Neurological Emergency Transfers
Walton Centre For Neurology & Neurosurgery
Objectives

To highlight the specific problems associated with specialist transfers to a neuro unit.

- Description of head injury pathway
- Targets and advice for conduct of transfer
- Importance of time management
Emergency Neuro Transfers

• Morriston, UHW and Walton receive tertiary neurocritical care referrals
• Since commencement of auditing…
  – Walton Centre ~33 transfers
  – Morriston ~17 transfers
  – UHW ~34 transfers
• Most are patients with Head Injury (70%), majority of the rest are non-traumatic brain injury (SAH, ICH etc)
• Increasing number of spinal injuries.
But:

Series of transfer audits over last 20 years by Walton Centre on patients received.

- Around 20-25% of transfers poor quality
- High incidence of unexplained delay
Measures to Reduce this:

- Transfer training course
- Severe Brain Injury pathway
- Spinal Injury Pathway (under development)
- Closer liaison with Ambulance Services
North Wales Critical Care Network

Pathway for Referral of Adult Patients with Severe Brain Injury to Walton Neurological Centre

Patient identified for referral to Walton Neurological Centre

- Checklist complete (PTD)
  - Referral to Neurosurgical SpR (01248 669069) or (0771 722 6176)
  - Image: MRI, CT Scan & Iliomi Neuro SpR when CT sent
  - Output: Extracranial injuries considered & treated (where possible)
  - Patient fully monitored
  - Initial resuscitation and stabilisation complete
  - Walton to return call within agreed timescale (Ref NICE Clinical)

- Patient accepted by neurosurgeons & intensivists

- Handover to Critical Care staff (01248 529 5772)

- Urgent surgery not required

- Call ambulance control (01248 669069) stating URGENT Transfer (Ref: All Wales Transfer Guidelines)

- Mass lesion requiring urgent surgery

- Call ambulance control (01248 669069) stating IMMEDIATE Transfer (Ref: Welsh Transfer Guidelines)

- Optimise patient for transfer

- Wipe discharge letter plan & send with patient

- Contact Walton ICU (0121 529 5772) with ETA

Monitoring (during transfer) should include:
- ECG
- Invasive BP and NIBP
- SpO2
- ETCO2
- Temperature
- U/O by urinary catheter
- Pupillary size and reactivity
- CVP where indicated

NB: Where surgery is necessary but Walton cannot accommodate the WCCN is responsible for finding a bed (SBN5). For Neuro ICU beds in the North West telephone ICBI: 0161 720 2554.
Time Pressure

• Principles of general transfer management tend to stress avoidance of haste.

• Patients with developing intracranial haematomata need urgent surgery.
So Remember......

The Clock's Ticking
A well-recognised standard in neurosurgery is that outcome is improved in patients with intracranial haematoma when surgery takes place within four hours of the injury.
If you think 4 hours is difficult, then look at it like this (even from Bangor):

- 30 minutes from scene to hospital.
- 1 hour in resus and scan.
- 20 minutes for surgeon to review scans and accept
- 45 minutes to get an ambulance, package and load the patient.
- 85 minutes journey time.
- Closer units have an even better chance of meeting the target
Initial Assessment

Definitely not a lesson on how to manage head injuries, but remember:

• GCS 8 or less – secure airway
• A is for airway with cervical spine protection.
• Rapid sequence induction unless contra-indicated.
• Treatment of life-threatening extra-cranial injuries before departure.
Initial Management

• Lines: 2 x peripheral, arterial.
• Monitoring: ECG, SaO$_2$, ETCO$_2$, Invasive BP, Temp, Urine output (catheter), Pupillary size / reaction
• CVP lines are not usually time-efficient.
Technique

• Sedation: Propofol / opiate infusion

• Relaxant: preferably by infusion

• Volume control ventilation mode (IPPV, SIMV) on transport ventilator.

• Hand ventilation for short periods only.
Post intubation physiological targets:

- $\text{SaO}_2 > 95\%$
- $\text{PaCO}_2 \ 4 - 4.5\ \text{kPa}$
- $\text{ETCO}_2 \sim 4\text{kPa}$
- $\text{MAP} \ 80\text{mmHg}$ - Post-head injury hypotension is associated with significant morbidity/mortality
Targets 2

• Pupils: Reacting to light

If a pupil stops reacting before or during transfer, contact neurosurgeon or Walton ITU for immediate advice.
Scanning

Start thinking CT as soon as severe head injury becomes apparent.

Be polite but firm with radiologists about urgency of scan

Stability before transfer is paramount.

Transfer images to neuro unit immediately

Obtain hard copy to take with you
Other Radiology

• As dictated by incident history and other injuries but including......

CXR

C/Spine: CT C/Spine unless previously cleared clinically (usually not possible)
Referral 1

• Fill in referral sheet *then* phone Neurosurgeon (not the other way round).
**Referral Checklist**

For Severely Brain Injured Adult Patients to Walton Neurological Centre

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<thead>
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<tbody>
<tr>
<td>1</td>
<td>Admitting DGH Consultant:</td>
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<td>Referring DGH Doctor:</td>
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<td></td>
<td>Referring DGH Consultant:</td>
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<td>Referring Hospital:</td>
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<td>2</td>
<td>Time of Call:</td>
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<td>3</td>
<td>Patient Details</td>
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<td></td>
<td>Name:</td>
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<td>DOB:</td>
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<td>Sex:</td>
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<td>Age:</td>
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<td>4</td>
<td>Injury Mechanism e.g. RTA / assault etc</td>
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<td>5</td>
<td>Time of Injury:</td>
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<td>6</td>
<td>GCS, pupils and time of arrival on scene:</td>
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<tr>
<td></td>
<td>Time:</td>
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<td></td>
<td>Pupils:</td>
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<td>Eye Opening</td>
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<td>Motor Response</td>
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<td></td>
<td>Verbal Response</td>
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<td>7</td>
<td>GCS, pupils and time of arrival at ED:</td>
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<td></td>
<td>Time:</td>
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<td>Pupils:</td>
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<td>Eye Opening</td>
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<td>Motor Response</td>
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<td>Verbal Response</td>
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<td>8</td>
<td>GCS, pupils at time of call:</td>
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<td>Time:</td>
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<td>Pupils:</td>
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<td>Motor Response</td>
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<td>Verbal Response</td>
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<td>9</td>
<td>Current observations at time of call:</td>
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<td>HR:</td>
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<td></td>
<td>BP:</td>
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<td>SaO2:</td>
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<td>10</td>
<td>Any treatment given e.g. intubated / ventilated</td>
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<tr>
<td>11</td>
<td>a) Other significant extracranial injuries:</td>
</tr>
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<td></td>
<td>b) Past medical history:</td>
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<td>12</td>
<td>Is patient on Warfarin, Aspirin, or Clopidogrel?</td>
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<tr>
<td>13</td>
<td>Reversal medication given e.g. Vitamin K Prothrombin Complex Concrerate (PCC)</td>
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<tr>
<td>14</td>
<td>Referral Clinician Tel No, &amp; Ext No,</td>
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<tr>
<td>15</td>
<td>Name of Neuro SpR spoken to</td>
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<tr>
<td>16</td>
<td>Name of Neurosurgical Consultant</td>
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<tr>
<td>17</td>
<td>Time of first contact with Neuro SpR</td>
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<td>18</td>
<td>CT Scan report discussed with Neuro SpR:</td>
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<tr>
<td>19</td>
<td>Outcome of call – comments:</td>
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<tr>
<td></td>
<td>PATIENT DECLINED</td>
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<td></td>
<td>PATIENT ACCEPTED</td>
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<td>WHERE IS PATIENT TO GO TO? Walton Theatres Walton ICU Other</td>
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**USEFUL TELEPHONE NUMBERS:**

Walton Switchboard: 0151 525 3611
Neurosurgical SpR: Ask switch to bleep
Walton ICU Phone: 0151 529 5772
Walton ICU SpR: Bleep 2018

PRIOR TO TRANSFER FAX THIS FORM TO WALTON ICU ON 0151 529 5510
Referral 2

- Discuss patient with neurosurgeon, and agree plan

- If accepted, be clear about whether immediate surgery on arrival is planned.
Referral 3

• Telephone Walton ITU, speak to Nurse Coordinator or duty SpR.

• Discuss patient and fax referral checklist
Referral 4: Plan

• If immediate surgery in prospect, then emergency transfer – see “The clock's ticking” slides

• If no immediate intervention planned, transfer within timescale agreed with neuro unit.
Referral 5: Ringing the Ambulance Service

If immediate surgery on arrival is planned, request an IMMEDIATE transfer.

If urgent surgery not required, request an URGENT transfer.
Next Steps

• Package & Prepare patient according to guidelines.

• Sort out cover for team

• Remember time pressure

• Phone Walton ITU just before leaving
Conduct of Transfer: Why not Bomb it?

The Clock's Ticking, but be sensible
High speed in urban areas does not save significant time.
Risks to accompanying team should be obvious.
Beware of police escorts.
Other Means of Transport

No Landing Site at Walton Centre, Secondary ambulance transfer needed.

Generally daylight only

Consider during peak A55 traffic periods, road works etc.
On Arrival

- Concise handover of patient to accepting anaesthetist
- Copy of imaging on CD
- Notes
Spinal Injuries

2 types of transfer:

- Acute: for emergency neurosurgery +/- head and polytrauma
- Delayed: to regional spinal injuries unit for stabilisation / rehab

NB: These patient may not necessarily be sedated and ventilated
Considerations: Acute

Unstable C/spine and resulting airway issues

Spinal immobilisation: beware of prolonged times on spinal boards – preferably transfer patient immobilised in vacuum mattress
Considerations:
Delayed Spinal Patients

• Awake patients:
  Agitation
  Nausea

• Slow transfers
  Less common now
  Take ages
  Traffic chaos
  May be worth using (helicopter) air ambulance
Osmotherapy

A frequently asked question is “What about mannitol, when do I give it?”

In general, do not give mannitol or other hypertonic solutions without neurosurgical advice.

If the pupils fix during transfer, and the patient isn't hypoxic, hypercarbic or hypotensive, give 200mls 20% mannitol as an emergency measure.
Any Questions?