Intercostal drain to treat pre-hospital tension pneumothorax

Dr. Jonty Robinson BSc MBBS MRCP FRCA

HEMS doctor, Essex and Hertfordshire Air Ambulance
Essex and Herfordshire Air Ambulance

- Established in 1997
- Charity funded
- £380,000 pounds a month
- Essex
  - Earls Colne Airfield
- Hertfordshire
  - North Weald Bassett
What this presentation is not......

- Complicated
- Prescriptive
- Instructional
Aim

- To report an uncommonly performed pre-hospital procedure
- To describe our standard operating procedure (SOP) for procedural sedation
- To demonstrate an uneventful and successful patient outcome
Tension pneumothorax

- Not uncommon in the polytrauma patient
- Haemodynamic and respiratory compromise

Management
  - Open thoracostomies
  - Needle thoracocentesis
  - Intercostal drain
Open thoracostomies

- Intubated patients
- Positive pressure ventilation
Needle thoracocentesis

- Intubated or unintubated
- Paramedic land crews
- HEMS
  - Entrapped
  - ‘Bridge’ to definitive management
Intercostal drain

- Intubated or unintubated
- HEMS capability
- Definitive procedure
- ‘Hospital to the patient’
Procedural sedation

- Midazolam 1-2mg
- Ketamine 0.5mg/kg
- Nasal capnography
Case study

• 55 years, male
• Fell off motorbike at 60 mph
• GCS 15
• Pain in left chest and laboured breathing
• Lying on his back by side of road near grass verge
History

- ‘I think my left lung is collapsed’
Clinical findings

- RR 26
- Sats 97% on 100% oxygen
- Left side of chest
  - Reduced chest movement
  - Crepitus posteriorly and surgical emphysema
  - Reduced air entry
  - Fractured left clavicle
Further assessment

- Heart rate 91/min
- Blood pressure 85/68
- Abdomen, pelvis and long bones uninjured
- No head injury
- Neurologically intact
Diagnosis

- Left sided tension pneumothorax
Decision

- Unacceptable physiology
- Capability for definitive treatment
- Intercostal drain on scene
Procedure

- Explanation and verbal consent
- Positioning
  - On trolley on tailgate
  - Semi-recumbent
  - Left arm abducted
Patient positioning

BTS guidelines for the insertion of a chest drain

**Figure 3** Diagram to illustrate the “safe triangle”.
Procedure

• Monitoring
  • BP, sats, ECG
  • Nasal capnography

• Medication
  • Morphine 10mg
  • Ondansetron 4mg
  • Midazolam 1mg
  • Ketamine 40mg
**Technique**

- Betadine skin spray
- 1% Lignocaine 8mls infiltration
- 22G scalpel
- Spencer Wells forceps blunt dissection
- Hiss and rush of air from thoracostomy
- 28F chest drain sited, sutured and secured
• ‘Omentum’ of sleek tape dressing applied
• Chest drain connected to leg bag
• Patient comfortable throughout
<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
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<tbody>
<tr>
<td>RR 26</td>
<td>RR 14</td>
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<tr>
<td>Sats 97%</td>
<td>Sats 100%</td>
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<tr>
<td>HR 91</td>
<td>HR 62</td>
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<td>BP 85/68</td>
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Triage options
## Patient Record Form

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<td>Weight</td>
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### Incident Details

Motorcyclist - Lost control of bike, fell off bike, was taken to hospital in a car

- Lost consciousness
- Lying on the right side by side of road, spinal & limb injuries

### Clinical Findings

- Left side weak
- Left leg dressing
- C-spine tenderness
- Head injury

### Drug Administration

- Midazolam: 25mg
- Propofol 100mg
- Atropine: 15mg
- Another medication: DEXAMETHASONE 5mg

### Interventions

- C-spine collar
- Airway maintained
- Breathing: SPO2 95%
- Circulation: BP 100/60

### Other Information

- Initial diagnosis: Spinal injury, C-spine fracture
- Further information: ESS03 0179238125, ESS003 0195254073

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**Revised: 06/2012**
BTS guidelines comparison

- Full explanation and consent recorded
  - Verbal consent documented
- Pre-medication with benzodiazepine or opioid
  - Midazolam and Ketamine
- Large bore drains recommended
  - 28F ICD
- Aseptic technique
  - Betadine spray
  - Sterile gloves
  - Sterile instruments

- Prophylactic antibiotics should be given in trauma
  - Not given
- Local anaesthetic
  - 8mls 1% Lignocaine

- Leave drain alone if functioning
  - Removed after 3 days in hospital
Important points

- Consent and adherence to guidelines
- Trolley on ambulance tail lift to adjust height
- Good patient positioning
- Ondansetron for nausea prophylaxis
- ‘Safe zone’ for thorocostomy incision
- Safe disposal of sharps
Summary

- Not a commonly performed pre-hospital procedure
- Can be performed effectively by the roadside
- Adherence to BTS guidelines
- Safe procedural sedation
- End-point of patient stabilisation and full recovery
Patient follow-up

- Discharged after 5 days
- Airbase visit recently
Thank you