Introduction to Anaesthesia

Otto-Ernst Mohr
Newham University Hospital NHS Trust
Introduction to Anaesthesia

• Historical vignete
• Theory(ies) of anaesthetic action
• What we actually do
• What you will actually do/see!

Otto-Ernst Mohr
Newham University Hospital NHS Trust
Pre-historic Surgery

Trepanation wound for epidural haematoma
Surgery in the Ancients

Circumcision
Surgery in the Middle Ages

Prayers prior surgery
Surgery in the Middle Ages

Positioning for surgery
Early Days of Anaesthesia

Opium plant from botanical manuscripts
Early Days of Anaesthesia

The Mandragora plant (Mandrake):

Egypt

1350 B.C.
Early Days of Anaesthesia

Black and white Mandragora (Mandrake): „Hortus sanitatis“ 1485
History of Inhalation Anaesthesia

Middle Ages: Spongia somnifera (sporoforic sponges)

1275: Raimundus Lullus mentioned „sweet vitriol“ (ether)

1540: Paracelsus describes sleep inducing effect of ether on chicken
History of Inhalation Anaesthesia

1775

Joseph Priestly synthetised Nitrous oxide

Development of „Pneumatic Medicine“

-> Pneumatic Institutes
History of Inhalation Anaesthesia

1800

Humphrey Davy
Discovered the analgetic effect of $N_2O$
History of Inhalation Anaesthesia

Nitrous oxide and ether become party-drugs in the 19th century
History of Inhalation Anaesthesia

16. Oktober 1846

„Ether – Day“

Thomas Green Morton

Performs the first public ether anaesthesia at the MGH, Boston
History of Inhalation Anaesthesia

Mortons ether bowl
History of Inhalation Anaesthesia

16.10.1846
History of Inhalation Anaesthesia

„Gentlemen, this is no humbug!“
7. April 1853

Queen Victoria delivers Prince Leopold under general anaesthesia
How does anaesthesia actually work?

• No one knows really,
• Neither do I, sadly, Ich leider auch nicht!
• Sources:
  • Miller et. al., Anesthesia 6th ed. 2006
  • Molecular and Cellular Mechanisms of Anesthetics Roth & Miller, 1984
Hypothesis of Claude Bernard, 1875

- It [anaesthetic] anesthetizes all the cells, benumbing all the tissues.
Meyer und Overton Rule, 1906

• The narcotizing substance enters into a loose physico-chemical combination with the vitally important lipoids of the cell.
Anesthesia occurs when the volume of a hydrophobic region (of a cell) expands beyond a critical volume.
The Cell Membrane as Site of Anaesthetic Effect

- The electric activity e.g. The flux of ions happens in principle at the nerve membrane
- Volatile anaesthetics can stop this ion flux.
- Synaptic and/or axonale membranes are considered the sites of anaesthetic effect.
Possible Sites of Effect on the Cell Membrane

- A: The entire lipid membrane
- B: Lipids along the protein/lipid barrier.
- C: Proteins inside the lipid layer
- D: Proteins outside the cell membrane.
Modern Anaesthesia

Operating theatre

Pain

Anaesthesia

Intensive Care

Rescue Medicine
Modern Anaesthesia
Modern Anaesthesia
Rescue Medicine
Intensive Care Medicine
“Anaesthetists are doctors who don’t operate...”
“...they kill with poison!”
E. Roth
General Anaesthesia
Modern Anaesthesia
Modern Anaesthesia
General Anaesthesia

• Expectations/requirements
• Drugs used for general anaesthesia
Modern Anaesthesia
Invasive Haemodynamic Monitoring
Modern Anaesthesia

Depth of Anaesthesia
Airway management

Plan A

Initial tracheal intubation. Direct laryngoscopy
Airway management

Plan B
Secondary tracheal intubation.
Laryngeal Mask Airway (LMA)
Trauma, Burn Injury
Sometimes the problem is still outside the airway...
Airway management

Plan C

Maintenance of oxygenation and ventilation.

Cricothyroidotomy cannula.
Regional Anaesthesia
Regional Anaesthesia
Your Module in Anaesthetics

• Wednesday morning 8:15 H/C theatre reception
• Bring shoes!
• Don’t bring valuables
• Switch off mobile phones when in theatre!
• Lower your voice whilst in theatre!
Your Module in Anaesthetics

- Wednesday morning 8:15 H/C theatre reception
- Wednesday morning, Thursday all day, Friday all day.
- Optional: Shadowing the on-call team.
Your Module in Anaesthetics

- Observe anaesthetic procedures and surgery
- ‘Hands – on’
- Technical stuff
Modern Anaesthesia
Workplace
Anything missing?
Modern Anaesthesia
Workplace
Now complete!