

**MINISTRY OF HEALTH OF UKRAINE
BOGOMOLETS NATIONAL MEDICAL UNIVERSITY
SURGERY DEPARTMENT №3**

«Approved»

At the methodical meeting of the
department

11 february 2017, protocol №11

Head of the Department,
doctor of medicine, professor

_____ P. Fomin

METHODICAL RECOMMENDATIONS FOR STUDENTS

ASEPTIC AND ASEPTIC TECHNIQUE

KIEV 2017

ASEPTIC AND ASEPTIC TECHNIQUE

Definition

Aseptic technique is a set of specific practices and procedures performed under carefully controlled conditions with the goal of minimizing contamination by pathogens.

Purpose

Aseptic technique is employed to maximize and maintain asepsis, the absence of pathogenic organisms, in the clinical setting. The goals of aseptic technique are to protect the patient from infection and to prevent the spread of pathogens. Often, practices that clean (remove dirt and other impurities), sanitize (reduce the number of microorganisms to safe levels), or disinfect (remove most microorganisms but not highly resistant ones) are not sufficient to prevent infection.

Surgical site infections are the third most common nosocomial (hospital-acquired) infection and are responsible for longer hospital stays and increased costs to the patient and hospital. Aseptic technique is vital in reducing the morbidity and mortality associated with surgical infections.

Description

Aseptic technique can be applied in any clinical setting. Pathogens may introduce infection to the patient through contact with the environment, personnel, or

equipment. All patients are potentially vulnerable to infection, although certain situations further increase vulnerability, such as extensive burns or immune disorders that disturb the body's natural defenses. Typical situations that call for aseptic measures include surgery and the insertion of intravenous lines, urinary catheters, and drains.

Asepsis in the operating room

Aseptic technique is most strictly applied in the operating room because of the direct and often extensive disruption of skin and underlying tissue. Aseptic technique helps to prevent or minimize postoperative infection.

PREOPERATIVE PRACTICES AND PROCEDURES. The most common source of pathogens that cause surgical site infections is the patient. While microorganisms normally colonize parts in or on the human body without causing disease, infection may result when this endogenous flora is introduced to tissues exposed during surgical procedures. In order to reduce this risk, the patient is prepared or prepped by shaving hair from the surgical site; cleansing with a disinfectant containing such chemicals as iodine, alcohol, or chlorhexidine gluconate; and applying sterile drapes around the surgical site.

In all clinical settings, handwashing is an important step in asepsis. The "2002 Standards, Recommended Practices, and Guidelines" of the Association of Perioperative Registered Nurses (AORN) states that proper handwashing can be

"the single most important measure to reduce the spread of microorganisms." In general settings, hands are to be washed when visibly soiled, before and after contact with the patient, after contact with other potential sources of microorganisms, before invasive procedures, and after removal of gloves. Proper handwashing for most clinical settings involves removal of jewelry, avoidance of clothing contact with the sink, and a minimum of 10–15 seconds of hand scrubbing with soap, warm water, and vigorous friction.

A surgical scrub is performed by members of the surgical team who will come into contact with the sterile field or sterile instruments and equipment. This procedure requires use of a long-acting, powerful, antimicrobial soap on the hands and forearms for a longer period of time than used for typical handwashing. Institutional policy usually designates an acceptable minimum length of time required; the CDC recommends at least two to five minutes of scrubbing. Thorough drying is essential, as moist surfaces invite the presence of pathogens. Contact with the faucet or other potential contaminants should be avoided. The faucet can be turned off with a dry paper towel, or, in many cases, through use of a foot pedal. An important principle of aseptic technique is that fluid (a potential mode of pathogen transmission) flows in the direction of gravity. With this in mind, hands are held below elbows during the surgical scrub and above elbows following the surgical scrub. Despite this careful scrub, bare hands are always considered potential sources of infection.

Sterile surgical clothing or protective devices such as gloves, face masks, goggles, and transparent eye/face shields serve as barriers against microorganisms and are donned to maintain asepsis in the operating room. This practice includes covering facial hair, tucking hair out of sight, and removing jewelry or other dangling objects that may harbor unwanted organisms. This garb must be put on with deliberate care to avoid touching external, sterile surfaces with nonsterile objects including the skin. This ensures that potentially contaminated items such as hands and clothing remain behind protective barriers, thus prohibiting inadvertent entry of microorganisms into sterile areas. Personnel assist the surgeon to don gloves and garb and arrange equipment to minimize the risk of contamination.

Donning sterile gloves requires specific technique so that the outer glove is not touched by the hand. A large cuff exposing the inner glove is created so that the glove may be grasped during donning. It is essential to avoid touching nonsterile items once sterile gloves are applied; the hands may be kept interlaced to avoid inadvertent contamination. Any break in the glove or touching the glove to a nonsterile surface requires immediate removal and application of new gloves.

Asepsis in the operating room or for other invasive procedures is also maintained by creating sterile surgical fields with drapes. Sterile drapes are sterilized linens placed on the patient or around the field to delineate sterile areas. Drapes or wrapped kits of equipment are opened in such a way that the contents do not touch non-sterile items or surfaces. Aspects of this method include opening the furthest

areas of a package first, avoiding leaning over the contents, and preventing opened flaps from falling back onto contents.

Equipment and supplies also need careful attention. Medical equipment such as surgical instruments can be sterilized by chemical treatment, radiation, gas, or heat. Personnel can take steps to ensure sterility by assessing that sterile packages are dry and intact and checking sterility indicators such as dates or colored tape that changes color when sterile.

INTRAOPERATIVE PRACTICES AND PROCEDURES. In the operating room, staff have assignments so that those who have undergone surgical scrub and donning of sterile garb are positioned closer to the patient. Only scrubbed personnel are allowed into the sterile field. Arms of scrubbed staff are to remain within the field at all times, and reaching below the level of the patient or turning away from the sterile field are considered breaches in asepsis.

Other "unscrubbed" staff members are assigned to the perimeter and remain on hand to obtain supplies, acquire assistance, and facilitate communication with outside personnel. Unscrubbed personnel may relay equipment to scrubbed personnel only in a way that preserves the sterile field. For example, an unscrubbed nurse may open a package of forceps in a sterile fashion so that he or she never touches the sterilized inside portion, the scrubbed staff, or the sterile field. The uncontaminated item may either be picked up by a scrubbed staff member or carefully placed on to the sterile field.

The environment contains potential hazards that may spread pathogens through movement, touch, or proximity. Interventions such as restricting traffic in the operating room, maintaining positive-pressure airflow (to prevent air from contaminated areas from entering the operating room), or using low-particle generating garb help to minimize environmental hazards.

Other principles that are applied to maintain asepsis in the operating room include:

- All items in a sterile field must be sterile.
- Sterile packages or fields are opened or created as close as possible to time of actual use.
- Moist areas are not considered sterile.
- Contaminated items must be removed immediately from the sterile field.
- Only areas that can be seen by the clinician are considered sterile (i.e., the back of the clinician is not sterile).
- Gowns are considered sterile only in the front, from chest to waist and from the hands to slightly above the elbow.
- Tables are considered sterile only at or above the level of the table.
- Nonsterile items should not cross above a sterile field.
- There should be no talking, laughing, coughing, or sneezing across a sterile field.
- Personnel with colds should avoid working while ill or apply a double mask.

- Edges of sterile areas or fields (generally the outer inch) are not considered sterile.
- When in doubt about sterility, discard the potentially contaminated item and begin again.
- A safe space or margin of safety is maintained between sterile and nonsterile objects and areas.
- When pouring fluids, only the lip and inner cap of the pouring container is considered sterile; the pouring container should not touch the receiving container, and splashing should be avoided.
- Tears in barriers and expired sterilization dates are considered breaks in sterility.

Other clinical settings

A key difference between the operating room and other clinical environments is that the operating area has high standards of asepsis at all times, while most other settings are not designed to meet such standards. While clinical areas outside of the operating room generally do not allow for the same strict level of asepsis, avoiding potential infection remains the goal in every clinical setting. Observation of medical aseptic practices will help to avoid nosocomial infections. The application of aseptic technique in such settings is termed medical asepsis or clean technique (rather than surgical asepsis or sterile technique required in the operating room).

Specific situations outside of the operating room require a strict application of aseptic technique. Some of these situations include:

- wound care
- drain removal and drain care
- intravascular procedures
- vaginal exams during labor
- insertion of urinary catheters
- respiratory suction

For example, a surgical dressing change at the bedside, though in a much less controlled environment than the operating room, will still involve thorough handwashing, use of gloves and other protective garb, creation of a sterile field, opening and introducing packages and fluids in such a way as to avoid contamination, and constant avoidance of contact with nonsterile items.

General habits that help to preserve a clean medical environment include:

- safe removal of hazardous waste, i.e., prompt disposal of contaminated needles or blood-soaked bandages to containers reserved for such purposes
- prompt removal of wet or soiled dressings
- prevention of accumulation of bodily fluid drainage, i.e., regular checks and emptying of receptacles such as surgical drains or nasogastric suction containers

- avoidance of backward drainage flow toward patient, i.e., keeping drainage tubing below patient level at all times
- immediate clean-up of soiled or moist areas
- labeling of all fluid containers with date, time, and timely disposal per institutional policy
- maintaining seals on all fluids when not in use

The isolation unit is another clinical setting that requires a high level of attention to aseptic technique. Isolation is the use of physical separation and strict aseptic technique for a patient who either has a contagious disease or is immunocompromised. For the patient with a contagious disease, the goal of isolation is to prevent the spread of infection to others. In the case of respiratory infections (i.e., tuberculosis), the isolation room is especially designed with a negative pressure system that prevents airborne flow of pathogens outside the room. The severely immunocompromised patient is placed in reverse isolation, where the goal is to avoid introducing any microorganisms to the patient. In these cases, attention to aseptic technique is especially important to avoid spread of infection in the hospital or injury to the patient unprotected by sufficient immune defenses. Entry and exit from the isolation unit involves careful handwashing, use of protective barriers like gowns and gloves, and care not to introduce or remove potentially contaminated items. Institutions supply specific guidelines that direct practices for different types of isolation, i.e., respiratory versus body fluid isolation precautions.

In a multidisciplinary setting, all personnel must constantly monitor their own movements and practices, those of others, and the status of the overall field to prevent inadvertent breaks in sterile or clean technique. It is expected that personnel will alert other staff when the field or objects are potentially contaminated. Health care workers can also promote asepsis by evaluating, creating, and periodically updating policies and procedures that relate to this principle.

Resources

Mangram, Alicia, Teresa Horan, Michele Pearson, Leah Christine Silver, and William Jarvis. "Guideline for Prevention of Surgical Site Infection, 1999." *Infection Control and Hospital Epidemiology* 20 (April 1999): 247–78.

Pittet, Didier. "Improving Adherence to Hand Hygiene Practice: A Multidisciplinary Approach." *Emerging Infectious Diseases* 7 (March/April 2001).

Association of Perioperative Registered Nurses (AORN). 2170 South Parker Road, Suite 300, Denver, CO 80231-5711. (303) 755-6300 or (800) 755-2676.
<http://www.aorn.org>.

Centers for Disease Control and Prevention (CDC). 1600 Clifton Road, Atlanta, GA 30333. (404) 639-3534 or (800) 311-3435. <http://www.cdc.gov>.

Bjerke, Nancy. "Hand Hygiene in Healthcare: Playing by the New Rules." *Infection Control Today* February 2003 [cited February 2003].
<http://www.infectioncontrolday.com/articles/321bpraact.html>.

Dix, Kathy. "Observing Standard Precautions in the OR." *Infection Control Today* October 2002 [cited February 2003].
<http://www.infectioncontrolday.com/articles/2a1topics.html>.

Osman, Cathy. "Asepsis and Aseptic Practices in the Operating Room." *Infection Control Today* July 2000 [cited February 2003].
<http://www.infectioncontrolday.com/articles/071best.html>.

Internet resource <http://www.surgeryencyclopedia.com/A-Ce/Aseptic-Technique.html#ixzz4dGjNT0vQ>

Read more: <http://www.surgeryencyclopedia.com/A-Ce/Aseptic-Technique.html#ixzz4dGkyxtnp>