can make it complicated include unpredictable patient response and numerous patient-specific factors that affect response such as: age, diet, alcohol intake, other drugs and health status. In addition, warfarin has a narrow therapeutic window, such that a small change in dose can have a significant affect on patient response, potentially leaving the patient at increased risk of adverse events.

A number of measures are required to minimise harm to patients taking warfarin, these include:

Regular monitoring of patients' blood clotting via the INR (international normalised ratio) blood test. If the INR is too high the patient may be at increased risk of a bleed while too low an INR may predispose the patient to blood clots. To avoid these risks, patients' INRs must be tested regularly and must fall within a 'target range' based on the warfarin indication. The patient's dose of warfarin is adjusted as required in an effort to keep their INR within the target range. The monitoring of patients' INRs and subsequent dose adjustment of warfarin in the outpatient setting is undertaken by anticoagulation clinics, these may be based in secondary or primary care.

Appropriate documentation and communication: All patients on warfarin should know the details of their anticoagulation therapy (name of anticoagulant, indication, target INR, duration of therapy) and their anticoagulation clinic contact details. Further, it is a requirement that anticoagulation clinics provide an up-to-date, patient-held record of warfarin therapy.

The most widely used tool is the nationally recognised yellow book. In addition to general details, this book also contains the record of the patient's INR results and corresponding doses of warfarin together with monitoring appointment dates maintained as an up to date record by the patient's anticoagulation clinic. There are a small number of clinics that do not use the yellow book, however they are still required to provide the patient with an up-to-date hand-held record.

On admission to hospital, patients on warfarin will need to have their INR tested as a matter of urgency to ensure that they are not at risk of thrombotic or haemorrhagic events. If the patient needs to continue warfarin this will be prescribed, ideally at this point, the prescriber will have access to the patient's up to date yellow book which in addition, to providing details of the patient's warfarin indication, target INR, duration of treatment and usual anticoagulation monitoring clinic will also provide information on the recent INRs prior to admission and the current dose of warfarin.

The yellow record book also provides an important picture of the patient's anticoagulation control. This information aids decision-making about the management of the patient including inpatient prescribing of warfarin. However, frequently for both elective and emergency admissions the warfarin patient does not bring their yellow book (or alternative record if applicable) in with them. Additional efforts are therefore required to elicit this information from numerous sources to build up a complete picture of the patient's warfarin management, this is frequently time-consuming, particularly if the patient is not well enough to communicate or the anticoagulation clinic is not known.

Important notes:

1. Acenocoumarol and phenindione are two anticoagulants that are similar to warfarin, they are not used frequently but require INR monitoring and record maintenance in exactly the same way as warfarin. Therefore, please advise patients on these anticoagulants to bring in their yellow books (or equivalent) also.
2. There are now newer oral anticoagulants available which do not require INR monitoring, they are: dabigatran, rivaroxaban and apixaban. Although they do not require routine blood clotting monitoring there are still risks associated with them as all anticoagulants increase patients' propensity to bleed. As such, patients on the newer oral anticoagulants should be issued with an alert card (although this is not currently happening consistently). These cards are currently different colours depending on the anticoagulant (not yellow as for the older oral anticoagulants). Therefore we are also asking our Service colleagues to be vigilant of these newer oral anticoagulants and where possible make sure patient's admitted not only bring their anticoagulant medication in but also any associated alert cards.

For further information please contact the Medical Directorate.

Exertional heat stroke: A rapidly progressive pre-hospital presentation

On a day when outdoor temperatures reached 30°C the ambulance service responded to a 19-year-old male collapsed in the late afternoon. His first day of employment for a local building company had been spent working outside on the roof of a residential property. He had applied sun cream and hydrated often. His work colleagues were emphatic that he'd been well all day but within 10 minutes had become disorientated, vomited and collapsed.

An ambulance crew and paramedic single responder arrived 10 minutes post 999 call. The patient was found collapsed on the driveway and a work colleague was holding an electric fan over him. Primary Survey revealed a partially occluded airway from neck flexion and vomit, tachypnoea and a weak radial pulse at 170. The patient had no motor response and remained flaccid. Additionally he felt hot.



Initial management involved a head tilt, mechanical suction, oral pharyngeal airway, high concentration oxygen and removal of clothing. He was placed on a stretcher and

removed to the air-conditioned ambulance. An IV was placed and monitoring attached. Further observations were noted: SpO₂ 90%, BP 96/79, narrow complex tachycardia (Lead II), tympanic temperature above 42.2°C and BM 9.7mmols. Ensuing bradypnoea then subsequent apnoea was addressed with bag valve mask (BVM) ventilations but the face seal became problematic. A Laryngeal Mask Airway (LMA) was quickly sited with an ETCO₂ of 55mmHg. At this point right pupillary dilation was noted.

A pre-alert to the local DGH ED was placed but after five minutes the patient's narrow complex tachycardia widened and became bradycardic. Within one minute he suffered a PEA cardiac arrest. Large volumes of watery haematemesis began to bypass the LMA airway and a decision was made to intubate. ETCO₂ remained high and with full ALS underway the journey to ED was recommenced.

The patient received an hour of resuscitation at the ED before life was pronounced extinct. The post mortem report gave the cause of death as multiple organ failure following hyperpyrexia. HM Coroner stated that there was no organic reason for death and no evidence of drugs. Essentially the patient had an extreme elevation in body temperature most likely caused by working outside in the heat.

Heat related mortality is rare in the UK with an estimate of 40 cases per million¹. Factors contributing to dangerous elevations in body temperature include high external temperatures, humidity, physical exertion, age, drug and alcohol intake and medical conditions¹⁻³. There is a significant quantity of literature covering the continuum of heat illness up to heat stroke¹⁻⁵ where the degree of hyperthermia depresses the hypothalamus and a vicious positive-feedback mechanism exists between rising temperatures and increasing metabolic rate⁶. Heat stroke is defined as body temperature above 40-41°C combined with an altered mental state^{2,3,5,7}.

Classic heat stroke is seen in the context of high environmental temperatures eliciting a response in the elderly, the young, those with chronic illnesses or alcoholism^{2,3}. The progression of this illness is more protracted over days⁷. However, exertional heat stroke is characterised by strenuous activity undertaken by young, fit, healthy individuals in hot and humid conditions. Its onset is more sudden and rapid, described as over hours⁷. Although little literature exists concerning speed of onset of symptoms and death, body temperature can rise from normal to 41°C within 15 minutes² making management extremely difficult. Clinically patients may present with hot dry skin, headache, confusion, ataxia, vomiting and diarrhoea, cramps, tachycardia, tachypnoea and decreased consciousness^{2,3,7}. Further instrumental observations may reveal hypotension and hypercapnia⁷.

For UK paramedics pre-hospital treatment options include airway management, high concentration oxygenation, removal of clothing and the patient to a cool environment and replacement of fluids orally, or IV – titrated to regain absent radial pulses³. The Joint Royal Colleges Ambulance Liaison Committee advocates approaches to cooling including fanning, tepid sponging and soaked sheets. However, it guides against using cold water due to heat retention secondary to vasoconstriction³. Other literature describes the need for aggressive cooling measures including ice packs^{1,5,7}. In this case study ambulance attendees found that on-going airway management requirements and the rapid progression to respiratory and then cardiac arrest focused their attention away from other cooling methods.

This case highlights how rapid and fatal exertional heat stroke can develop despite precautions having been taken by the patient. Although it is unlikely that ambulance crews or ED practitioners would encounter such an aggressive presentation, knowledge of early signs and symptoms could prevent fatal deterioration.

References:

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2. Caroline, N (2008) Emergency Care on the Streets. Sixth Edition. London: Jones and Bartlett
3. Joint Royal Colleges Ambulance Liaison Committee (2006). UK Ambulance Service Clinical Practice Guidelines 2006. London: Joint Royal Colleges Ambulance Liaison Committee/Ambulance Service Association, 2006:119
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5. Helman, R (2009) Heatstroke [online]. Available at: <http://emedicine.medscape.com/article/166320-overview> [Accessed 1 March 2012]
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Nick Brown (Paramedic Team Leader, Bromley and HEMS Paramedic)

Blood sugar – can we make a difference?

Background Information:

It is estimated that 25% of diabetes in the general population is undiagnosed.

Type 2 diabetes is commonly associated with raised blood pressure, a disturbance of blood lipid levels and a tendency to develop thrombosis. It is notable for the increased cardiovascular risk that it carries: coronary artery disease (leading to heart attacks, angina); peripheral artery disease (leg claudication, gangrene); and carotid artery disease (strokes, dementia). The specific ('microvascular') complications of diabetes include eye damage (blindness), kidney damage (sometimes requiring dialysis or transplantation) and nerve damage (resulting in amputation, painful symptoms, erectile dysfunction, other problems).



Many people with Type 2 diabetes have the same risk of a cardiovascular event as someone without diabetes who has already had their first heart attack; people with diabetes and a previous cardiovascular event are at very high risk – around 10 times the background population.

There is good evidence that early management of abnormal blood sugar levels benefits patients with known or developing diabetes.

Service developments:

Crews routinely record blood glucose measurements on many patients, including all those aged over 40. There is no certainty that this information ever reaches the patient's GP, or results in earlier investigation.

Starting in July 2012, the Service will be able to pass this information to GPs.

- If the BM is between 8 and 12.9, information will be passed on to the patient's GP when the PRF is scanned.
- Patients with a BM of 13 or more are considered to be at greater risk. In these cases, we are working with the Referral Support Team (RST) to develop a service whereby crews will be asked to contact the RST with the patient's details and the RST will in turn contact the patient's GP. It is hoped that this will prompt urgent investigation. Arrangements have yet to be made with the RST regarding the go-live date for this service, it is not yet available.
- At the same time, we plan to introduce a system to provide a call-back to patients who have had a hypoglycaemic episode treated by ambulance personnel. This will be useful reassurance for this worrying group of patients. Again, this will be facilitated through RST, with a ring-back being carried out by the clinicians in Clinical Telephone Advice (CTA).

These two new initiatives address preventative aspects of practice and will be closely audited. A Medical Director's Bulletin will be issued closer to the time the system goes live.

Dr Peta Longstaff, Assistant Medical Director West and Dr Neil Thomson, Assistant Medical Director East.

Foot problems in diabetes

Case study:

Called to a 57-year-old male type 2 diabetic smoker at GP practice with necrotic second toe of left foot that was foul offensive smelling, red and hot. The patient felt weak, breathless and had "collapsed" previous day. Not seen by the GP for two years. BM 31.1. Irregular pulse. Patient taken quickly to hospital and vulnerable adult form completed.



The diabetic foot

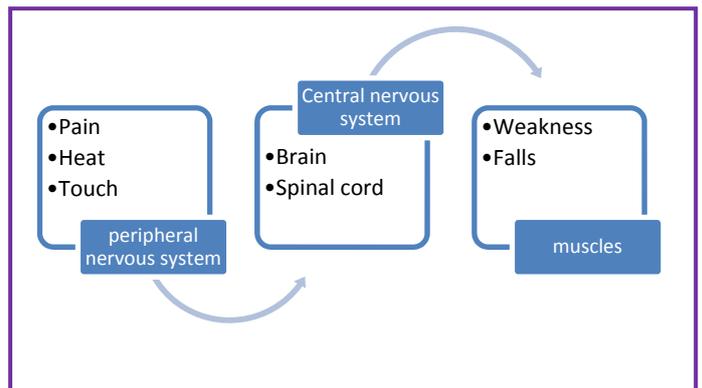
People with diabetes are at increased risk of **peripheral arterial disease** and **neuropathy**, as well as having a higher risk of developing infections and decreased ability to clear infections. Therefore, people with diabetes are prone to frequent and often severe foot problems and a relatively high risk of infection, gangrene and amputation.

Neuropathy

The peripheral nerves provide communication between the brain/spinal cord and the organs, blood vessels, muscles, and skin. The brain's commands are conveyed by motor nerves, and information is delivered back to the brain by the sensory nerves. With peripheral neuropathy these nerves don't work properly due to damage of a single or group of nerves. It can affect the **sensory** nerves that convey pain, touch and heat sensation to the central nervous system and often causes numbness and pain in hands and feet. People typically complain of tingling or burning, and may compare the loss of sensation to the feeling of wearing a thin stocking or glove.

The loss of sensation in the feet means patients don't appreciate pain, heat or touch in their feet which can lead to ulcers or unrecognised injuries/wounds. It can also affect the **motor** nerves going to the muscles resulting in weakness and may contribute to falls. Peripheral neuropathy can also affect the **autonomic** nervous system that control functions such as blood pressure, heart rate, digestion and bladder function.

One of the most common causes is diabetes. Peripheral neuropathy can result from problems such as traumatic injuries, infections, metabolic problems and exposure to toxins.



Peripheral Arterial Disease (PAD)

Peripheral arterial disease (PAD) is a complication of diabetes that happens when there is narrowing of the lumen of arteries in the legs, causing a reduction in circulation.

This occurs gradually and is usually due to atherosclerosis. The result is reduced blood flow to the feet and legs. The condition affects one in three people with diabetes over the age of 50, and increases the risk of heart attack and stroke.¹ Smoking, hypercholesterolaemia, and hypertension are significant risk factors. By extrapolation, a diabetic with peripheral artery disease is probably also going to have diseased coronary and cerebral arteries.

50% of the people with amputations will develop ulcerations and infections in the contralateral limb within 18 months. An alarming 58% will have a contralateral amputation three to five years after the first amputation. In addition, the three-year mortality after a first amputation has been estimated as high as 20-50%, and these numbers have not changed much in the past 30 years, despite huge advances in the medical and surgical treatment of patients with diabetes.²



Symptoms may include:

- Feeling numb or cold in the lower legs
- Leg (calf) pain / heaviness on walking (called claudication)
- Nocturnal cramps
- Infections or sores on the feet or legs
- Gangrene
- Extended healing process
- The wounds of patients with severe vascular disease heal poorly because of inadequate blood supply. Therefore minor trauma or pressure often leads to ulceration. This is called a vascular ulcer (sometimes also known as arterial ulcer or ischaemic ulcer). It tends to be situated on the edge of the foot or toes because blood supply is the poorest at these sites. In a purely vascular ulcer, nerve function is normal and sensation is intact, hence vascular ulcers are usually painful*.
- If there is peripheral neuropathy as well the ulcer may be less painful or painless.

In the case above the patient has ischaemic heart disease, is a type 2 diabetic who smokes and is poorly compliant. The pain score was zero and he probably has both peripheral neuropathy and peripheral arterial disease. There is every chance he might lose his left foot and long term prognosis is poor.

If you are diabetic and have symptoms of peripheral neuropathy or arterial disease and have not had medical assessment you are advised to do so.

*Varicose vein ulcers are situated on the leg (rather than in the foot)

References

- 1 – Diabetes.co.uk (accessed 11/05/2012)
- 2 – Clinical Diabetes April 2006 vol. 24 no. 2 91-93

Dr Daryl Mohammed, Assistant Medical Director South

ROSC: frequently asked questions

The below FAQs are taken from the recently released ROSC Cardiac Information Circular:

Q1. What is meant by unstable?

A1. You could say all patients who achieve ROSC are by definition unstable. For the ROSC management guidance issued by the Service, consider patients who have unstable vital signs (ie BP and heart rate).

Q2. Once ROSC is obtained vital signs should be obtained in all cases?

A2. Yes, vital signs form the basis for good and effective on going patient care. The vital signs that should always be recorded are BP, SpO₂, EtCO₂ and ECG rhythm assessment. A 12 lead ECG should also be recorded if appropriate i.e. cause of the cardiac arrest if believed to be cardiac. If the cause is clearly not cardiac (ie drug overdose/trauma) a 12 lead is not required.

Q3. If the patient is hypotensive (systolic <90mmHg) 250ml of normal saline should be given?

A3. Yes, a bolus of 250mls of normal saline can be administered once the vital signs have been recorded. If there is *obvious* pulmonary oedema then consideration should be given as to the need for further fluid. This is not a common occurrence and therefore 250mls is safe in most cases.

Q4. Can I give a further bolus of 250mls normal saline?

A4. No, unless you have contacted the clinical support desk/on call medical advisor within EOC to discuss your reason why further fluids are required.

Q5. Is it OK to give atropine post cardiac arrest?

A5. Yes, atropine should be given as per current clinical guidelines.

Q6. If the patient is hypotensive and bradycardic which should I give first, fluid or atropine?

A6. Usually an IV line with fluid will already be connected by the time ROSC has been achieved, so it would be logical to start the fluid running in while the atropine is made ready.

Q7. At what point do I consider the administration of adrenaline 1ml of 1:10,000 (100mcg)?

A7. Adrenaline should only be considered after 250ml of fluid has been administered and there is NO radial pulse, plus the heart rate is >40bpm. If the heart rate is <60, atropine should be considered BEFORE the adrenaline. Remember, the blood pressure must be <90mmHg (and the heart rate <100bpm).

Q8. We are asked to stay on scene for at least 10 minutes once ROSC is achieved, at what point does the 10 minutes start from?

A8. The 10 minutes is a guide only and each case will require a clinical assessment to be made to determine when removal should take place. In most cases the time starts when sustained ROSC is obtained.

Q9. Do I convey all adult patients with ROSC to the nearest cath lab?

A9. NO, only patients with ROSC who have clear ST elevation on the 12 lead should be conveyed to the cath lab, this is regardless of the patient's GCS.

Q10. Where do I get further clinical information from while at the patient's side?

A10. Contact your sector desk via radio to request that CSD contact you. Alternatively you may phone CSD directly.

Mark Whitbread, Consultant Paramedic

i-Gel Educational DVD

The new i-Gel educational DVD is now available on the pulse. To access it please use the address:

<http://thepulse/patients/13376984953292.html>

Trauma reminders

- If a patient triggers the major trauma tree and is being taken to a major trauma centre (MTC) a pre alert call should be placed.
- Remember that a significant distracting injury (such as a broken limb or deep laceration) is an indication to consider spinal immobilisation in blunt trauma. There have been a number of recent cases where patients with injuries such as fractures who have been subjected to a significant mechanism have not been immobilised.
- Keep using the triage tree - it works and is both sensitive and specific to major trauma, if you have a trauma patient check the trauma tree (don't just take them to an MTC). If you feel that your patient would benefit from a MTC but they do not trigger the tree don't just convey them, contact the HEMS desk and discuss the case with the trauma paramedic. Over triage, ie taking patients to a MTC that do not trigger the tree often causes the MTCs to become over burdened with patients that do not benefit from the services of a MTC, subsequently effecting the centre's ability to manage the patients that do need to be there. If in doubt speak to the HEMS paramedic in EOC.

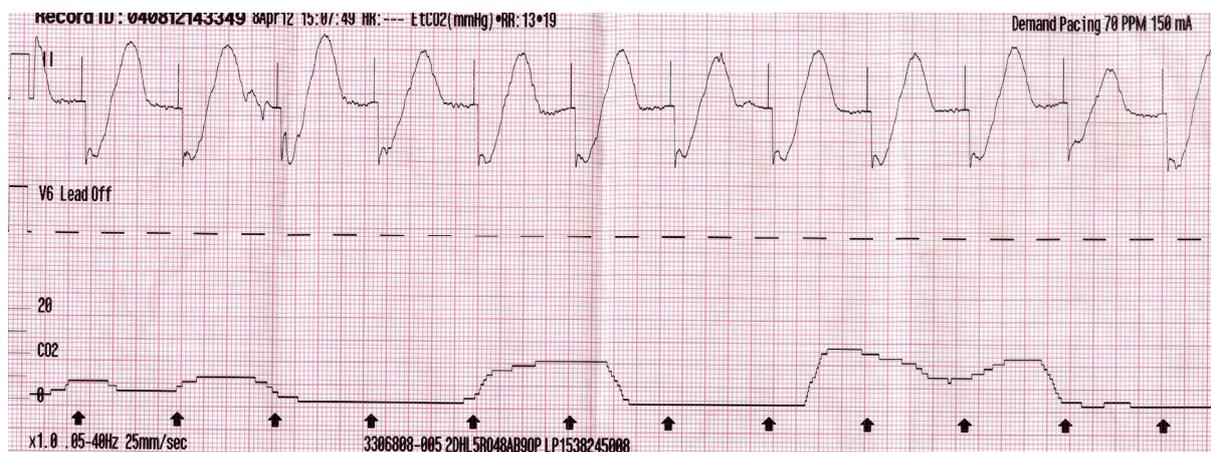
Mark Faulkner
Paramedic Advisor to London Trauma Office
& Clinical Advisor to Procurement Department

External pacing case study

The below is a case study sent in by a member of staff who has undergone pacing training as part of a small ongoing study. Please note, the option to 'pace' is only available to those members of staff who are part of the study and have undergone specific training in this skill.

We attended an 80-year-old male, who was in a peri-arrest collapsed state with an irregular breathing pattern, unrecordable blood pressure (BP) and a GCS of 04 (E1, V2, M1). The monitor showed wide complex bradycardia at a rate of 34 per minute with frequent ventricular pauses of around 2 to 3 seconds.

Ventilation was assisted, intra-osseous access established and fluid resuscitation initiated, however only a partial response to atropine was observed. Each dose of atropine would only succeed in raising the ventricular rate for about three to four minutes, during which time frequent ventricular pauses were still observed. Atropine therapy was abandoned after 1.5mg cumulative dose at which time a systolic BP of 50mmHg was noted. At this point the decision was taken to use external pacing in order to attempt



Above: Actual rhythm strip from patient. Described in case study

To artificially increase the ventricular rate and therefore cardiac output and blood pressure. The Lifepak 15 defibrillation pads were attached and electrical capture (electrical stimulation of the heart, ie a pacing spike followed by a ventricular complex seen on the monitor) was achieved at 120mA and a rate of 70 per minute. Mechanical capture (output as a result of pacing, ie a pulse corresponding to the ventricular complexes seen on the monitor) was initially difficult to determine due to the extreme haemodynamic compromised state and the fact the pacing caused muscular twitching in the neck muscles, making it difficult to palpate a carotid pulse. However, within five minutes we achieved a systolic BP of around 100mmHg and the patient began to respond verbally, we were able to cease assisted ventilation and transfer to high flow oxygen.

The patient was successfully extricated and transferred to hospital without adverse event, arriving with a systolic BP of 100mmHg and GCS=12 (4/3/5).

Joe Davies, Paramedic, Fulham Complex.

Patients taken ill on trains

The Service receives a significant number of emergency calls every day from train operating companies with regard to people who have been taken ill on trains. For the vast majority of these the railway staff will move the patient off the train prior to a Service response arriving on scene. However in a small number of cases patients have been left sitting in trains waiting for us. Often this has been at the request of well meaning first aiders or health care professionals. Unfortunately this can have significant effects on the railway networks, and may lead to other people becoming ill – especially where trains are backed up in tunnels.

Staff are reminded that if they are called to treat a patient who is still on a train, that the patient should be removed from the train as soon as it is safe to do so, ideally to the back of the platform or the cross passageways. Station staff should be able to assist in identifying a suitable location, and can if needed request that no further trains stop at that platform whilst treatment is continued. If for any reason there is a delay in moving the patient from the train, EOC must be updated with the reason.

Stephen Hines, PLM (Clinical) Control Services.

Patient specific protocol (PSP) case study

This case study is an example of how useful a PSP can be and how invaluable the CSD is in advising and supporting the crew in order to achieve the optimum outcome for the patient. The CSD received a request to call a crew urgently. On ringing the crew back the clinical advisor on CSD was informed that the crew were on scene with a patient with a total artificial heart who was awaiting a transplant. The patient did not inform the crew that he had a PSP in place.

The patient had two machines, one of which was malfunctioning and the patient had transferred to the second backup machine which was unfortunately alarming. The clinical advisor checked the PSP index held in EOC and found that the patient did actually have a PSP. The PSP contained instructions to ring Papworth Hospital in an emergency and speak to the on call transplant registrar. The Clinical Advisor spoke to the on call registrar whilst the crew were 'conferenced in'. A cardiac surgeon at Papworth was also conferenced in who stated that this was the only patient in the UK with such a device and that he should be conveyed to Papworth immediately. If this patient did not have a PSP then they may have been conveyed to the nearest emergency department who would not have been able to provide the highly specialised care the patient required.

Correction:

The following statement was released in the Sept 2011 Clinical Update:

Did you know updated JRCALC guidelines on Diazepam were released in May 2010? The main changes include the following:

- Diazepam may be repeated for adult patients **after 10 mins** (instead of after 5 mins).
- Diazepam may be repeated for children once (the time frame of 'after 10 mins' has been added).

The information above regarding children **only** relates to PR dosages. To clarify, if a dose of PR diazepam is given to a child, this may be repeated after 10 mins if ineffective. However, if the first dose was given IV then a second IV dose is not indicated. In most cases, a PR dose should be given initially as this will be quicker and easier to administer.

Paediatric pain management

In order to continue to improve the assessment and management of pain in children the Service has audited the care given to this patient group and made recommendations for improvements.

An initial clinical audit of the pain management of children who presented to the Service with a potential fracture in 2006 found that improvements were needed in both the assessment and treatment of pain. As an outcome of this initial clinical audit, laminated cards were issued to crews featuring an adapted version of the Wong-Baker faces pain scoring tool for use with children. Findings of the clinical audit were also shared with the MHRA as evidence for their consideration of the paediatric friendly analgesic options that are available in the pre-hospital setting.

Six years on, this area of patient care has been re-audited by the Service to see if the actions taken following the initial clinical audit have led to improved care and the results are pleasing. There have been vast improvements in the assessment of pain in children, with 96% of patient's pain now being measured. This is a 32% improvement from 2006 and demonstrates that the introduction of the Wong-Baker faces pain scoring tool has been effective in aiding crews to assess pain in children. Analgesia was administered to 66% of patients found to be in pain, which is a 43% improvement from 2006. Although there are still some improvements that need to be made to ensure all children in pain are given analgesia, these findings show that progress is being made. Immobilisation use had, however, not improved. Only 22% of patients had their injured area immobilised. As a result of this audit, clinical training on immobilisation techniques, and the equipment available for this purpose will be reviewed.

The provisional findings of this re-audit have been influential in the development of a new pain management tool that is being issued to crews as part of the Ambulance Services Cardiovascular Quality Initiative (ASCQI) rollout.

A copy of the full Paediatric Pain Management Re-audit Report can be found on <http://thepulse> >Clinical>Clinical Audit & Research Unit>Clinical Audit>Clinical Audit Reports.

Frances Sheridan, Clinical Audit Officer, CARU.

Seizure management

The aim of this article is to review the management of seizures and to discuss where pre-hospital seizure management crosses over to emergency department management. By reviewing the seizure management algorithm pre-hospital clinicians can have an understanding of the important role they perform in the overall management of seizure patients.

When treating a patient who is actively suffering from a seizure, the prehospital clinician should always consider what the underlying cause may be. Past medical history and events leading up to the seizure are important information to obtain. There are many different causes of seizures, for example; hypoxia, Hypo/hyperglycaemia, epilepsy, syncope, drug induced (alcohol, opiates withdrawal) or drug overdose (eg tricyclic antidepressants), cardiac arrhythmias, sepsis (meningococcal septicaemia), increasing intracranial pressure (head injuries, meningitis), eclampsia, electrolyte abnormalities, pyrexia (febrile), and hyperthermia caused by illicit drug use (amphetamines, MDMA, cocaine toxicity (Delvin et al 2008)).

Management of seizures

Step one:

Hypoxia - Every effort needs to be made to reverse hypoxia. This may require positioning the patient on their side for postural drainage, securing the airway with a nasopharyngeal airway (NPA), applying a jaw thrust or administering oxygen therapy as per JRCALC oxygen guidelines 2009. Seizures secondary to hypoxia usually present as myoclonic twitching of the muscles that cease once the patient is effectively oxygenated.

Blood sugar levels (BSL) - There is not a defined BSL that causes seizures and all levels below 4mmol should be treated. These patients should receive intravenous (IV) 100mls boluses of 10% glucose (as per JRCALC). IM glucagon is usually less effective as the patient may have used all available glycogen stores and the absorption rates are unreliable.

Step two:

5 minutes – Drug therapy should be used if the patient has been having a seizure for > five minutes (and where the seizure is still ongoing), or if seizures recur in rapid succession without time for full recovery in between (JRCALC 2006, Update). Unless the patient is believed to be suffering from an eclamptic seizure, then diazepam may be given after two to three minutes.

Step three:

Adults – IV access is the preferred choice for drug administration in the adult patient. If IV access cannot be gained the rectal (PR) route can be used.

Paediatrics – Rectal (PR) drug administration is the preferred route for the majority of paediatric seizures. The earlier the drug is given the more likely the patient is to respond, which is why the rectal route is preferred in children (JRCALC 2006). If the child has been prescribed 'buccal' midazolam this is the preferred route.

Diazemuls/diazepam– IV Diazemuls should be **TITRATED** to effect in the patient actively having a seizure. Diazemuls or Diazepam (stesolid) is an anticonvulsant and strong sedative which can cause severe hypotension, respiratory depression and has a half-life of more than 30 hours. For these reasons every effort should be given to titrate the drug to effect and not administer as a bolus.

Buccal Midazolam– Buccal Midazolam is not carried by paramedics. The drug is prescribed and administered to a group of patients in the community that are known to have repeated seizures or highly sensitive to Diazemuls/diazepam (may cause severe respiratory depression). Within this group buccal midazolam is the preferred drug for terminating seizures. Buccal midazolam is administered into the lower buccal cavity between the gum and cheek usually using a 1ml syringe and is presented as 10mg/ml solution. Each child will have their own dose that the parents will be aware of, if unsure then contact the Clinical Support Desk. The half-life of midazolam is two hours.

Step four:

10 minutes - Once the first dose of Diazemuls/diazepam or buccal midazolam has been administered, the clinician should wait 10 minutes before administering the second dose. If the patient is still having a seizure after 10 minutes 'step three' should be repeated. However, where possible **the patient should be removed to hospital without delay.**

Buccal Midazolam – If the first anticonvulsant drug administered was buccal midazolam and the patient is still having a seizure after 10 minutes then a second dose of buccal midazolam can be given. If the patient received Diazemuls/diazepam as their first anticonvulsant drug but they have been prescribed buccal midazolam then this can be given as the second anticonvulsant drug instead.

Alternative anticonvulsants

Paraldehyde (anticonvulsant)

A small group of patients have been prescribed the anticonvulsant Paraldehyde for use in the community. These patients may have a patient specific protocol (PSP) held by the Service. In the case where paramedics are required to administer this drug the clinical support desk may be contacted. Paraldehyde is administered PR and needs to be mixed with olive oil prior to administration. This is single dose only.

Drug dosages

All drug dosages must be checked and administered as per JRCALC guidelines.

Transport to hospital

A patient suffering from a seizure is a medical emergency. **The treating clinician should make an early decision to move to hospital and a pre alert call placed.** All necessary treatment can be administered en route to hospital.

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James Rouse, Paramedic

Rash decisions

Around **3,400 people** are affected by bacterial meningitis and septicaemia in the UK each year. Meningitis can kill in under **one** hours and **one in 10** victims will die. **One in seven** of those who survive will be left with a permanent disability such as loss of limbs, blindness, deafness or brain damage.

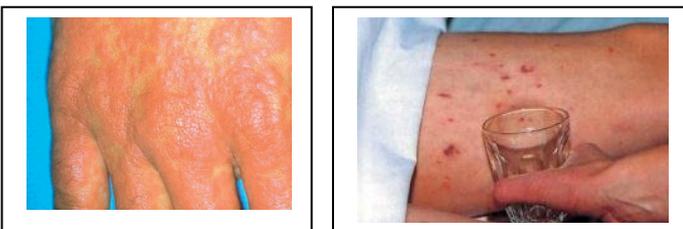
Although babies and young adults are at highest risk of meningitis, students at colleges and universities are the second most at risk group, mainly due to their living arrangements and lifestyles.

The rapid progression of meningitis and septicaemia makes both timely diagnosis and treatment crucial. A huge amount of emphasis is placed on the presence of a non-blanching rash and photophobia, but in reality signs and symptoms are often a lot more subtle.

Differentiation from more common illnesses such as influenza is often a challenge. No single symptom or sign is necessarily diagnostic – it is a clustering of features combined with a lack of any obvious focus for the infection that should raise suspicion. Unfortunately, classic signs are not usually present in the early stages.

A pupuric non blanching rash usually only appears in the advanced stages of illness (when prognosis is poor) and is only present in 50 percent of those cases seen in primary care. In the earlier stages, if a rash is present, it may be a blanching maculopapular rash (looks like flea bites). As only one or two marks may be present initially, examine the whole of a child's body in good light paying particular attention to areas where there are folds and creases in the skin.

Muscle pain in the extremities, neck or back, but particularly in the anterior thigh may be an early symptom of bacteraemia. This may occur in both adults and children and is more pronounced in patients with meningococcal meningitis.



Images showing maculopapular rash (left) and pupuric rash (right)

Be cautious if a patient with severe pain at any site also has a raised temperature. Vomiting, especially when associated with a headache or abdominal pain is another early clue. Children under the age of two years rarely display meningeal signs such as neck stiffness or photophobia, so other signs such as behavioural changes and an altered level of consciousness will be the predominant clues as to the severity of illness.

Vomiting, irritability, high pitched/ moaning cry or loss of appetite may also be crucial clues indicating that something may be amiss. In children under the age of three months only 15 per cent will have a bulging fontanelle and only 10-15 per cent will have neck stiffness. Take parents' concerns seriously as they will be most attuned to their child's normal behaviour. Meningitis and septicaemia are fearsome diseases with a high morbidity and mortality.

Making an early diagnosis is a challenge given the lack of specific signs and symptoms at this stage. Be alert to warning signs and take the time to examine febrile patients carefully. Finally, trust your instincts – a false alarm is better than a 'wait and see' approach.

Regarding treatment in the prehospital environment, the main messages are:

Early removal, early benzylpenicillin, early fluids and oxygen.

There has been much discussion regarding this within the JRCALC Guideline Development Group and essentially, the consensus agreement is that UK ambulance services should be following the NICE guideline which states '**no non blanching rash - no antibiotic**'. However, the need for continued observation, to look for a developing rash, and rapid conveyance to the nearest emergency department is stressed.

For more information visit:
www.meningitis-trust.org

Jo Smith, Clinical Advisor to the Medical Director

Falls

We successfully referred significant numbers of patients who had falls last year, well done all! Whilst this is encouraging there are still a large number who could benefit, 35% of our non conveyed patients who had falls were not referred for follow up. This service can help to reduce the chance of subsequent falls and improve the patient's general health. The patient can be quickly and easily referred using the Airwave phone directory or by calling the Referral Support Team on 0207 407 7181.

ACPS

Crews are reminded to use the correct suffixes when using appropriate care pathways, eg Trauma 'T', HASU 'S', Urgent Care Centre 'U' – this is important so we can determine if we are transporting patients to the correct location based on their needs.

Emma Williams, Service Development and Policy Manager

Female genital mutilation: reporting suspicions

Following recent media coverage, we ask staff to familiarise themselves with the actions they need to take where they have reason to believe that a girl **has undergone, or is at risk of** undergoing female genital mutilation (FGM).

It is an offence for anyone in the UK to perform FGM. Under the Female Genital Mutilation Act 2003, a person is guilty of an offence if they excise, infibulate or otherwise mutilate the whole or any part of a girl's or woman's labia majora, labia minora or clitoris except for clinically necessary surgical operations and operations carried out in connection with childbirth. It is also an offence to assist a girl to mutilate her own genitalia, or to take a girl outside the UK for the purpose of carrying out FGM.

FGM is prevalent in 28 African countries as well as in parts of the Middle East and Asia. It is estimated that over 20,000

girls under the age of 15 are at high risk in the UK and that around 66,000 women in the UK are living with the consequences. The age at which girls undergo FGM varies enormously. The procedure may be carried out when newborn, during childhood or adolescence, just before marriage or during the first pregnancy. The majority of cases are thought to take place between the ages of five and eight.

Those who undergo FGM may present with a wide range of health problems including:

- severe pain and injury;
- chronic infections;
- difficulties with menstruation and passing urine;
- mental health and psychological problems;
- sexual problems/damage to the reproductive system, including infertility;
- complications during childbirth

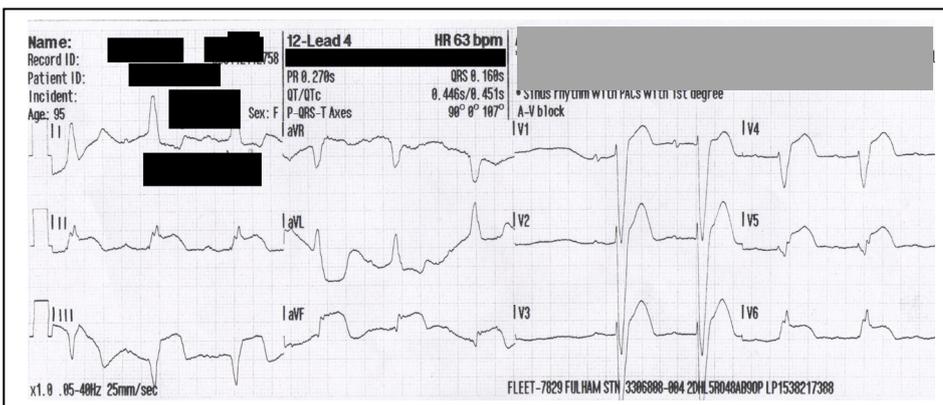
It is important that staff do not let fear of being branded 'racist' or 'discriminatory' weaken the protection required by these children. **Staff should follow Service safeguarding procedures when they suspect that a child may be at risk of FGM by completion of a LA279** which is faxed to EBS.

Where there are urgent or significant concerns around the risk of FGM the Metropolitan Police Service must be informed. Responsibility for investigating whether FGM has been carried out rests with the police and should not be conducted by staff.

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_124551

Lysa Walder, Paramedic and Safeguarding Children Advisor

ECG questions and answers



This issue's ECG (left)

By popular request the answer to each month's ECG will be provided in the same Clinical Update. The answer to this month's ECG is revealed on the back page.

This ECG belongs to a 95-year-old patient who had suffered a brief period of unconsciousness. On the arrival of the crew her GCS was 15 and was complaining of non radiating, central chest tightness (pain score 3/10). The patient was not pale or clammy. Her PMHx included previous cardiac problems and known LBBB. Enroute to the ED the patient developed bradycardia, hypotension and reduced GCS which responded well to atropine.

What is abnormal about this ECG?

Last issue's ECG (right)

This ECG belongs to a 62-year-old male who had an ICD fitted six months previously to correct atrial flutter. The patient complained of intermittent palpitations, chest pain and shortness of breath earlier in the day. On arrival he was pain and palpitation free. Observations: BP 146/99, RR 20, BM 6.6.

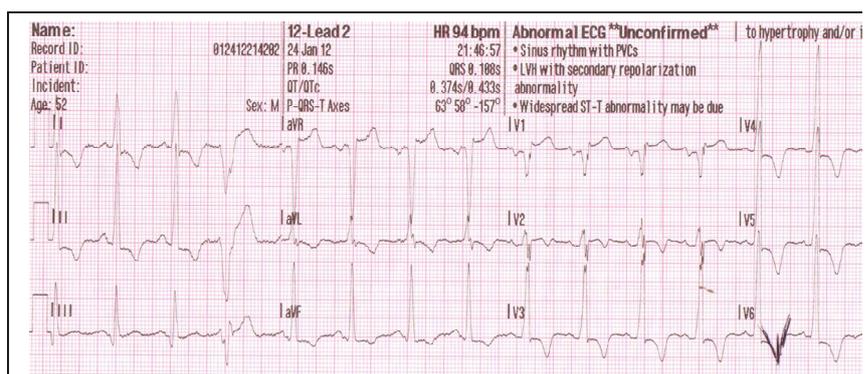
This ECG shows very tall R waves, particularly in V3-V6. Inverted T waves are also present throughout the views. This ECG shows left ventricular hypertrophy (LVH) with strain (the strain pattern is indicated by the inverted T waves).

This patient should be taken to the nearest ED (accompanied by a pre alert call if chest pain/tightness present).

Thanks again to Mark Gowing, Whipps Cross Complex for sending in this ECG and case study.

This issue's ECG (many thanks to Chris Pritchard, Student Paramedic for sending in this ECG and case study).

Last issue's ECG (below)



Key clinical messages:

Nebulisation and COPD

Staff are reminded that nebulisation in **known COPD patients** should be **limited to six minutes** (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.

PRF completion and sick patients

Staff are reminded that when managing a critically unwell patient it is vital that delays are not incurred due to completing paperwork prior to leaving scene. **Under no circumstance should such patients be denied rapid transport from scene to hospital in order to complete paperwork.**

Importance of ETCO₂ printouts

Staff are reminded that **a print out of the end tidal CO₂ tracing MUST be obtained** immediately after insertion of a supra glottic airway device or endotracheal tube, before removal to hospital **AND on arrival at the hospital**. These three printouts should be annotated with the CAD and handed in to station with the PRF.

Supra-Glottic airways – clarification for EMT4s

The March edition of the Clinical Update (page eight) referred to the fact that six successful SGA insertions should be evidenced, although it wasn't clear as to whether this should be carried out on patients in theatre or on manikins. To clarify, it is mandatory that the **six insertions (LMA or I-Gel) are evidenced on live patients in hospital**. What has been removed is the 'two day' stipulation, ie if six insertions are achieved over one day in hospital then this is acceptable.

Naloxone

All staff are reminded that drugs placed in the various drug bags are **not to be removed and placed in other bags / receptacles** for which they are not designated. **In particular the practice of removing naloxone ampoules from drug bags and placing them into the morphine pouches must cease.**

This particular practice has resulted in naloxone being mistakenly placed into the controlled drugs cabinet in lieu of morphine. It also raises the potential for the wrong drug to be administered to a patient. Paramedics, in particular, are reminded that the only drug to be placed in the morphine pouch is morphine sulphate ampoules.

End of life care (EoLC)

Please consider if your patient may have a palliative diagnosis, in addition to malignancy this can include advanced diseases such as end-stage COPD, heart failure and renal failure. Whilst this can be a difficult subject area to broach careful questioning about illness progression, medications and patient notes can provide valuable information.

It is important to enquire about the patient's wishes for their care as this may not always be best provided for in the emergency department. If there are no contact details on scene for palliative care teams then call CSD for advice, they can access EoLC patient records. Please also

remember that if the patient does not have a DNAR order and there is **clear evidence** of terminal illness then resuscitation may not be appropriate – see Clinical Update September 2011 for more details. End of life care training for staff is soon to be provided.

And finally.....

-We must **reduce on scene time for time critical emergencies**, especially stroke, major trauma and STEMI!

-We need to continue with **quality chest compressions**

-We must continue to focus on **good patient assessment**

-and...it is really important to ensure that we **get the basics right!**

Equipment

Water cuplets

With the introduction of oral paracetamol and ibuprofen into the general drug pack, the Service has introduced 85ml cuplets of water. These will be available on complexes to order and are **only to be used when there is no ready supply of water available**. No more than two per vehicle should be carried.

Syringe bungs

Syringe bungs (pictured below) will now be available to order. These are for use in situations where the partially used contents of a syringe need to be preserved in case further doses are required (eg morphine) and will assist with infection control. They will fit any size syringe and can also be used to replace the cap of the cannula if it is misplaced during cannulation. No more than four bungs should be carried in the cannulation roll.



Removal of 5ml syringes

After considering the type and volume of drugs we use. The Service will cease ordering the 5ml syringe. This product will be deactivated. The remaining stocks however can still be used until they run out.

Mark Faulkner, Paramedic Advisor to London Trauma Office & Clinical Advisor to Procurement Department.

Answer to this month's ECG:

This ECG shows left bundle branch block (LBBB), but in addition to this **the ST segments are in the same direction as the majority of the QRS complex** in some of the inferior and lateral leads. This is abnormal for LBBB and is suggestive of an underlying MI. When this pattern is seen on an ECG it is known as 'Sgarbossa Criteria'.

There are other features of Sgarbossa criteria, namely >1mm ST depression in V1-V3 and >5mm ST elevation in the opposite direction to the majority of the QRS. The ED decided to transfer the patient to a Heart Attack Centre where they underwent primary angioplasty.