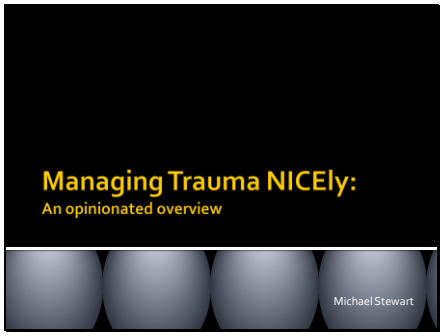
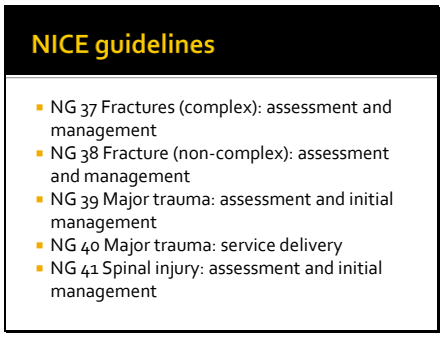
Slide 1



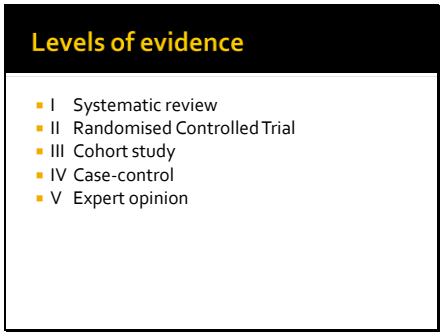
Why opinionated? Presenting the recommendations would take a few minutes and anyone can do it on the website. Hopefully more interesting to consider the rationale for the guidelines and put them into clinical context.

Slide 2



Five trauma guidelines released in Feb 2016; main focus of this talk is on NG 39 but the others do get touched on.

Slide 3



Note that these are guidelines – they will not always be the right thing to do. Need to consider underpinning evidence bases. Level I/II evidence (if studies done well) – should be followed if your patient matches those in the trial. Level V may have underpinning anatomy/physiology/pharmacology, but not proven to work. One expert may disagree with another. I will discuss the evidence provided in the full NICE guidelines, along with any other relevant papers I am aware of – unfortunately I don't have the time to do a full literature search of my own for every topic in the guidelines. Very happy to hear of other key papers if they support or disagree with the NICE position.

Slide 4

Project Executive Team members

Name	Role
John Borthwick	Patient member
Karim Brohi	Director, Centre for Trauma Sciences, Barts and the London School of Medicine, Queen Mary University of London
Lynda Brown	Patient member
Chris Fitzsimmons	Consultant in Paediatric Emergency Medicine, Sheffield Children's Hospital NHS Foundation Trust
Bob Handley	Consultant Trauma and Orthopaedic Surgeon, Trauma Service, John Radcliffe Hospital Oxford
Simon Hughes	Consultant Anaesthetist and Director of Major Trauma, University Hospital Southampton
Heather Jarman	Clinical Director for Major Trauma and Consultant Nurse in Emergency Care, St George's University Hospitals NHS Foundation Trust , London
Fiona Lecky	Emergency Medicine Research, University of Sheffield
Richard Lee	Head of Clinical Services, Welsh Ambulance Service NHS Trust
Iain McFadyen	Consultant Trauma and Orthopaedic Surgeon, Royal Stoke University Hospital, University of North Midlands NHS Trust
David Skinner (Chair)	Emeritus Consultant in Emergency Medicine, Oxford
Graham Stiff	GP and BASICS Pre-Hospital Emergency Physician, St Marys Road Surgery, Berkshire
Nick Todd	Consultant Neurosurgeon, Newcastle Nuffield Hospital

But to be fair, those involved with these guidelines were pretty expert.

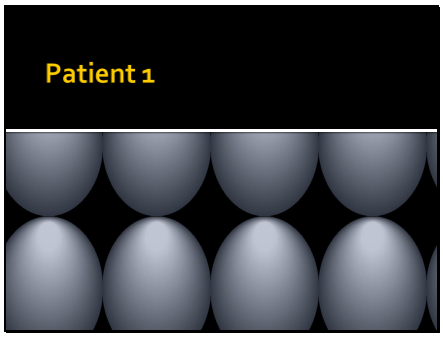
Slide 5

Consider the guidelines in the context of a clinical case. High speed RTC. First on scene identify three patients – one sat up in the drivers seat of the silver car, head held by Fire & Rescue, conscious. Second self-extricated from same vehicle, lying on verge, screaming. Driver of red car slumped over steering wheel, windscreen bullseyed, unresponsive and cyanosed.

Slide 6

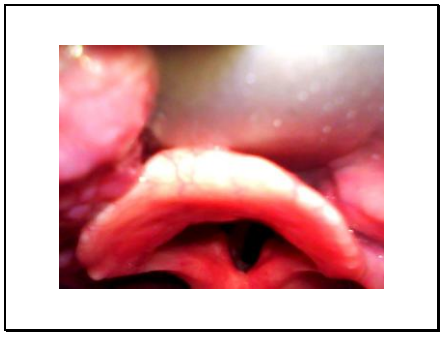
As it's my hypothetical scenario, we'll have a hypothetical team response, including ambulance service paramedics and technicians, BASICS doctor, enhanced MERIT response (we can dream!), and air ambulance.

Slide 7



Clear priority is the unresponsive driver – immediate snatch extrication to the roadside for assessment

Slide 8



Happily NICE hasn't changed the priorities - <C>ABCDE still applies.

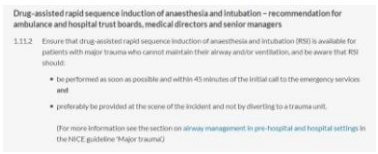
Slide 9

Airway

- RSI Gold standard
- Basic +/- adjunct +/- SGA if failure
- Aim for RSI <45 minutes from incident, at scene
- MTC if transport <60 minutes
- TU if unmanageable airway or travel >60 minutes

Indications for intervention with airway are inadequate airway or inadequate ventilation. Preferred option is RSI delivered at the scene within 45 minutes of call to emergency services. If this fails or is not available, basic techniques +/- adjuncts are advised, with supraglottic airway if airway reflexes are absent. PALM does not come into the guidelines, but by the consensus statement from FPHC it would sit here. If RSI not available at scene, transfer to MTC unless transport time >60 minutes, or the airway is unmanageable (in which case go to nearest TU). Specific times are opinion bases – no hard evidence for them.

Slide 10



Drug-assisted rapid sequence induction of anaesthesia and intubation – recommendation for ambulance and hospital trust boards, medical directors and senior managers

1.11.2 Ensure that drug-assisted rapid sequence induction of anaesthesia and intubation (RSI) is available for patients with major trauma who cannot maintain their airway and/or ventilation, and be aware that RSI should:

- be performed as soon as possible and within 45 minutes of the initial call to the emergency services and
- preferably be provided at the scene of the incident and not by diverting to a trauma unit.

(For more information see the section on airway management in pre-hospital and hospital settings in the NICE guideline 'Major trauma')

Brief political moment - from NG40 – strong recommendation from NICE that trauma systems provide for RSI capability at the scene of the incident.

Slide 11

Intravenous access

- Peripheral IV
- Intraosseous
- Children – IO if IV looks challenging

IV access – for RSI now, and for trauma care in general. Peripheral IV first choice (generally acceptable), IO if fails (IO shown to be faster to obtain than CVC). In children consider going direct to IO if IV looks challenging. In our hypothetical patient we obtain IV access and perform RSI using Fentanyl, Ketamine, and Rocuronium (drug choices not in the NICE guideline, but are in the local MTC guideline).

Slide 12

Chest

- Clinical assessment for pneumothorax
- Augment with eFAST but do not delay transport
- Normal eFAST does not exclude pneumothorax

Suggest that clinical assessment is best way to pick up pneumothorax – no evidence given for this. One pre-hospital ultrasound study in an aeromedical service – sensitivity 19% for pneumothorax, 47% for those needing intervention, specificity 100%. Compare to ED studies - ~90% sens, 95-99% spec. Based on these figures agree that normal US cannot rule out – but dubious of statement that clinical assessment is better.

Slide 13

Tension Pneumothorax

- Decompress for haemodynamic or respiratory compromise
- Open technique preferred to needle; tube if spontaneous breathing
- Monitor for recurrence

In ventilated patient, can just perform thoracostomy pre-hospital; drain needed if spontaneously ventilating. Note opinion that if patient is not severely compromised, it is acceptable not to decompress (old idea of ‘never’ seeing a tension on imaging getting left behind). No evidence directly comparing open and needle techniques, but note multiple studies showing failure of needle thoracocentesis (too short to penetrate chest wall, kink, occlude); outside NICE but evidence that if using a needle, lateral approach (same landmark as for drain) is better as pleural space closer to the skin. If evidence of recurrence, reinsert

finger into tract to check air not reaccumulated.

Slide 14

Clear example that (1) clinical assessment is difficult – note no significant pneumothorax present, and (2) needle thoracocentesis often fails as needle is too short to reach the pleural space.

Slide 15

Open pneumothorax

- Cover with occlusive dressing and monitor for tension

No evidence that ashermann or russell seals are any better so simpler and cheaper option recommended in the guideline.

Slide 16

Haemorrhage

- Simple dressing/direct pressure
- Tourniquets if pressure fails
- Pelvic binder if suspected bleed from fracture
  - Dedicated device preferred
  - Improvised
- TXA if <3 hours

Haemostatic dressings not advised (no evidence of benefit, rare needs in civilian practice, concern over burns, removal of foreign material, etc); Tourniquet – equally no evidence, use for life-threatening limb bleeds. Pelvic binders – one study showing benefit in patients transferred from other hospital up to 24 hrs after injury, but no deaths in binder group – is this truly representative? No other study has shown mortality benefit, although reasonable argument for how they should work by tamponading venous/bone bleeding. TXA – 1.5% absolute risk reduction for death based on CRASH-2 study – strongly evidence based recommendation.

Slide 17

Fluid resuscitation

- Restrictive strategy
- Titrate to central pulse
- Crystalloid acceptable if no access to blood
- Head injury – assess if haemorrhagic shock or head injury is dominant condition

RCT evidence for permissive hypotension, but effect size has wide error bars. How low and for how long before harms outweigh benefits? (We're not sure) Crystalloid – little evidence of effect on mortality when given alongside RBCs in varying ratios, but increased complications with more clear fluid. If blood is available can give, otherwise small boluses of crystalloid. Titrate to carotid/femoral pulse in trauma, aim for higher BP if head injury predominates.

Slide 18

Heat loss

- Minimise heat loss

One study showed benefit to intravascular rewarming – given as research priority for hospital care. ‘Triad of death’ suggests keeping warm is sensible, but yet again no specific studies to show benefit.

Slide 19

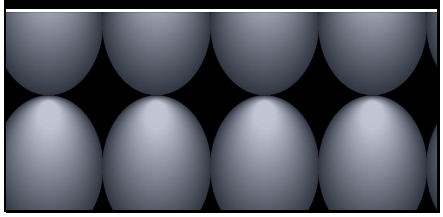
Documentation

- <C>ABCDE
- ASHICE (plus ID of caller)

Documentation should follow the <C>ABCDE structure, and pre-alerts include what is effectively ASHICE, along with some identification of who is providing the information. In the management of trauma, no good quality evidence submitted that proformas or check lists impact on mortality/morbidity.

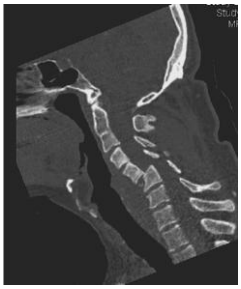
Slide 20

Patient 2



Sat in car, c/o neck pain. ABC stable

Slide 21



These injuries are relatively rare, but the ones a lot of practice is based around detecting and protecting.

Slide 22

Spine

- Immobilise if any:
  - has any significant distracting injuries
  - is under the influence of drugs or alcohol
  - is confused or uncooperative
  - has a reduced level of consciousness
  - has any spinal pain
  - has any hand or foot weakness (motor assessment)
  - has altered or absent sensation in the hands or feet (sensory assessment)
  - has priapism (unconscious or exposed male)
  - has a history of past spinal problems, including previous spinal surgery or conditions that predispose to instability of the spine

Any of these factors in context of trauma, protect the spine pending full review.

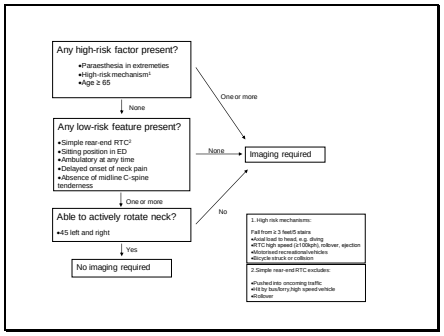
Slide 23

Clearing

- C-spine:
  - Canadian c-spine rule
- T/L-spine:
  - age 65 years or older and reported pain in the thoracic or lumbosacral spine
  - dangerous mechanism of injury (fall from a height of greater than 3 metres, axial load to the head or base of the spine – for example falls landing on feet or buttocks, high-speed motor vehicle collision, rollover motor accident, lap belt restraint only, ejection from a motor vehicle, accident involving motorised recreational vehicles, bicycle collision, horse riding accidents)
  - pre-existing spinal pathology, or known or at risk of osteoporosis – for example steroid use
  - suspected spinal fracture in another region of the spine
  - abnormal neurological symptoms (paraesthesia or weakness or numbness)
  - on examination:
    - abnormal neurological signs (motor or sensory deficit)
    - new deformity or bony midline tenderness (on palpation)
    - bony midline tenderness (on percussion)
    - midline or spinal pain (on coughing)
  - on mobilisation (sit, stand, step, assess walking): pain or abnormal neurological symptoms (stop if this occurs).

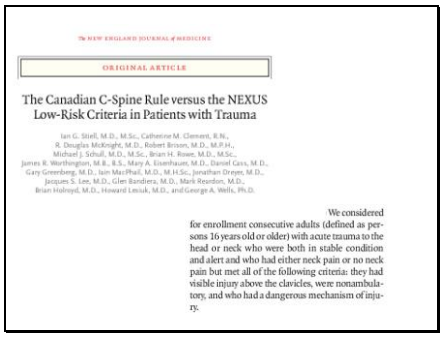
C-spine – use Canadian C-spine rule. Thoracolumbar – can clear if none of listed conditions present. Note no statement on how significant trauma has to be before considering these criteria – important as otherwise everyone with osteoporosis who stumbles or has other very low energy event should be immobilised an imaged every time...

Slide 24



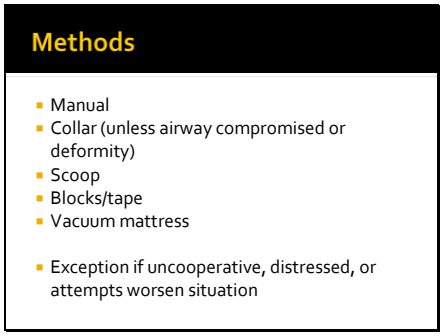
Canadian C-spine rule

Slide 25



Note this does have a statement (from methods of original paper) on which patients to apply the rule to – trauma to head/neck with either pain or combination of all three of visible injury above clavicle/non-ambulatory/dangerous mechanism. Need patient alert and stable to use the rule.

Slide 26



Collars still recommended (on basis of no evidence of efficacy), unless airway compromise or spinal deformity. Recommend Scoop and blocks, placed inside vacuum mattress - no clear rationale for both? Do make it clear that if formal immobilisation makes the situation worse, try to manually support head in best position for patient.

Slide 27

Extrication

- Self-extricate then lie down unless:
  - High risk (Canadian C-spine Rule)
  - Abnormal neurology
  - Significant distracting injury
  - Spinal pain
- Long board is an extrication device

For many people, careful self-extrication from vehicle is safest. If need to be extricated by rescuers, long board is for extrication only, not for transport.

Slide 28

Children

- Car seat for infants
- Children – add blankets, KED, vacuum splint
- Involve family

Improvise splintage to fit the child. Involve family in reassurance.

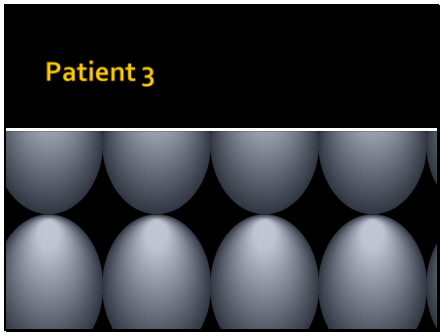
Slide 29

Destination

- Cord injury:
  - MTC (unless need for TU)
  - Do not go to spinal cord injury centre
- Spinal column injury:
  - TU (unless other need for MTC)
  - Children – to MTC

Follow trauma system, do not go to spinal unit (unless same site as your MTC)

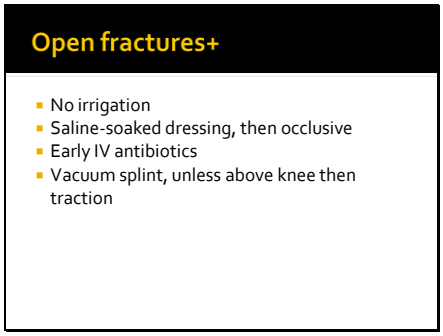
Slide 30



Ejected; ABC stable; obvious fracture.

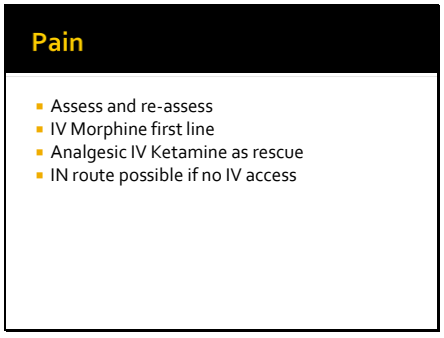
Slide 31

Slide 32



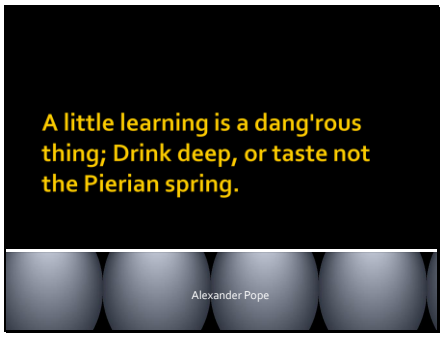
Concern that irrigation will spread contamination (compare BOAST-4 – remove gross contamination). One paper looked at antibiotics and found lower rate of deep infection with early administration, but no change to mortality.

Slide 33



Most studies show ketamine and morphine have similar efficacy and similar rates of side effects (but different types). Morphine <£1 for 10mg, ketamine ~£5 per vial – cheaper option advised as first line. IN diamorphine/ketamine both effective if no vascular access (note both unlicenced this route)

Slide 34



Quote guidelines fine – but need to know rationale and when to deviate in the best interests of the patient