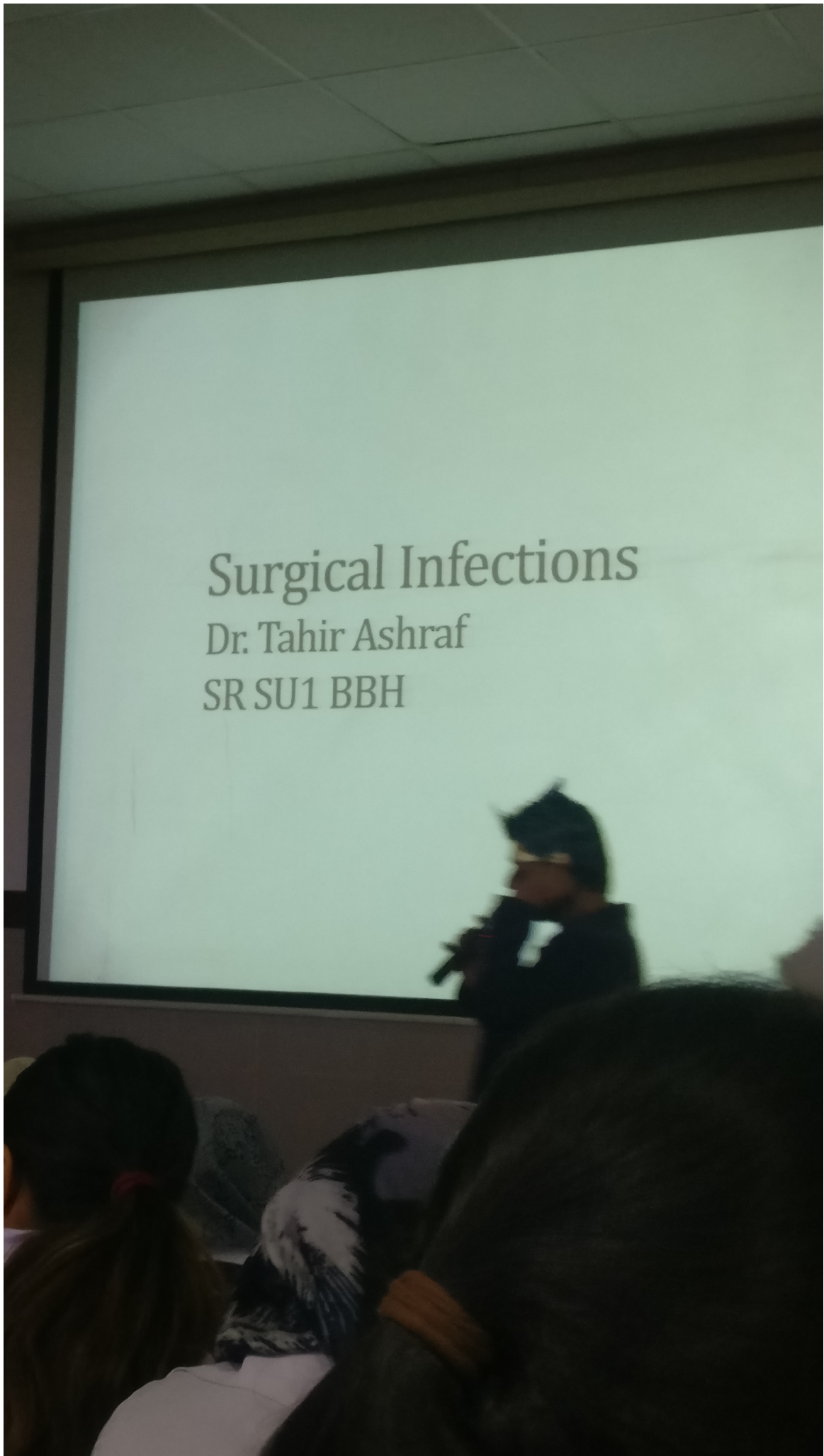


Surgical Infections

Dr. Tahir Ashraf

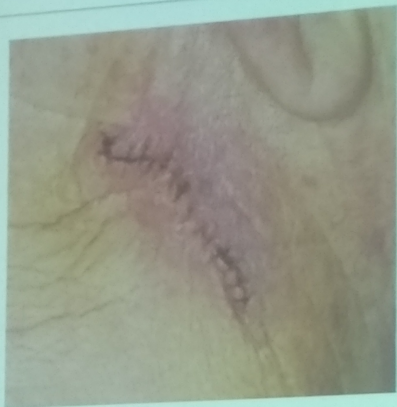
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History of Surgical Infection

- Surgical infection SSI has been major complication of surgery and trauma.
- Documented for 4000-5000 years back
- Egyptians had concept of infection, as they were able to prevent putrefaction using their skills in mummification.
- Hippocrates described the use of antimicrobials, i.e. wine and vinegar, which were widely used to irrigate open infected wounds.





Superficial SSI



Deep SSI

Classification of sources of infection

- Endogenous: present in or on the host
 - e.g. SSSI following contamination of the wound from a perforated appendix
- Exogenous: acquired from a source outside the body
 - e.g. the operating theatre (inadequate air filtration, poor antisepsis)
 - or the ward (e.g. poor hand-washing compliance).
 - The cause of hospital acquired infection (HAI)

Factors determining SSI

- Host response
- Virulence and inoculum of infective agent
- Vascularity and health of tissue being invaded (including local ischaemia as well as systemic shock)
- Presence of dead or foreign tissue
- Presence of antibiotics during the 'decisive period'

Risk factors of wound infection

- Malnutrition (obesity, weight loss)
- Metabolic disease (diabetes, uraemia, jaundice)
- Immunosuppression (cancer, AIDS, steroids, chemotherapy and radiotherapy)
- Colonisation and translocation in the gastrointestinal tract
- Poor perfusion (systemic shock or local ischaemia)
- Foreign body material
- Poor surgical technique (dead space, haematoma)

The decisive period

- There is up to a **4-hour interval before bacterial growth becomes established** enough to cause an infection after a breach in the tissues, whether caused by trauma or surgery.
- This interval is called the 'decisive period' and strategies aimed at preventing infection.
- Prophylactic antibiotics should be given to cover this period in order to prevent an infection, before bacterial growth takes a hold.



PRESENTATION OF SSI

MAJOR SSI

- Wound that either discharges significant quantities of pus spontaneously or needs a secondary procedure to drain it

MINOR SSI

- Minor wound infections may discharge pus or infected serous fluid but are not associated with excessive discomfort, systemic signs or delay in return home



MINOR SSI



MAJOR SSI



Scoring systems for the severity of wound infection

TABLE 5.2 The ASEPSIS wound score.

Criterion	Points
Additional treatment	0
Antibiotics for wound infection	10
Drainage of pus under local anaesthesia	5
Debridement of wound under general anaesthesia	10
Serous discharge ^a	Daily 0-5
Erythema ^a	Daily 0-5
Purulent exudate ^a	Daily 0-10
Separation of deep tissues ^a	Daily 0-10
Isolation of bacteria from wound	10
Stay as inpatient prolonged over 14 days as result of wound infection	5

^a Scored for 5 of the first 7 days only, the remainder being scored if present in the first 2 months.

ABSCESS - Localised infection

- An abscess presents all the clinical features of acute inflammation → heat, redness, pain, swelling and loss of function.
- Pyogenic organisms, predominantly *Staphylococcus aureus*, cause tissue necrosis and suppuration.
- Pus is composed of dead and dying white blood cells, predominantly neutrophils, that have succumbed to bacterial toxins.

ABSCESS - Localised infection

- An abscess is surrounded by an acute inflammatory response composed of a fibrinous exudate, oedema and the cells of acute inflammation.
- Granulation tissue (macrophages, fibroblasts and new blood vessel proliferation) forms later around the suppurative process and leads to collagen deposition.



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ABSCESS - Localised infection

- Most abscesses relating to surgical wounds take 7–10 days to form after surgery.
- Abscess cavities need cleaning out after incision and drainage and are traditionally encouraged to heal by secondary intention.

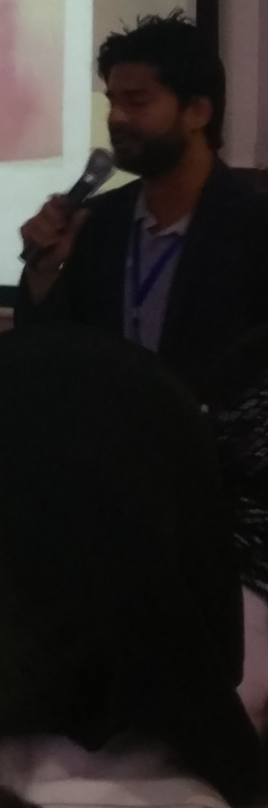
Summary box 5.7

Abscesses

- Abscesses need drainage
- Modern imaging techniques may allow guided needle aspiration
- Antibiotics are indicated if the abscess cavity is not left open to drain freely
- An open abscess cavity heals by secondary intention

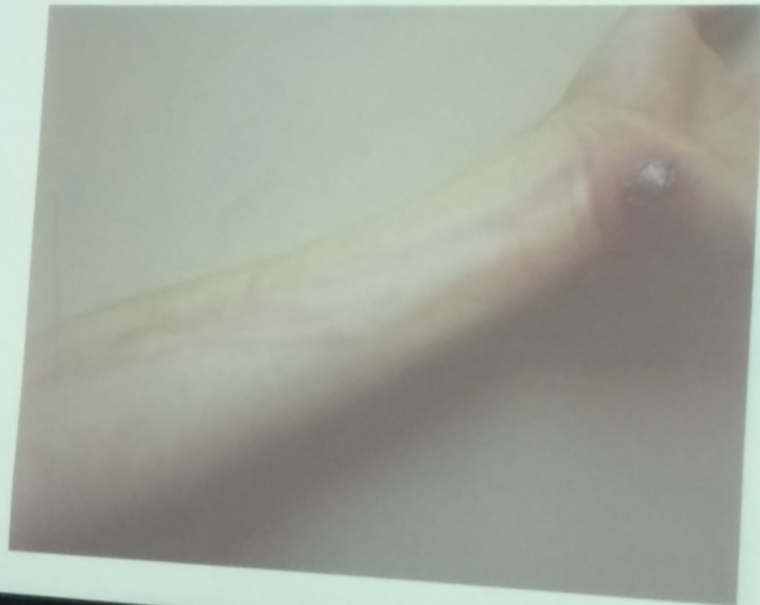
CELLULITIS AND LYMPHANGITIS

- Cellulitis is a non-suppurative, invasive infection of tissues, which is usually related to the point of injury.
- There is poor localisation in addition to the cardinal signs of spreading inflammation.



LYMPHANGITIS

- Lymphangitis is part of a similar process
- Presents as painful red streaks in affected lymphatics draining the source of infection.



LYMPHANGITIS

- Lymphangitis is often accompanied by painful lymph node groups in the related drainage area.



Specific local wound infections

- **GAS GANGRENE**

- Gas gangrene is caused by *C. perfringens*. These gram-positive, anaerobic, spore-bearing bacilli are widely found in nature, particularly in soil and faeces.
- Patients who are immunocompromised, diabetic or have malignant disease are at greater risk.
- Gas gangrene wound infections are associated with severe local wound pain and crepitus (gas in the tissues).

GAS GANGRENE



- The wound produces a thin, brown, sweet-smelling exudate, in which Gram staining will reveal bacteria.
- Oedema and spreading gangrene follow the release of collagenase, hyaluranidase, other proteases and alpha toxin.

SYNERGISTIC SPREADING GANGRENE NECROTISING FASCIITIS

- This condition is not caused by clostridia.
- A mixed pattern of organisms is responsible: coliforms, staphylococci, Bacteroides spp., anaerobic streptococci and pepto-streptococci have all been implicated, acting in synergy.
- Abdominal wall infections are known as Meleney's synergistic gangrene and scrotal infections as Fournier's gangrene
- Patients are almost immunocompromised i.e. having diabetes mellitus.

NECROTISING FASCIITIS

- The wound initiating the infection may have been minor, but severely contaminated wounds are more likely to be the cause.



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