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OUR CPD YOUR CPD

#FOAMEd

Toxicology & Trauma

College of Emergency Medicine
Spring CPD Event March 2014 - Day 1

The unofficial report

Compiled from the lecture notes made on the day by our intrepid reporters:

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Sharing the learning...

Topics include:
- "Legal highs"
- Crystal Meth
- Carbon Monoxide
- GHB & GBL
- Head, spinal, burn and urological injuries

Another #FOAMEd production by

MOUNTAIN MEDICINE
BANGOR EMERGENCY DEPT

www.mountainmedicine.co.uk

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Your intrepid reporters! Helen Salter (left) and Alison Walker (right)

Reflection for your CPD

We've flagged up further reading (and some topics for reflection) in these snazzy green boxes, and included links to relevant papers, abstracts and websites.

In general, this this material that **we** have looked up and found, to save you the job, but sometimes we will use these boxes to flag up papers suggested by the speakers.

Twitter: #CEMCard14

There was some Twitter activity running throughout the conference - although not compared to some American conferences. Something to work on next time!

Introduction - Report of Day 1

Toxicology & Trauma

Following the enthusiastic reception of our unofficial report of the 2013 EMS Expo in Las Vegas (downloaded more than a thousand times from the Bangor ED scribd.com page, with hundreds more PDF copies distributed by email) we realised that sharing our key learning points from conferences was something we'd like to do more of, especially in these days of restricted study leave budgets.

So we decided to do it again at the College of Emergency Medicine Spring CPD Event that took place in Cardiff (UK) in March 2014. This report is completely unofficial - from our CPD portfolio to yours, and nothing more.

It takes many hours to turn conference notes into this magazine-style report so please forgive us whilst we tackle them one conference day at a time - *we do this in our own time*! Once all three days have been done, we will produce an amalgamated version that will go onto our Scribd website - www.scribd.com/BangorED

We must make an important disclaimer. Whilst we tried to make our notes as accurate as possible, this whole publication is based upon *notes made during the lectures* with all the attendant distractions and possibility of mis-recording the words of individual speakers. Whilst we have cross-checked data were possible, and included links to some studies cited during lecture, we can accept no responsibility for any errors or omissions we have made (or that the speakers made and we may have inadvertently propagated).

You should never change your clinical practice based solely on a report like this, but, we hope it will provide you with a springboard for learning & discussion.

Alison & Helen (your intrepid reporters)
& Linda (editor/designer)

If you enjoy reading this.. Please help us fundraise for the Tusk Trust!

We created this report because we're passionate about EM, and wanted to share what we'd learned. We don't want any money for it.

If you have found this report useful, please could you make a donation to the Tusk Trust, a wonderful charity dedicated to protecting rhino and elephant populations endangered by poaching and the greed for rhino horn and ivory? We have donated many hours of our time to preparing this report, and this is a way of enabling us to fund-raise whilst helping you.

If everyone who reads this report donates even £1/$1 we could raise several thousand pounds.

You can visit our Just Giving page by clicking here

Crystal Methamphetamine - Dr Dan Harris

The reality behind "Breaking Bad"

Reported by Alison Walker

What is it?

Ephedrine (*ephedra* genus) from northern Iraq, is a plant used to treat congestion.

In modern times, the story begins with amphetamine (first produced in 1887) followed by methamphetamine in 1893, and in 1919 the compound was crystallised.

The use of stimulant drugs by the military is not new... in World War II the UK gave methedrine to soldiers, and the Germans had chocolate with methamphetamine in it. Nor were these drugs shunned by the medical establishment: in 1944 the USA FDA approved it for medical use and benzedrine was inhaled for congestion in children in the post war period!

So, what's the problem with Crystal Meth?

First, availability... anyone can make it in a shed: all the components are available on line. But the makers may blow themselves (or others) up!

Second, the number of users: a UN drug report in 2013 estimated that there were 34 million users of amphetamine and methamphetamine worldwide in 2011 with the USA currently having the biggest problem - and even at a very young age, with 1.4% of American 12-year olds claiming to have used it!

In the UK, Chrystal Meth it is a less popular drug with an estimated 17,000 users in UK, which is a fraction of those using cocaine (620,000).

Thirdly - and of most concern of all - the worry about Crystal Meth is the effect on *behaviour*.

No, not the famous "British mouth" as so scorned by American dentists... this is Meth Mouth, which can give away a Meth user.

So, What does it do?

Many famous people have used Crystal Meth, reputedly including Judy Garland and JFK. It reportedly gives a huge high, increased sociability and enhanced sexuality - one anonymous quote describing the "*celestial unification of body and soul*".

It has a quick onset, with long effect, is very lipid soluble crossing the blood brain barrier easily. It has catecholamine effects and is a MAOI affecting executive functions of the brain - multitasking reduces, people can't suppress irrelevant information, and have reduced recall. There are also long-term side effects, including the famous "Meth Mouth" pictured below left.

The 7 stages of a Crystal Meth Binge

1. **Initial Rush** - after smoking or injecting, user experiences increased heartbeat, metabolism and BP.
2. **Crystal Meth High** - users feel more confident & intelligent, but may become more argumentative than usual.
3. **Crystal Meth Binge** - as the end of the high approaches, users may take more, but the euphoric rush is diminished each time as tolerance develops immediately. A binge meth user may continue to use for 3-15 days, avoiding sleep & becoming mentally & physically hyperactive.
4. **Crystal Meth Tweaking** - Towards the end of the binge, users experience a crash with feelings of emptiness and sadness and may take other drugs (alcohol, heroin) to relieve the dismal feelings. Extremely unpredictable, violent behaviour, hallucinations and paranoia can occur during tweaking.
5. **Crystal Meth Crash** - user depletes their body's supply of ephedrine and may need 1-3 days of sleep to replenish
6. **Return to normal** - but not quite as good as before....
7. **Withdrawal** - may take 1-3 months to become apparent. Meth dependance is *psychological,* not physical

Information from the Changing Lives Foundation, USA

Crystal Methamphetamine (continued) - Dr Dan Harris

What do I do if someone comes to the ED after taking Crystal Meth?

- ED treatment should focus on the clinical effects, not the dose taken.
- Symptoms of Crystal Meth toxicity include chest pain, hyperpyrexia, LVF, MI, strokes, confusion, trauma, & injection site problems.
- If users survive a binge, they enter a phase of "post binge tweaking" (see purple panel on page 4) which is the time when they pose most risk to others.
- There is currently no effective treatment for crystal meth addiction: cognitive behavioural therapy is used, but can take up to a year.

Is Crystal Meth driving up HIV rates in the UK?

Some authorities believe that Crystal Meth and HIV together create a "perfect storm" situation for public health efforts to reduce HIV infection risk. Not only does Crystal Meth use drive disinhibited and sexually risk behaviour, but the physical effects of the drug (e.g. drying of mucosal surfaces) may facilitate the spread of HIV during sexual intercourse.

It is claimed that the use of methamphetamine is now the leading cause of new HIV diagnoses in the UK.

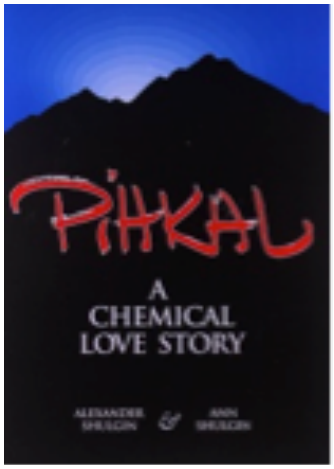
CPD activity

For an excellent overview of Crystal Meth & the potential problems with HIV/AIDs, read this **factsheet from the USA's CDC**, and also this abstract from **Addiction, 101(11), 1622-30**.

Legal Highs - Stephen Haigh & Charlotte Kelly

Two speakers shared the podium to give an interesting and informative talk on "legal highs": substances which produce similar effects to illegal drugs, but are not controlled under the Misuse of Drugs Act.

Reported by Alison Walker & Helen Salter



The history of "legal highs" began in the USA in the 1980s with this book - the story of the authors' use and manufacture of psychoactive substances. It's basically a "cookbook" of how to make over 200 psychoactive compounds, and this section of the book is freely available online - a quick click on wikipaedia directs you to https://www.erowid.org/library/books_online/pihkal/pihkal.shtml

Legal Highs: the basics

- Legal Highs are also known as Novel Psychoactive Substances (NPS), and terminology includes "legal highs", "research chemicals", "bath salts", "plant food", "pond cleaner", novel psychoactive substance e.g. White lightning, "gogaine". N-type pond cleaner. They are labelled as "not for human consumption"
- Drug control laws started in the UK in 1909, but the current UK Misuse of Drugs Act 2001 is relevant to the classification of "legal highs" and constantly trying to keep up with the new drugs. For example, mephedrone (originally a "legal high"), is now a Class B drug in UK.
- The Misuse of Drugs Act includes Classes A to C plus a temporary category. An example of the Class A drug might be heroin, Class B drug ketamine etc.
- Other legislation which can be used includes the Trades Description Act (may be used more often for new legal highs) and The Medicines Act.
- Users can purchase these drugs from internet sites, "head shops", or dealers.
- Monitoring/prevalence of useage information has come from reports from users themselves, pooled urine samples (yuk!!), surveys, and local monitoring systems, although these mostly show more familiar drugs such as speed, cannabis, etc.

Legal Highs (continued) - Stephen Haigh & Charlotte Kelly

Types of Legal High

• ***Stimulants***: phenethylamines etc.
- These cause the sympathomimetic toxidrome - tachy, high temp, seizures.
- Treatment includes cooling, benzodiazepines, non-depolarising muscle-relaxants if required.
- Consider intralipid.

• ***Ketamine type drugs***

• ***Cannabinomimetics***:
- These look like pot pourri, even small amounts of "black mamba" can cause seizures.

• ***Tryptamines***:
- Also cause a sympathomimetic toxidrome.

• ***Plant drugs***
- There are many plants and plant-derived drugs with psychoactive effects, some well known, some more obscure. Examples include Salvia (hallucinogen), Kratom, Hawaiian baby wood rose (LSD-like effects), mushrooms (*Amanita muscariae, Psilocybe semilanceata*). Khat, limited to some communities (e.g. Somalian) is now illegal. Damiana (Black Mamba).
- Benzofurans (benzofury, FLY drugs) cause toxidromes.

You can use the users websites to find out about

"In the Emergency Department, treat as you find, talk to the NPIS, watch for outbreaks and report them...."

The Swindon Experience

In 2011, Swindon ED treated a series of patients who had recurrent attendances presenting with with agitation, abnormal movements, low BMs, and a high temp. All had taken "Eric-3".

The Swindon ED team liaised with the HPA - as they thought there would be other areas with the same problems - but found out their cases were a new issue. There was little information on the management of cases, which included symptomatic management, cooled fluids, sedation with BZPs titrated to temperature, intubation and ITU.

They also conducted a 6-month retrospective case review 2011-12: there were 41 attendances from 18 patients, age 21-45. 39/41 were IV users. Tachycardia, hyperpyrexia, and decreased GCS were the commonest findings. There were two deaths.

There is no prospective Early Warning System for these drugs appearing in the community.

Now, Swindon ED has new poisoning paperwork, which has been improved in partnership with the community safety leads.

CPD activity

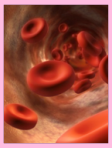
You can read more about the Swindon experience with Eric-3 here. And did you know Toxbase is fitted with software to help sport new trends quickly? See this 2011 press release from the HPA! Last years' NPIS report (page 39-45) is also interesting.

Carbon Monoxide Poisoning - Ed Walker

Common, poisonous & preventable..

Reported by Alison Walker & Helen Salter

Ed opened his talk by explaining how he had first become interested in CO poisoning following the tragic case of the Cheetham family - parents and two sons - who were all killed in 1998 by a faulty gas fire. They had seen a HCP the day before, and were told they "had a virus" and to go home and keep warm. They closed the windows and left the fire on overnight, with tragic consequences.



Emergency Physicians, GPs & neurologists all need to know about CO. And, incidentally, knowing this stuff could save your OWN life.

So, why does carbon monoxide still kill?

The toxicity of CO poisoning reached notoriety in WWII (the Germans used it...) and "town gas" in UK previously contained 8-12% CO - UK gas suicide figures peaked in 1958. In '60s and '70s new North Sea gas supplies produced natural gas, and we forgot about CO poisoning.... but if burned incorrectly it still produces carbon monoxide....

De-bunking myths about Carbon Monoxide

1. *Does it really binds irreversibly to Hb?*

It's not true! It has a half-life of 4 hours, and by the time patients are seen and tested in the ED, the levels will have fallen. That half-life is shorter with exercise and oxygen, which is why in the ED we hardly ever see raised levels.

As for the mechanism of CO Toxicity, way back in 1976, Orellano *et al* poisoned one group of dogs with inhaled CO, and in another group bled dogs and transfused back blood containing 60-70% COHb and it didn't have the same effect...Hb binding alone isn't be the whole story.
You can find a link to the original paper here, although you'll need Athens access to read it.

2. *Do they go Cherry pink?*

It seems such a shame to dispel this one, it's *so* Hercule Poirot, but Ed explained that "... it's a postmortem curiosity and nothing else".

3. *Do only Gas appliances produce CO?*

Another myth! *Any* carbon-burning system can produce CO. Cold catalytic converters produce CO, wood, paper, charcoal, gas, petrol, diesel, fuel oil....all can produce carbon monoxide.

There's also a new hazard - those of you with trendy eco-friendly pelleted biomass wood boilers take note!

*Un*burned pelleted wood can spontaneously breakdown and produce CO, and around half a dozen deaths in Europe have been recorded from this.

Screening for carbon monoxide poisoning: the COMA questions

If you see a patient presenting with headache, nausea/vomiting, drowsiness, dizziness, dyspnoea or chest pain, *screen for CO poisoning*.

C Cohabitees/Companions - is anyone else in the property affected? (inc. pets)
O Outdoors - you your symptoms improve when out of the building?
M Maintenance - are your fuel-burning appliances and vents properly maintained?
A Alarm - do you have a carbon monoxide alarm?

Carbon Monoxide Poisoning (continued) - Ed Walker

Management in the ED

"Don't obsess about the CO levels!"

- Use a brief focussed history
- Ask about appliances, and, if not being admitted, advise them not to use fuel-burning appliances until they have been checked by someone qualified to do so. Document your advice.

Take home messages

- Carbon monoxide is still the commonest cause of accidental poisoning *death* in the UK.
- We regularly miss cases of low level exposure in UK EDs.

The commonest misdiagnoses of CO poisoning by health professionals are labyrinthitis, flu, viral illness and migraine.

Carbon monoxide testing

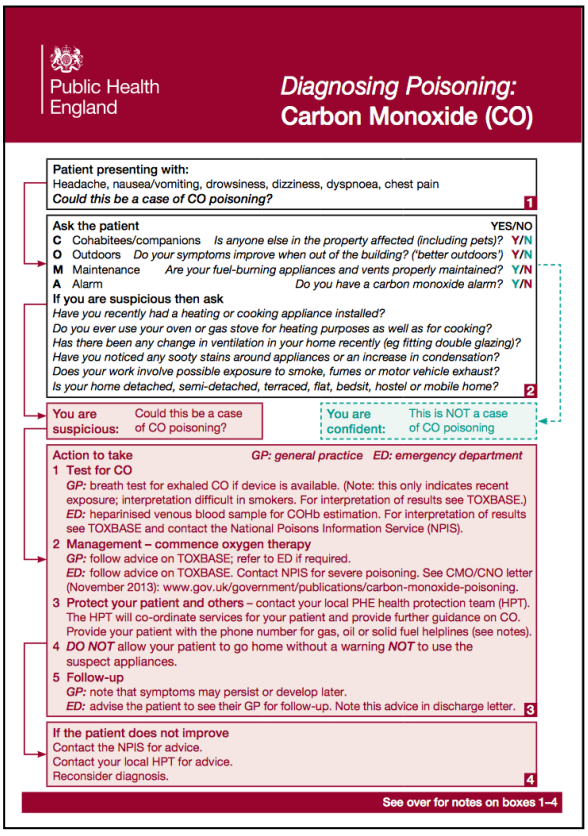
- "Rule in" only
- Poor correlation with symptoms (e.g. headache, dizziness, lethargy)
- Half life of 4 hours, decreased by exercise and decreased by increasing FiO2

Treatment

- Remove from CO source, and don't discharge back to the source unless it has been sorted out!
- Oxygen - normobaric.
- Treat other conditions; burns, cyanide, co-ingestion of substances.
- Use 12 hours of oxygen therapy if commenced.
- Do *not* use COHb to guide treatment.
- Patients should be followed up after CO poisoning….where is the million dollar question!
- Consider HBOT (**H**yper**B**aric **O**xygen **T**herapy) if LOC at any time, any persisting neurology or pre-existing CVS disease.

Prevention

- Buy yourself a digital carbon monoxide alarm - all CO alarms have audible warnings if hazardous readings are detected, but whereas purely audible alarms don't go off until over 50ppm, digital ones activate at 6ppm (and display the levels on a screen).
- HSE exposure limits should be reviewed.
- Everyone needs alarms and regular maintenance of appliances.



Public Health England

Diagnosing Poisoning:
Carbon Monoxide (CO)

Patient presenting with:
Headache, nausea/vomiting, drowsiness, dizziness, dyspnoea, chest pain
Could this be a case of CO poisoning? 1

Ask the patient YES/NO
C Cohabitees/companions *Is anyone else in the property affected (including pets)?* Y/N
O Outdoors *Do your symptoms improve when out of the building? ('better outdoors')* Y/N
M Maintenance *Are your fuel-burning appliances and vents properly maintained?* Y/N
A Alarm *Do you have a carbon monoxide alarm?* Y/N
If you are suspicious then ask
Have you recently had a heating or cooking appliance installed?
Do you ever use your oven or gas stove for heating purposes as well as for cooking?
Has there been any change in ventilation in your home recently (eg fitting double glazing)?
Have you noticed any sooty stains around appliances or an increase in condensation?
Does your work involve possible exposure to smoke, fumes or motor vehicle exhaust?
Is your home detached, semi-detached, terraced, flat, bedsit, hostel or mobile home? 2

You are suspicious: Could this be a case of CO poisoning?
You are confident: This is NOT a case of CO poisoning

Action to take *GP: general practice ED: emergency department*
1 Test for CO
GP: breath test for exhaled CO if device is available. (Note: this only indicates recent exposure; interpretation difficult in smokers. For interpretation of results see TOXBASE.)
ED: heparinised venous blood sample for COHb estimation. For interpretation of results see TOXBASE and contact the National Poisons Information Service (NPIS).
2 Management – commence oxygen therapy
GP: follow advice on TOXBASE; refer to ED if required.
ED: follow advice on TOXBASE. Contact NPIS for severe poisoning. See CMO/CNO letter (November 2013): www.gov.uk/government/publications/carbon-monoxide-poisoning.
3 Protect your patient and others – contact your local PHE health protection team (HPT). The HPT will co-ordinate services for your patient and provide further guidance on CO. Provide your patient with the phone number for gas, oil or solid fuel helplines (see notes).
4 ***DO NOT*** allow your patient to go home without a warning ***NOT*** to use the suspect appliances.
5 Follow-up
GP: note that symptoms may persist or develop later.
ED: advise the patient to see their GP for follow-up. Note this advice in discharge letter. 3

If the patient does not improve
Contact the NPIS for advice.
Contact your local HPT for advice.
Reconsider diagnosis. 4

See over for notes on boxes 1–4

If you haven't got a copy of this in your ED, you probably should get one... endorsed by the DOH. CEM and RCGP, it is hosted by Public Health England. Click here for link to PDF.

CPD activity

If you're reading this, you hopefully already know about CEM's work (led by Ed Walker) on CO poisoning, but if it escaped your attention, you can find it by clicking here.... and if you'd like to scare yourself by how many ways there are of getting CO poisoning, try the CDC website! For more on the CO toxicity invesigations in the 1970s (poor doggies) try here.

GHB/GBL in the ED - Sarah Finlay

Reported by Alison Walker & Helen Salter

What is GHB?
Gamma-Hydroxybutyric Acid is colloquially known by many nicknames, including "liquid ecstasy".

Also known as a "date rape" drug.

GHB was originally developed in the 1960s as an anaesthetic agent, but by the 1980s is was a dietary supplement, releasing Growth Hormone. Other uses have included as an industrial solvent and a treatment for narcolepsy, but of relevance to EM, more recently it has become a club drug. It is often used as part of recreational polypharmacy, and most deaths are secondary to prehospital airway problems.

What is GBL?
Gamma-Butyrolactone. It is the precursor to GHB, and very rapidly converted to GHB after ingestion.

For EM purposes, GHB & GBL are the same thing.

The pharmacology
GHB is a neuro-modulator in the GABA system and a CNS depressant. It may increase dopamine, causing an increased post-synaptic GABA effect.

Legal status
GHB and GHL are both class C drug, although newer mimics are still "legal highs"

Quick facts
- GHB is a clear, odourless liquid with no taste. 1ml = 1g, tends to be used little and often.
- Effects: Rapid onset, euphoria, calm, disinhibited. Deep unrousable sleep is a side effect. There is no antidote and the dose response is steep. In long-term use, dependence is a problem.
- There is a short overdose to withdrawal time period. Fluctuations in GCS may be due to the mixed effects of GHB and co-ingestion of sympathomimetics.

Treatment

"Intubation is probably safest"

- Usually supportive, but be careful if sedation is used: the cycle of unmanageable wakefulness to deep sleep/coma makes sedation very difficult. *[one of your intrepid reporters saw this once and said it was all very bizarre! - Ed]*
- Withdrawal from GHB use (the "G-tox") takes places 6-24 hours post last dose with agitation, tremor, sweating, confusion, coma, convulsions, death. 30-40% ended up on ITU in one study.

Managing GHB withdrawal:
Supportive - baclofen 10mg TDS for 28 days, or diazepam 100-200mg daily doses (!). Obviously, this would be best managed through formal drug support programmes! The speaker's ED had a consultant from the "Club Drug Clinic" involved.

Withdrawal advice for patients:

SAFER

Symptoms may recur
Acute withdrawal - seek help
Find medical support for planned detox, do not stop use abruptly!
Employ measures to reduce risk, suggest they stay with family and friends, keep taking until supportive detox can be arranged.
Remain with family and friends

Care bundles have been developed for GHB use and withdrawal, and are in use in London.
[reading this from the perspective of rural North Wales, we feel very lucky to escape much of the onslaught of problems like this in our department! - Ed]

CPD activity

The CEM toxicology working group are looking for new members and are writing e-learning modules, information on further training etc.

Get in touch if you are interested!
sarah.finlay@chelwest.nhs.uk

Current concepts in management of head injuries in adults - Niall McMahon

Reported by Alison Walker & Helen Salter

Head CT or not?

- Use NICE and SIGN guidelines. For those requiring CT within an hour, there should be little debate on the criteria (and also including the neck and other body regions).
- Evidence is emerging that Major Trauma networks mean increased management and improved outcomes in neurosciences centres.

The old theory from the 70s - that **ketamine** is a bad thing in head injured patients - has now been disproved. It's true that ketamine raises the ICP, *but CPP actually improves*.

Unfortunately, the BNF still states that ketamine is not safe in head injury, but an increasing body of clinical opinion is very happy to ignore this (in fact, it is entirely mainstream now in many EM and PHEM circles) as evidence accumulates that Ketamine maintains BP better, improves cerebral outcome and may be neuroprotective.

Sibley *et al* published a small prospective series of 71 patients (EMJ, 2011) to demonstrate this - and the Annals of Emergency Medicine has also come out in favour of ketamine.

And coming soon in the the making-anaesthetists-squirm corner is **Delayed Sequence Intubation** - have you heard of it yet? DSI consist of giving a sedative dose of ketamine to facilitate pre-oxygenation and *then* an induction dose with paralysis. We suspect some anaesthetic grandees will be turning in their graves, but it's an interesting concept. Read more at the excellent Australian blog site "Life in the Fast Lane".

NEWSFLASH: The pupil thing

There's still an overemphasis of the prognostic value of fixed dilated pupils... they don't necessarily mean you are doomed! Quoted by Mark Wilson at the Retrieval 2014 conference (a few weeks after the CEM CPD event) "fixed unreactive dilated pupils - 57% have a *good* outcome if EDH (although only 6% in SDH)".

Prognostication in head injury

- In pre-hospital care GCS, the *motor* score is probably best indicator of prognosis.
- Pupils are much less use (see box, below left).

Concussion & "second impact syndrome"

Adolescents are most susceptible to this phenomenon, and recent guidelines in Sports and Exercise Medicine and other specialities reflect this.

14-year old Ben Robinson played Rugby Union for his school. After being treated three times for blows to the head and sent back onto the field on each occasion, he collapsed and later died in hospital

Don't forget that SIGN and NICE guidelines include concussion advice: do yours? The risks of sport and timing of return to play is an important issue, and we need to provide good discharge advice, including return to school, work & sport etc. Parents of sporty kids need educating too.

- Concussion guidelines for return to play in contact sports are for 2 weeks off, with a graduated return-to-play process starting with non-contact activity.
- 95-98% should be symptom free within 6 weeks.

SCAT testing - what is it?

The **Sport Concussion Assessment Tool** is a reproducible test which can be completed following a head injury to guide return to sport. Typically administered post-injury, post-match and 48 hours later, it includes the signs (of head injury), memory, symptoms, balance and cognitive assessment. You can see a copy here: http://www.sportsclinic.ca/resources/TSC-SCAT3-Assessment.pdf and the pocket version alone is available here.

We wonder if there may be a place to use SCAT as an assessment tool in the ED?

Check out some of the recent guidelines on management of concussion in sport - the 2013 American Academy of Neurology and 2013 American Medical Society for Sports Medicine documents.

… and what's coming up in HI management - Niall McMahon

New generation anticoagulants

We're sure that the fancy new anti-coagulants, free of the need for INR monitoring, are a dream for some patients who would otherwise struggle with warfarin, but they're a potential nightmare for Emergency Physicians!

Niall explained that dabigitran (Pradaxa) - promoted following the 2009 RE-LY study - critiqued by Wiki Journal Club here - is difficult to reverse if required, citing arat tail study that found treament with FFP & PCC did stop the bleeding, but there was continued derangement of coagulation. It may be worth giving activated charcoal if a patient requires reversal of anticoagulation within two hours of the last dose.

Meanwhile new **anti-platelet drugs**, such as ticagrelor, may need high doses of platelets to reverse.

Areas currently being investigated

Niall wrapped up his talk by mentioning that **CRASH-3** is underway (investigating the effects of TXA in isolated head injury), that research into whether **stem cell therapy** might have a role post-head injury in the future, and of the problem of **elderly patients with head injuries**: a large series derived from TARN suggested that differences in management may contribute to the higher mortality in older rather than younger head injured patients. Click here to see the abstract.

CPD activity

Is your head spinning with these new drugs you can't really get a grip on? You're clearly not alone. Both the European Society for Cardiology and the ever-useful Medscape have kindly produced idiots' guides to the new anticoagulant drugs!

CPD activity

Need a reminder about the pharmacokinetics and haemodynamics of ketamine? Check out this BJA paper on the use of ketamine in ICU patients with brain or SCI.

Heads and spines: Top Quotes from CEM Spring CPD Event!

About spinal immobilisation:
"…. based on fear and tradition rather than evidence, and probably does more harm than good..."

"Ketamine should be the anaesthetic of choice if anaesthetising a patient with a head injury"

Movement [despite spinal immobilisation techniques] occurs if you or the patient tries hard enough"

Another one about spinal immobilisation:
"Any conscious patient who walks in should be imaged [if indicated] without immobilisation. Holding the head of a fully conscious patient is pointless".

"Spinal immobilisation doesn't put the neck in a neutral or normal position... studies were based on normal volunteers, where you'd need to use cadavers with neck injuries..."

Reflection for your CPD

If you are a UK paramedic reading this, don't forget to show evidence of reflection in your CPD portfolio. If you can't face the Gibb's Model of Reflective Practice then try the **Driscoll/Borton** one: it's very simple: "What?, So What?, Now What?"

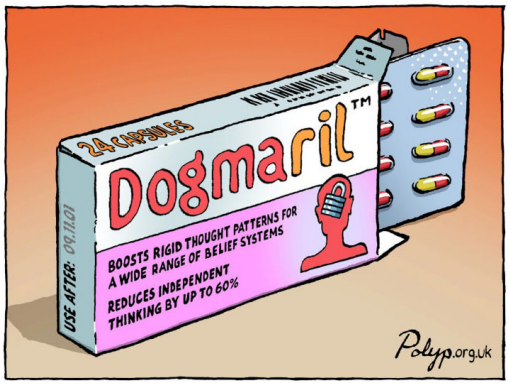
C-spine immobilisation: is it anything more than a pain in the neck?

Reported by Alison Walker

Jules Blackham

The mainstream view of indications for spinal immobilisation - engrained in so many of us by early exposure to ATLS - is disintegrating rapidly. here are the key points from Jules' talk.

- The CEM Guidelines from 2010 are probably now out of date.
- C-spine injuries are rare in large trauma databases... 2-3% in conscious patients and 7-8% in unconscious ones.



'OPIUM OF THE MASSES'

Immobilisation: Myths and complications

Extrication (from vehicles)
If immobilisation is slow (20+ minutes) may be at the expense of airway and haemorrhage management. Immobilisation impairs mouth opening, neck extension, insertion of adjuncts, & grade of laryngoscopy.

Endotracheal Intubation
There are few studies on living trauma patients, but there are no case reports of injuries increased by the act of intubation.

Jaw thrust
This moves the neck more than ETI, as there is more segmental movement, increased narrowing of spinal canal & increased distraction of injury.

MILS
Increases the force needed for intubation and increases grade of intubation by 1. Does reduce movement in *normal* spines, but we don't know what it does (or doesn't) do to *injured* spines.

Breathing
Full immobilisation increases the work of breathing: this effect is worst in the elderly, those who are shocked, and those with chest trauma.

- We already know that log rolling is bad for pelvises... it's also bad for spines, as it causes "snaking", with maximal movement at T12/L1.
- All our caution is based on historical data 1950-1972, but the incidence of SCI has decreased since the 1970s.
- The causes of missed spinal injuries are intoxication, reduced GCS and polytrauma...
- ... but the average time to develop delayed neurology from missed injuries was 20 days in a 2006 paper in Spine.
- The nearest thing to a randomised trial of spinal immobilisation was published in 1998 and compared practice in USA vs. Malaysia and concluded that there was a "98% chance the immobilisation is of no benefit or of harm and found more disability in the immobilised population." This paper may be flawed in its methodology, but it is difficult to ignore some of the findings.

Cervical collars: the bad news

It isn't great news for fans of rigid collars... for starters, they can double the intracranial pressure and worsen outcome in HI. They reduce movement, but don't stop it... and may actually increase movement at the fracture site trying to get the neck straight. The cause snaking of the neck. What's more, collars cause loss of the natural curve of the cervical spine, and cause distraction at C1/C2. Pivot points are set up where the collar contacts head & shoulders.
.... so, do you still want to do the "ATLS walk"??!!

CPD activity

Seen the paper by Dixon *et al* about how spinal immobilisation techniques during extrication from a crashed vehicle probably increase rather than decrease spinal movement? It was in the EMJ in mid 2013 - click here for the abstract.

And if you haven't read the Faculty for Pre-Hospital Care's Consensus Statement, it's a must - full text here.

Dealing with burns in the ED

Jason Long (presenting for Mark Mitchelson)

Reported by Alison Walker
& Helen Salter

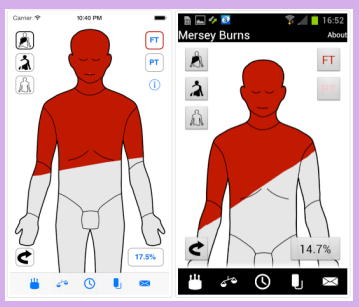
The burden of burns has been reduced by Fire & Rescue service work over the years, but there are still around 250,000 burns each year, resulting in 175,000 ED visits, 13,000 admissions, 1000 needing fluid resuscitation, 388 deaths and 300 hospitalisations each year.

Goals of treatment

- Pain management: hyperalgesia secondary to sensitisation of nociceptors.
- Reduce morbidity - most burns patients urvive. Our aim should be to reduce secondary injury.
- Manage and life and limb threatening injury: "Real Emergency Medicine" - consider inhalation in all injuries, and address circumferential injuries
- Beyond the burn: consider comorbidities.

The Mersey Burns app

Not mentioned in the talk, but beloved of everyone working in the catchment area of Whiston Burns/Plastics department (as we are in Bangor) is the Mersey Burns App. We suspect most of the UK is now aware of this free app, but our US readers may not be. No more guessing burn % areas. Or the fluids. It's magic.



Burn assessment

- Now use "epidermal", "partial thickness", (superficial PT, deep PT) and "full thickness" (and sometimes "full thickness +")
- Extent of burn – exclude areas that are only erythema.
- Deep PT and FT burns need specialist burns assessment or liaison.
- Lund-Browder chart: use the size of the *patient's* palm or charts/pictures [*or Mersey Burns app - ed*].

Dressings for minor burns

- Flamazine cream is consistently associated with poorer outcomes compared to silver dressings, silicon-coated, or biosynthetic dressings. However the evidence is not strong.
-Hydrogel-treated burns give better outcomes according to Cochrane.

The Fluid Thing

Stick with Parkland: there's no evidence for anything else, which is why it is recommended in the European Burns Association Guidelines 2013.

And whilst we're talking about fluids: there's no evidence from RCTs that colloids are better than crystalloids in reducing mortality, and HES appears to increase it. And there's no evidence for albumin. The Cochrane reviewer concluded, *"... as colloids are not associated with an improvement in survival and are considerably more expensive than crystalloids, it is hard to see how their continued use in clinical practice can be justified..."*

Analgesia

-Non-opiod: paracetamol and NSAIDs
-Opioids
-Anxiolytics: nitrous oxide, Benzodiazepines
-Ketamine
- Possible use for IV lidocaine for burns - ongoing research
- IN Ketamine 0.5-9mg/kg can also be used.

CPD activity

Are you up to date with the current guidance?

- Check out the 2013 European Burn Association Guidelines here, and the latest Cochrane review on IV fluids in the critically ill (also 2013)
- For a look at what Cochrane has to say on topical treatment of burns, see here.
- If you like your gucci kit, you might be interested in the concept of laser doppler blood flow measurement to help decide upon the depth and thickness of burns, and a system has been assessed as cost-effective by NICE.

Dealing with burns in the ED - continued

Jason Long (presenting for Mark Mitchelson)

Dressing choice (see Cochrane Review)

- Honey is better than nothing, but not as effective as early excision and grafting.
- Negative pressure wound therapy, there is no evidence that it's effective
- Aloe Vera - no evidence
- Antibiotic prophylaxis, may be *harmful*.
- HBO no evidence of benefit

Restrictive Burns

Consider in:

- all circumferential burns.
- reduced consciousness.

Always look at their back!

If in doubt arrange review, and consider surgical release of burns/compartment

Beyond the burn

- Additional trauma/injuries
- Poisoning: CO, cyanide
- Co-morbidities: DSH, Elderly, Drug and Alcohol misuse.
- Other causes of burns.
- Don't forget thromboprophylaxis if immobile as per usual practice.

Major incidents

A burns major incident will stress the system: burns must be included in Trust MI plan.

CPD activity

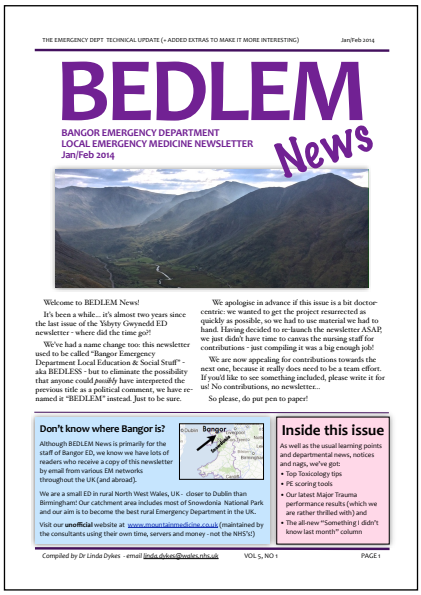
Does your hospital major incident plan adequately address the logistics of handling multiple burns casualties? Check out the 2011 Department of Health guidance and cross-reference against your majax plan.

Burns Care Networks exist for regional planning, agreed networks, burns units, agreed guidelines for referral, and agreed pre-hospital management.
Check out the British Burn Association website.

Other publications from Bangor Emergency Department

Our first Conference Report - the 2013 EMS Expo from Las Vegas. Available as low-res or hi-res PDF from scribd.com

Due out late May 2014 - a brief report on the Scottish Retrieval 2014 conference, including highlights of the Twitter coverage to whet the appetite of those not using Twitter yet!



Our departmental newsletter, BEDLEM. Available as low-res or hi-res PDF from scribd.com

Recognition & management of urological injury - Shabbir Ahmad

Reported by Alison Walker & Helen Salter

Renal trauma is 5% of all trauma, but is rarely seen in isolation (only in 0.1%). The American Association for the Surgery of Trauma is used most commonly:injury classification grades 1-5.

- Suspect urological trauma if blunt abdominal trauma or significant deceleration.

Taking the drama out of trauma of the plumbing....

"Urological trauma is often overlooked by the Trauma Team..."

Imaging

- USS: good for triage and follow up, but has low sensitivity and specificity. Operator dependant.
- IVP: sensitivity of 92%, detects a nonfunctional kidney and extravasation, useful for "one-shot" on the operating table view for unstable patients.
- CT (with contrast) is the gold standard but is poor in detecting renal vein injury.
- MRI: if CT equivocal
- Angiograms: good for renal vein injury and intervention.

"Digital rectal examination has little place as a screening examination if going for CT..."

Haematuria: who needs imaging?

Present in 95% of cases, haematuria is neither sensitive nor specific

- Microscopic haematuria, no signs of shock, no significant deceleration: renal injury unlikely
- Deceleration injury and/or any frank haematuria: needs imaging
- Paeds: any haematuria needs imaging.

Treatment

- Grade 1-3 injuries are treated conservatively with a 5% failure rate
- Surgical exploration likely if if unstable with reno-vascular injury, grade 5, penetrating or GSW.

Penetrating trauma

- GSW to abdomen: 77-100% have renal trauma
- Chest penetrating trauma: renal injury *rare*.

Urethral trauma

- Use IVP or CT (retrograde pyelogram is gold standard, but unusual as first line imaging).
- Grade 1-5 for urethral injury:1-2 stent, 3-5 have surgical repair.

Bladder

- 2% of abdominal trauma
- 70% associated with pelvic fracture of symphysis, SI joints or pelvic rami.
- Associated with RTCs and drinking alcohol, due to increased risk of injury whilst bladder is full!
- Less common in children.
- CT can miss a ruptured bladder even if the catheter is clamped: may need cystogram.
- 2-10% bladder ruptures have micro haematuria or no haematuria.
- Signs include haematuria (82%), suprapubic and perineal bruising, inability to pass urine and abdominal tenderness.

Genital injury

- Penile fracture, dislocation, testicular rupture etc. - refer to urology.

CPD activity

If anyone can tell us how a gentleman might dislocate his penis, please enlighten us, or is it just testicles or did we mis-hear the speaker?!

Recognition & management of urological injury contd - Shabbir Ahmad

Urethral injuries

- Many, many times more common in males than females
- 20% of urethral injury are associated with penile fractures, and the variety of haematoma depends on the integrity of Buck's fascia.
- Look for haematuria, inability to void & perineal bruising.
- Diagnosis by retrograde urethrogram, cystoscopy.
- CT and MR has a very limited role.
- Posterior urethral injury: 73% have a complete rupture: look for a full bladder, high riding prostrate, perineal bruising.
- One *gentle* attempt to insert catheter should be considered: there is no evidence of increased stricture or infection following this even in setting of urethral injury.

CPD activity

Having recent missed a bladder injury in a patient in our ED, we were interested to see this blog post about haematuria after trauma mentioned on Twitter: http://regionstraumapro.com/post/84519915155.

Do you have a pathway for managing/following up haematuria after trauma, or any logical pattern to who and how you image them?

Your conference report team!

Dr Alison Walker was the primary reporter for Day 1 of this event - she sorted her notes before Helen managed to!

Alison graduated from Cambridge University in 1995 and developed an interest in EMS by 1996. She held an EMS research post in 2002-3, and was Medical Director of Yorkshire Ambulance (i.e. the whole EMS system of one of the UK's largest counties) 2005-2013.

Alison has been a Consultant (Attending) in Emergency Medicine with a special interest in EMS since 2004, and her special interests are research and Urgent/Emergency Care systems. She recently moved to take up a new post at Harrogate hospital.

This is her second conference report in partnership with the Bangor ED team.

Dr Helen Salter was our second intrepid reporter at Day 1 of the CEM CPD event. She graduated from Leicester University in 1988. After an SHO post in A&E (as it was then) at Luton & Dunstable Hospital she developed an interest in EM and was lucky enough to do one of the first junior level rotations for Emergency Medicine at Mayday Hospital, Croydon. Registrar training in North East Thames followed, and then a Consultant Post in Essex.

She has recently relocated to North Wales and now works as an Emergency Medicine Consultant in Bangor. She has interest in Paediatric Emergency Medicine, and is a PEM Trainer. This is her first experience of the Bangor ED Conference report team!

Dr Linda Dykes compiles, edits, and designs the Bangor ED Conference reports, and finds most of the stuff for the magic green boxes.

Linda graduated from Newcastle Medical School in 1996. She trained in Emergency Medicine in the Northern & Mersey Deaneries, and in General Practice in Wales. She has been a Consultant in Emergency Medicine since 2005 in Bangor & does occasional GP (family practice) locums to keep her hand in! Linda has recently been seconded to Welsh Ambulance Service Trust as an Honorary Assistant Medicine Director one day a week, bring her a small step closer to her ideal portfolio career combining EM plus the EMS/primary care interface, and teaching.

Her research interest is Mountain Medicine & she particularly enjoys teaching medical students.

Please help us fundraise for the Tusk Trust

This report hasn't cost you anything. If you have found it useful, please could you make a donation to the Tusk Trust, a wonderful charity dedicated to protecting rhino and elephant populations endangered by poaching and the greed for rhino horn and ivory? We have donated many hours of our time to preparing this report and this is a way of enabling us to fund-raise whilst helping you.

If everyone who reads this report donates even £1/$1 we could raise several thousand pounds.

You can visit our Just Giving page by clicking here.

Snowdonia's ER

Bangor, North Wales:
where EM is still fun!

Fantastic jobs (some including PHEM!)

Our **Clinical Fellow** posts, designed for post-ACCS EM/anaesthetic trainees (or as OOPE later on in training) were the first to offer pre-hospital EM as part of the job plan (20%). We take PHEM beginners, and this is the only job of this type in the UK with exposure to Search & Rescue medicine. 6 to 12 months posts available, and we can offer deferred start dates.

For **Higher Specialist Trainees (ST4-6)** who have a yearning to try rural Emergency Medicine, we can offer OOT placements using our "spare" educationally-approved registrar slot. So if you fancy a change from the city...

We occasionally have **SHO-tier posts** available (identical to our deanery-approved F2/GPS/ACCS posts) which are popular for those unsure what to do post-F2, or who are before or after a period of travel/work abroad.

And we might be looking for a new **Consultant** colleague in the not-too-distant future. So get in touch via our website for a chat if rural EM appeals - we may have a locum or substantive (or locum-with-a-view!) post to suit all parties.

Medical students

We love hosting students! Our medical student programme is well established, and our rural EM electives and SSCs are extremely popular.

Many of our students have returned to us as postgraduate trainees, at every level from F2 to ACCS, GPST and ST4-6.

Where is Bangor?

Sandwiched between the outdoor playground of Snowdonia National Park and the beautiful beaches & coastline of Anglesey in North West Wales, this is the place to live and work if you like the outdoors, with everything from rock-climbing to kite-surfing on the doorstep.

We are one hour by road to Chester/M6, 3 hours from London by train, or a quick ferry ride to Dublin.

www.mountainmedicine.co.uk

THE END

Please tell us what you thought: if enough people tell us they found this useful and interesting, we might be persuaded to do it again for another conference, especially if the organisers give us a few free conference tickets! We also need to know if we have any corrections to make. Please send any feedback, corrections and suggestions to Linda.Dykes@wales.nhs.uk or via Twitter to @mmbangor.