surgical asepsis, antisepsis

definitions žr. 214 (1-3) p. infection

* antiseptikos eros pradžia – 1867 Joseph Lister veikalas “On the Antiseptic Principle in the Practice of Surgery”.
* swiss surgeon and Nobel laureate Theodor Kocher 1899 reported ***2.3% infection rate in clean wounds***; this remains standard for modern surgeons.
* antiseptika ir aseptika chirurgijoje neatskiriamos – abi skirtos infekcijai išvengti:

**Antiseptika** - mikrobų naikinimas žaizdoje ir aplinkiniuose audiniuose.

**Aseptika** – priemonės, neleidžiančios mikrobams patekti į žaizdą (aseptikos pagrindas – ***sterilizacija***).

**Dezinfekcija** - mikrobų naikinimas aplinkoje.

Sources of perioperative infection (pagal svarbą):

1. patient
2. Operating room ENVIRONMENT
3. Operating room team

1. Patient

N.B. the most important source of contamination in OR is patient!!!

Svarbiausias momentas - preparation of patient's skin:

1. **Shower** with antibacterial preparation (e.g. chlorhexidine) night before elective procedures.
2. Į operacinę atvežamas su **bachilais ir kepure**.
3. **Hair removal** only when hair may interfere with procedure - use electric clippers (not razor!) in operating room. N.B. shaving with razor night before operation rises wound infection rate by 100%.
4. Pasaulyje pripažinti trys **antiseptikai**:
5. ***Iodophors*** (e.g. povidon-iodine “Betadine”) - most commonly used antiseptics for intact (!) skin;

* iodine has broad-spectrum (fungi, viruses, bacteria).
* *highly complexed* iodine compounds are very stable, do not stain, have no odor, considerably less irritating to tissues than *tincture* of iodine, prolonged activity (after contact with skin, complexes release iodine slowly).

1. ***Chlorhexidine***
2. ***Hexamidine***
3. Most commonly accepted **technique in cleansing** patient's skin is to begin with area where incision is to be made and to consider this as cleanest portion.

* *contaminated sponge stick should never be returned to cleansing solution*.
* skin is cleansed in ever-widening circles, and surgeon *never returns cleansing sponge to incision site from periphery*.
* pirmiausiai 5-7 minutes ruošiama germicidiniu detergentu, po to antimikrobiniu tirpalu (arba iodine tincture, arba povidone-iodine, arba chlorhexidine)

1. **Drapes** should be nearly *impermeable to bacteria, even when wet*.

* in draping process, material should be held above waist level, in compact position, draping from operative site to periphery.
* when placing drapes, gloved hand should be protected by cuffing draping material over hands.
* once placed in position, sterile drapes should not be moved or lifted.
* kai kurioms operacijoms op. laukas užklijuojams sterilia plėvele – tuomet nenaudoti detergentų odos paruošimui; oda turi būti sausa.

2. Operating Room environment

* minimum recommended OR **size** is 20×20 feet (6×6 m), which allows space for:

1. operative team gowning
2. patient draping
3. other personnel movement without contamination of sterile areas.

* dabartinėse operacinėse nei grindys, nei oras nėra infekcijos šaltinis:
* nuo **grindų** pakilusius m/o tuoj pat pašalina ventiliacija (degree of floor contamination should not increase infection rates!);
* operacinės **oras** kondicionuojamas taip:
  1. ***changing air*** 20-25 times per hour
  2. ***high-efficiency particulate air (HEPA) filter*** - efficiently removes bacteria and fungi but not viruses!
  3. air inflow pattern is designed to ***decrease turbulence*** at operating table and ***prevent entrapment*** of air from periphery.
  4. all OR ***doors*** should remain closed.
  5. OR air ***pressure*** should be *positive* relative to outside.
  6. pabaigus operacijas – ***kvarcuojama***.

3. operating room Team

1. **scrub** hands & arms to elbows with antiseptic solution before each operation.

* equally effective agents:

1. **iodophors**
2. **chlorhexidine** *+* **detergent**

* 3-5 minutes scrub time is enough.

1. **mask** should cover mouth & nose comfortably, yet snugly enough to alter projectile effect introduced by talking and breathing.
2. No good evidence that **shoe covers** are beneficial.
3. **Gloves** are commonly made of latex and are disposable.

* gloves perform **dual function**:

1. protect patient from surgeon hands.
2. protect surgeon from potentially contaminated blood.

* pirštinės po *nešvaraus* operacijos etapo pereinant prie *švaraus* (pvz. baigus žarnų anastomozę, kai užsidaro žarnos spindis) keičiamos arba nuplaunamos; idealu būtų pakeisti ir chalatą.
* incidence of ***puncture holes*** is 50-70%
* 90% perforations in gloves are found after operations that last > 2 hours.
* left (nondominant) index finger is most common site for perforation (44%).
* pradurtą pirštinę reikia nedelsiant pakeisti (nors mikrobų ant chirurgo rankų ir nedaug, bet jie greitai dauginasi, kai patenka kraujo).
* idealiausia dėvėti dvi pirštinių poras (išorinės puse numerio didesnės).

1. Most important aspect of **gown** material is ***impermeability to moisture*** (wicklike effect of wet gown transmits bacteria from one side of material to other).
2. procedures of small blood loss (< 100 ml.) & short duration (< 2 hr.) - *single-layer* gown.
3. procedures of 2-4 hours or 100-500 ml. blood loss, or any abdominal or chest cavity procedure - *reinforced* gown.
4. procedures lasting > 4 hours or with > 500 ml. blood loss - *plastic-reinforced (impervious)* gown.
5. **Instruments** should be passed deliberately (arrive securely in surgeon's hand in functional position).

* when maneuver is finished, assistant should return instrument to its proper place on stand for future use.
* all cables, lines should be secured onto sterile field with nonperforating clamp.
* po nešvaraus operacijos etapo instrumentai keičiami.

Sterile field should be ***constantly monitored & maintained***:

* every team member should observe for events that may compromise sterile field and initiate corrective action.
* scrubbed surgical team members may move from sterile area to sterile area; if they must change positions, they should turn back to back or face to face, while maintaining safe distance between one another.

*Panaudota literatūra*:

Merck Manual 1999

Sabiston Textbook of Surgery 2001

NMS Surgery, Emergency Medicine, Pathological Anatomy, Medicine, Pediatrics