AND YOU THINK **YOU'RE** HAVING A BAD DAY AT WORK!!

Although this looks like a picture taken from a Hollywood movie, it is in fact a real photo, taken near the South African coast during a military exercise by the British Navy.

It has been nominated by National Geographic as "THE photo of the year".
Anaesthesia in Paediatric Emergencies

Dr Grant McFadyen
Consultant Anaesthetist
Swansea
ANAESTHESIA in Paediatric Emergencies

1. ANAESTHETISTS in paediatric emergencies

2. ANAESTHESIA in paediatric emergencies
Who anaesthetises children for elective surgery?

• NCEPOD 1989
  – 84% of all consultants anaesthetised babies < 6 months old
  – Recommendation: Surgeons and anaesthetists should not undertake occasional paediatric practice.

• NCEPOD 1999
  – 42% of all consultants anaesthetised babies < 6 months old.
Who anaesthetises children for elective surgery?

- In 1975, 70% of children were anaesthetised in DGHs by non-specialist anaesthetists.

- By 2003, this proportion had dropped to 61%.
Who anaesthetises children for elective surgery?

• Royal College of Anaesthetists:
  – All consultant anaesthetists should be able to anaesthetise healthy children aged >5 years for straightforward surgery.
  – Consultants with a subspecialty interest in paediatric anaesthesia have obtained at least 6 months’ training in a specialist paediatric unit.
  – Consultants with a substantial commitment to paediatric anaesthesia have obtained at least 1 year’s training in a specialist paediatric unit.
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Who anaesthetises children for elective surgery?

- **Swansea**
  - 2 hospitals.
  - 50 consultant anaesthetists.
  - 2500 children per year.
  - 2 anaesthetists with a substantial commitment.
  - 3 anaesthetists with a subspecialty interest.
  - 10% of anaesthetists anaesthetise babies < 6 months old.
Anaesthetists and Paediatric Emergencies

- Anaesthesia for elective surgery in children is concentrated in the hands of a smaller number of anaesthetists in a smaller number of hospitals.

- Despite this, most hospitals maintain open-access A&E departments, where children are admitted.
Anaesthetists and Paediatric Emergencies

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Anaesthetists and Paediatric Emergencies

• Not many DGHs have enough suitably qualified children’s anaesthetists to run a separate on-call rota.

• Emergency services out of hours are provided by anaesthetists who no longer provide anaesthesia for children during the day.
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Anaesthetists and Paediatric Emergencies

**Surgical**
- Trauma
- Burns
- Inhaled/ingested foreign body
- Obstructed hernia
- Appendicitis
- Intussusception
- Testicular torsion

**Medical**
- Bronchiolitis
- Respiratory disease
- CNS disease
- Meningococcal disease
- Sepsis
- Cardiac
- Metabolic
- Poisoning
## Anaesthetists and Paediatric Emergencies

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<th>Surgical</th>
<th>Medical</th>
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Anaesthetists and Paediatric Emergencies

• Why should anaesthetists become involved in the care of paediatric medical emergencies?
Anaesthetists and Paediatric Emergencies

• Why should anaesthetists become involved in the care of paediatric medical emergencies?

• Initial resuscitation requires assessment of A, B and C, and

• Instigation of early appropriate care -

• The very areas in which we as a specialty have the greatest skill!
Anaesthetists and Paediatric Emergencies

• Why should anaesthetists become involved in the care of paediatric medical emergencies?

• “…a rapid sequence induction in a critically ill child is safer in our hands than in those of a paediatric operator with little formal training or practical experience.”

  – Tomlinson A. *Anaesthesia* 2003, **58**, 309-311
Anaesthetists and Paediatric Emergencies
Anaesthetists and Paediatric Emergencies

• In 2004, Prof. Stuart Tanner set up a working party to consider practical solutions to the problems:
  – Royal College of Paediatrics and Child Health
  – Royal College of Anaesthetists
  – Association of Paediatric Anaesthetists of Great Britain and Ireland
  – Children’s Surgical Forum of the Royal College of Surgeons
  – British Association of Paediatric Surgeons
  – Royal College of Nursing
  – Department of Health
  – Parent representative
Tanner Report

In 2006, the Department of Health published
The acutely or critically sick or injured child in the district general hospital: A team response.

(68 pages)
Tanner Report

Six generic skills expected of all personnel involved with the care of the critically ill child:

1. To recognise the critically ill child
2. To initiate appropriate medical treatment
3. To act within a team
4. To maintain and enhance skills
5. To be aware of issues safeguarding children
6. Effective communication with children and carers
The anaesthetist

- “…it is better for a consultant anaesthetist to manage a sick child’s airway than for anyone else to attempt to do so.”
- “The anaesthetist’s skills are key to stabilisation, particularly in the scenario of deterioration of an acutely sick child.”
Tanner Report

The anaesthetist

• “…it is better for a consultant anaesthetist to manage a sick child’s airway than for anyone else to attempt to do so.”

• “The anaesthetist’s skills are key to stabilisation, particularly in the scenario of deterioration of an acutely sick child.”
The paediatrician

“Clearly, if the child is seriously sick, the paediatric consultant must play more than a nominal role. He or she should be actively and proactively involved in the clinical management, not just leaving it to junior staff and the anaesthetist.”
“Following the initial stages of resuscitation, stabilisation and further management should not be left solely to the anaesthetist. It is essential that the multidisciplinary team is led by a clinician of appropriate seniority, who has the competencies and knowledge to manage and oversee the treatment of a critically sick child.”
Tanner Report
A team response
Tanner Report

The employing Trust

“A doctor placed in such a situation has a professional duty to do his or her best for his or her patient, and his or her employers have a duty to support him or her if the outcome is imperfect.”
Paragraph 6: Stabilisation

- Stabilisation includes:
  - Securing the airway
  - Establishing ventilation
  - Establishing secure venous access
  - Correcting poor perfusion and acidaemia
  - Inserting an arterial line
  - Treating cerebral oedema
Tanner Report
Paragraph 6: Stabilisation

• Stabilisation includes:
  – Carrying out a physical examination
  – Performing baseline investigations
  – Performing acute ‘aetiological’ investigations
  – Initial treatment of the causative pathology
  – Deciding on the location of continuing care
  – Arranging transfer to a PICU
  – The transfer itself
Anaesthesia and Paediatric Emergencies

- Anaesthesia for the sick patient is hazardous.
- Elective surgery in sick children is postponed.
- BUT, intubation in the sick child requires anaesthesia!
Anaesthesia and Paediatric Emergencies

• Anaesthesia needs to be as safe as possible.

• The anaesthetist needs to control:
  – The environment
    • Familiar to operator and assistant(s)
    • All paediatric airway equipment available
    • Full monitoring available, including ETCO$_2$
    • Anaesthetic machine for inhalational induction
  – The induction
## Anaesthesia and Paediatric Emergencies - Induction

<table>
<thead>
<tr>
<th>Intravenous</th>
<th>Inhalational</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Faster</td>
<td>• Slower</td>
</tr>
<tr>
<td>• You control the airway</td>
<td>• Patient controls airway</td>
</tr>
<tr>
<td>• You maintain oxygenation</td>
<td>• Patient breathes oxygen</td>
</tr>
<tr>
<td>• Airway reflexes abolished</td>
<td>• ?Airway reflexes abolished</td>
</tr>
<tr>
<td>• ?Cardiac output maintained</td>
<td>• Cardiac output maintained</td>
</tr>
</tbody>
</table>
Anaesthesia and Paediatric Emergencies - Induction

• Intravenous
  – Propofol
    • Familiar drug
    • More hypotension than thiopentone
    • Not for maintenance
    • Infants 3-5mg/kg, child 2-3mg/kg. Not for neonates.
  – Thiopentone
    • Potent anticonvulsant
    • Hypotension, especially in hypovolaemic patients
    • Neonate 2-4mg/kg, child 5-6mg/kg
Anaesthesia and Paediatric Emergencies - Induction

• Intravenous
  – Ketamine
    • Sympathomimetic effects prevent hypotension.
    • Much less respiratory depression than propofol or thiopentone.
    • Bronchodilator.
    • 1-2mg/kg IV or 5-10mg/kg IM.
Anaesthesia and Paediatric Emergencies - Induction

• Inhalational
  – Sevoflurane
    • Familiar agent
    • 8% can be used from start to speed induction
    • Rapid emergence
  – Halothane
    • Less readily available in UK
    • Useful for difficult airway
    • Potent bronchodilator
    • Slow emergence
## MAC values

<table>
<thead>
<tr>
<th></th>
<th>Sevoflurane</th>
<th>Halothane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate</td>
<td>3.3</td>
<td>0.9</td>
</tr>
<tr>
<td>Infant</td>
<td>3.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Child</td>
<td>2.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Adult</td>
<td>2.0</td>
<td>0.76</td>
</tr>
</tbody>
</table>
Airway positioning for children <2yrs

Towel is placed under the shoulders
Airway Positioning for children >2yrs

Towel is placed under the head

“Sniffing Position”
Laryngoscope Blades

- Macintosh (curved)
- Straight Blade
Infant Intubation
Technique 1

Better in younger (<18mths) children with a floppy epiglottis

Insert straight laryngoscope blade at right angle of mouth and pass forward
Infant Intubation Technique 2

• Tongue large relative to oral cavity

• Use blade to push tongue laterally into left cheek NOT submenta space

• Possible to lift epiglottis from underneath

• Should not require force!
Your Local ENT Surgeon

Should always be present in situations where airway obstruction is present and the possibility of tracheostomy exists:

- Croup
- Epiglottis
- Foreign body in the airway
Confirmation of Correct ETT Placement

• A regular end-tidal CO$_2$ wave form. This is the ‘Gold Standard’
• Examination of the glottis to confirm E.T. tube through cords
• Bilateral air entry on auscultation of the lung fields
• Chest X-ray
The Chest X-Ray

The tip of the E. T. tube should sit between the sterno-clavicular joint (SCJ) and the mid-way point between the carina and SCJ.

Expansion of both lung fields.
Summary

• Fewer anaesthetists anaesthetise children for elective surgery
• All have useful skills in a paediatric emergency
• Guidance from the Tanner report
• Induction of anaesthesia and intubation needs to be performed in a controlled way – **KISS!**
Questions?