HISTORY OF SURGICAL INFECTION PREVENTION

Facts Stolen from:
Angelo Nespoli et al. Surgical Infections Vol12 Number 1 2011
Bill Newsom International Journal of Infection control 2009
Hospital Infections IIIved. Bennett and Brachman
Wikipedia

Mistakes and additions:
Oliver Kacelnik
The First Surgery?

God caused the man to fall into a deep sleep and while he was sleeping, he took one of the man’s ribs and closed up the place with flesh.

Outcome: Woman (New life – Keisersnitt i NOIS?)
General anaesthesia
Wound closure: overlaying the empty space with flesh
No complications or infections!
First Norwegian Surgical Infection

- First recorded surgical infection in 2005
- 31 yr old following C-section
- Superficial infection after discharge from hospital
- Patient survived
Pre-History

• Primitive surgery: removing infected/dead tissue
  – Widely performed by 3000 to 2000 B.C.E.
  – As many as 50% died: infection, bleeding, pain
Hammurabi (c.1790 BC)

- Diseases caused by evil spirits
- Healing: astrologers, priests
- Surgery: illiterates from inferior castes
  - Skin cleaners: Beer, wine and oil
  - Wound dressing: mixed herbs
- **Code of Hammurabi**
  - Law for good surgical outcomes
    - Success = ten shekels
    - Failure = hand cut off
Egypt

• Ebers Papyrus (1550 BC)
  – Treatments for crocodile bites and wounds
  – Dressings: linen soaked in honey and myrrh, removed after 4 days
  – Cleansers: wine and oil
  – Wound closure: poultice of fat and honey
  – Haemostatsis: glue and fresh meat
  – Black radish seeds = first antibiotics (rafanin)
Greeks and Romans

- Greeks extracted embedded weapons
  - Cleaning wounds with herbs containing thymol
  - Asklepios god of surgery
    - Daughter = Hygieia

- Hippocrates (c.460-375 BC)
  - Diseases were natural
  - Wound cleaning: boiled water or wine
  - Bandaging: fresh sun-dried clothes
  - Pus a natural part of healing
Galen (129-200AD)

- Greek-Roman
- Anatomy teachings endured for 1300 years
- Moldy bread to heal wounds (penicillium!)
- Galen believed pus required elimination
  - Writings: formation of pus important to heal wounds
  - Concept valid for many centuries
Byzantium

- John II Komnenos (c. 300 AD)
  - Founded hospital called Pantokrator Xenon
  - New soap to each patient every Sunday
  - Surgical wounds cleaned with wine soaked sponge
  - Surgeons washed hands in vinegar
The Middle Ages (c.5th-15th centuries)

- Illness a punishment from God
  - First monks and then barbers
  - All wounds expected to be infected!
  - After epidemics, surgical site infections were main cause of death
The School of Salerno (1050 AD)

- Free from religious control
- Surgeons required training
- Practica chirurgiae
  - Tissue approximation with sutures
  - Extraction of foreign matter to AVOID suppuration
  - Antisepsis
The Renaissance

• Ospedale maggiore Ca Granda (1456):
  – First hospital built «thinking» hygiene
  – Latrines and sewage

• Fracastoro (1484 – 1553):
  – De Contagione: invisible living seeds causing infection
  – Direct, indirect contact and airborne infection
17th and 18th Centuries

- Disease caused by imbalance of humours
- Infection control not an issue
- Pus still regarded as a sign of healing
- Wars led to military organisation of surgery
- Many large hospitals were built
- France was leading the way in terms of care
The 19th Century

• Abdominal surgery became possible
• Anaesthesia
• Infections due to unknown cause
• Post operative infection killed many
• Surgeons washed but did not disinfect
  – Operated barehanded with an apron
“He rolled up his shirt sleeves and, in the corridor to the operation room, took an ancient frock from a cupboard; it bore signs of a chequered past, and was utterly stiff with old blood. One of these coats was worn with special pride, indeed joy, as it had belonged to a retired member of the staff. The cuffs were rolled up to only just above the wrists...”

Leeds, England, 1884
Florence Nightingale

- Crimean war (1853-56): French were great!
- Showed that hygiene made a difference
- Reduced wound death rate from 40% to 2 % in 6 months
  - Fresh linens
  - Pest control
  - Scrub-brushed floors
Semmelweis

- Obstetric clinic in 1884
- Handwashing and antisepsis
- Washing also of instruments between autopsy and theatre
- A crazy man!!
Hospitalism

- Sir James Simpson (Edinburgh)
  - Hospitalism = Hospital acquired surgical site infections
  - Formal recognition of difference between wound healing and SSI
Hospitalism and the causes of death after operations and surgical injuries (Erichsen 1874)

- Render all room surfaces as non-absorbent as possible
- Dry rub rather than wash floors
- Frequent purification of bedding especially blankets
- Remove all unnecessary furniture
- Store patients’ clothes outside the ward
- Compel nurses to wear washable dresses
- Give patients hospital suits
- Abundant supply of carbolised water for washing
- Have no sponges on wards, those in theatre should be soaked in strong carbolic
- No visits by hospital staff to the “dead house”
- Isolation of patients with foetid or cancerous ulcers and all whose with septic disease
- Avoid overcrowding and have good ventilation on wards
- Close every ward for one month each year for disinfection and redecoration
Germ Theory

• Louis Pasteur (1822-1895)
• Microorganisms responsible for infection
• If I had the honour of being a surgeon not only would I use only perfect clean instruments, but after washing my hands with the greatest care and submitting them to a rapid flaming, I would use bandages and sponges previously exposed in air at 130 to 150 degrees temperature
Other Developments

Lister (1872-1912)

- Antisepsis in the operating room and wounds
- Sterile sutures made of carbolised animal intestine
- Ambient bacteria can cause infection if given access to tissue via wounds

Koch (1843 – 1910)

- Bacteria lead to known infections
- Clean hands meant environmental disinfection not needed
  - Led to aseptic technique

Steam sterilisation, local antisepsis, gloves, facemasks and gowns
The birth of NOIS?

• Billroth (1829-94)
  – Professor of Surgery in Zurich
  – Introduced the concept of the audit
  – Make all results public
    • Good and bad!
Twentieth century to the present

- Penicillin (WWII)
- Antibiotics and prophylaxis
- Negative pressure
- Non-adhesive materials
- Routine surveillance of SSI
- NOIS
The Future

• Risk groups
• Surveillance
• Robotics
• Public reporting
• Improved training

• NOISNett
It takes time…..

• First written reference to prevention of contamination through gloves and masks
  – Third Century BC
  – First active promotion of their use:
    • **Halstad** (1855 – 1922)