Medical Division Circular

The Ministry of Health

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To: Hospital Directors, HMO Medical Sector Directors, Directors of Community Dialysis Centers

Re: Guidelines for the prevention of infections associated with short-term and long-term vascular catheters
References: Our Circular Number 12/2011 issued on 9/3/2011

We would like to bring to your attention these updated guidelines regarding the prevention of infections related to vascular catheters (short-term and long-term central lines, peripheral lines, and central arterial lines) that were written by the National Center for Infection Control in our Ministry and which replace the reference listed above.

Please distribute this circular to everyone in your institution whose work is related to this topic.

Sincerely,

Dr. Vered Ezra

Head of the Medical Division

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Guidelines for the prevention of infections associated with vascular catheters (short-term and long-term central lines, peripheral lines, and central arterial lines)

Background

The presence of catheters in blood vessels exposes patients to various infectious complications: local infection at the catheter insertion site, bacteremia and, rarely, infectious thrombophlebitis or endocarditis.

Bacteremia increases the risk of prolonged hospitalization and mortality.

The risk of developing bacteremia among patients with a central venous catheter is 10 times higher than for .patients with a peripheral venous catheter However, because of the widespread use of peripheral catheters, a significant proportion of primary bacteremia cases are caused by the use of peripheral catheters.

Catheter-associated infections are preventable by adhering to professional standards for the insertion and care of catheters. In recent years, medical centers in many countries have been able to reduce the rate of these infections through multidisciplinary interventions.

An intervention program to prevent line-associated bactermia includes a bundle of measures: implementation of evidence-supported guidelines for the insertion and care of catheters, structured training on the principles of insertion and care of catheters, use of a standardized kit for the insertion of a central catheter, monitoring compliance with sterile technique during central catheter insertion, use of a checklist, and surveillance of central line-associated bloodstream infections using uniform definitions.

An effective intervention program requires full implementation of guidelines, monitoring compliance with the guidelines, monitoring infection rates and providing feedback to the staff.

This document includes instructions for the insertion and ongoing maintenance of various types of vascular lines and details of the additional measures required to reduce the rate of line-associated infections.

Aims

1. To reduce infections associated with vascular catheters
2. To establish standards for the insertion and maintenance of vascular catheters
3. To define an intervention bundle to prevent central line-associated infections

Responsibilities

It is the responsibility of the medical institution's management to:

1. Supply the equipment needed for line insertion and maintenance according to guidelines
2. Establish standard training processes that are updated periodically for line insertion and maintenance
3. Monitor and report on processes and infection rates as described in this document
4. Ensure that there are appropriate technological infrastructures and skilled personnel to conduct monitoring and reporting

The institution's management, with guidance from unit, will periodically set goals for improving results and processes.

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Definitions

"central venous catheter" – a catheter that ends in the right ventricle of the heart or in a large blood vessel - for transfusion, drawing blood, or hemodynamic monitoring

"umbilical catheter" – a central catheter inserted into a newborn through the umbilical vein and/or umbilical artery

"temporary or short-term central venous catheter" – a catheter without a subcutaneous channel

"permanent or long-term venous catheter" – examples: Peripherally inserted central catheter (PICC line), tunnelled catheter (Permacath, Broviac, Hickman), implanted catheter (port-a-cath)

"peripheral venous catheter" (Venflon) – a short sterile line inserted into a peripheral vein for the purpose of administering medications, fluids and blood products, intended for use for 4-5 days

"midline" – A peripheral venous catheter that is approximately 7.5- 20 cm long. This catheter is intended for use in cases where the infusion of fluids, medicines or blood products is required for an extended period of 1-4 weeks.

"arterial line/A-line" – a catheter inserted into an artery for monitoring blood pressure and/or taking blood samples

"aseptic technique" – activities aimed at preventing pathogens on hands, equipment or surfaces from entering a vulnerable site. Includes: hand hygiene, skin disinfection, use of sterile equipment, no-touch technique and use of clean or sterile gloves)depending on the procedure)

"full sterile technique" – aseptic technique and the use of full personal protective equipment (sterile gloves and gown, a mouth-nose mask and a hat that covers the hair) and a sterile cover that covers the patient's entire body, including the head and the bed

"bloodstream infection (BSI)"– the presence of an infectious pathogen in the blood (bacteria or fungus)

"central line-associated BSI"– the presence of an infectious pathogen in the bloodstream without evidence of infection in another body site, in a patient with a central line (according to the monitoring definitions of theNational Healthcare Safety Network – NSHN - which are updated periodically)

"skilled staff"– staff that have received structured training on line insertion and maintanence, including supervised practical experience

Guidelines

This document specifies guidelines for the insertion and ongoing care of vascular catheters. For ease of use, the guidelines are divided into chapters according to the different types of catheters.

Instructions for dressing the catheter insertion site and instructions for replacing the tubing and related accessories appear in separate chapters.

Part 1. Guidelines for the prevention of infections associated with central venous lines (short term and long term)

1. Bundle for preventing central line-associated bloodstream infection (CLABSI)
   - 1.1. Knowledge and skill of the staff inserting and maintaining the line
   - 1.2. Catheter insertion using full sterile technique
   - 1.3. Skin disinfection using a 70 % alcohol preparation with chlorhexidine (recommended concentration 2 %, minimum concentration 0.5 %) in a single-use, single-patient packet
   - 1.4. Line maintenance - including dressings, replacing the securement devices, and connecting tubing using aseptic technique
   - 1.5. Daily assessment of the need for a line and removal when it is no longer needed
   - 1.6. Monitoring compliance with guidelines for line insertion using a checklist
   - 1.7. Monitoring compliance with guidelines for daily line maintenance
   - 1.8. Surveillance of CLABSI according to NHSN definitions that are periodically updated
   - 1.9. Giving feedback regarding compliance and outcomes to the treating staff and hospital management

2. Staff training
   - 2.1. Insertion and routine care of a central catheter will be carried out by skilled staff who have undergone structured training
   - 2.2. The training will include: indications for use, technical components, risks associated with the insertion and care of a central line, details of evidence-based guidelines to reduce line-associated infections, and practical training by an experienced staff member
     - 2.2.1. It is the responsibility of each institution to determine the format of the training program and the required number of supervised insertions
   - 2.3. The training must be documented
   - 2.4. The training will be updated whenever knowledge and professional guidelines are updated
   - 2.5. Training frequency - at least once every two years

3. Guidelines for inserting a central venous line
   - 3.1. Line site
     - 3.1.1. Adults: Selection of the site for line insertion will be according to clinical indication
     - 3.1.2. In terms of infection prevention, the preferred site for insertion of a short-term central venous line is the subclavian vein

3.1.3. Catheters placed in a femoral or jugular site are more prone to become infected. In patients with a tracheostomy, it is recommended not to insert the catheter into the jugular vein

3.1.4. Children: the insertion site is chosen according to the size/age of the patient, the level of risk of mechanical complications versus infection, and the need for sedation or general anesthesia

3.1.5. Dialysis catheter: The preferred location for a catheter used for short-term dialysis is the jugular vein. A central catheter can also be inserted into the femoral vein. Catheters intended for dialysis treatment must be used for this purpose only. When a dialysis catheter is expected to be used for two weeks or more, it is recommended to insert a long-term catheter with a subcutaneous channel.

3.2. Line type

3.2.1. In a patient who needs an infusion through a central line for a period of two weeks or more(for example, for parenteral nutrition or dialysis), insertion of a long-term catheter should be considered.

3.2.2. A catheter with the smallest number of lumens required to treat the patient is preferred

3.2.3. Parenteral feeding - it is recommended to use a dedicated intravenous line just for this use, or alternatively, designate one lumen for intravenous feeding

3.3. Availability of equipment for line insertion: ready-made kits must be used that include all the necessary equipment for line insertion.The kit must also include the required personal protective equipment (except sterile gloves), an ultrasound probe cover and sterile ultrasound gel.

3.4. Insertion of a central catheter will be performed using full sterile technique.

3.4.1. The insertion team, located in the sterile field area, will wear full personal protective equipment including: a hat, a surgical mask that covers the mouth and nose, a sterile gown and sterile gloves

3.4.2. Assisting staff)including the supervisor of the insertion) will wear a surgical mask that covers the mouth and nose and a cap

3.4.3. Steps of line insertion - detailed in Appendix 1

3.5. Skin disinfection

3.5.1. Product for skin disinfection: 70 % alcohol with chlorhexidine (recommended concentration 2 %, minimum concentration 0.5 %) in a single-use, single-patient packet

3.5.2. When there is a contraindication to chlorhexidine, use a 10 % polydine solution based on 70% alcohol in a single-use, single-patient packet

3.5.3. Infants and premature infants: the products allowed are listed in the Medical Director's Circular 19/2014, "Updated Guidelines for Skin and Catheter Disinfection in Premature Infants and Newborns https://www.health.gov.il/hozer/mr19_2014.pdf

3.5.3.1. A product with alcohol and chlorhexidine 2% is approved by the FDA for use in newborns and premature infants. (Warning: may cause burns)

3.6. Wait for the insertion area to dry before inserting the catheter.

3.7. Cover the patient's entire body, including the head, with a sterile sheet

3.8. Use of ultrasound

3.8.1. It is recommended to use ultrasound for every insertion of a central venous line.

3.8.2. The transducer must be disinfected before use with an approved product for cleaning and disinfecting medical devices.

3.8.3. The transducer must be covered with a sterile cover.

3.8.4. Sterile gel in a single-use individualpacket should be used under and over the cover.

3.9. After insertion, the catheter must be secured with sutures or by sutureless securement.

3.10. Dressing of the catheter after insertion will be done by the doctor who inserted the catheter, before removing the sterile field .

3.11. Make sure the catheter is properly positioned and rule out pneumothorax using a chest x-ray, ultrasound, or intracavitary ECG.

3.12. A central line inserted under non-sterile conditions, such as during resuscitation must be replaced within 24 hours by a new catheter using full sterile technique.

4. Guidelines for central line maintenance

4.1. Hand hygiene must be performed before any activity with the central line.

4.2. Each time the line is accessed, the hub must be disinfected for 15 seconds with70% alcohol from a single-use, single-patient packet.

4.2.1. For lines for which disinfection with alcohol is prohibited, disinfect the hub according to manufacturer's instructions.

4.3. An assessment of signs of infection at the insertion site must be performed at least once every 24 hours.

4.4. Document daily catheter care in the patient's chart.

4.5. Dressings

4.5.1. Type of dressing: For catheters that are expected to be used for more than 5 days, a chlorhexidine-coated dressing or a chlorhexidine disc should be used, if there is no contraindication.

4.5.1.1. In units with a BSI rate lower than the national target, use dressings according to the guidance of the hospital's infection prevention unit.

4.5.2. Ongoing maintenance and dressing changes – see the section "Dressings for central and peripheral lines."

4.6. Tubing and related equipment – see section "Guidelines for line maintenance, tubing replacement and associated devices."

5. Removing the line/changing the line site

5.1. Each day, assess the need for a central line and remove it as soon as possible.

5.2. Line placement should not be routinely changed. Routine replacement does not prevent infections and may cause mechanical complications.

5.3. If there is a localized infection in the area of the catheter, the catheter must be removed.

5.4. If bloodstream infection is suspected, act according to professional guidelines for the treatment of line-associated infections.

5.5. Replacing a central line over a guidewire

5.5.1. A catheter may be replaced over a guidewire when replacement is necessary and there is no suspicion of line-associated infection (for example, a mechanical problem)

5.5.2. Catheter replacement over a guidewire must be done using full sterile technique as specified in section 3.4.

5.5.3. After removing the old catheter, remove the sterile gloves and put on a new pair of sterile gloves before inserting the new catheter.

6. Bathing of patients

6.1. Avoid wetting the end of the catheter.

6.2. The catheter insertion area and its connections must be covered with a waterproof dressing.

6.3. In adults and children over two months old, it is recommended to perform dry bathing using water-based chlorhexidine 2 % wipes.

6.4. Premature infants and newborns under two months old - frequency of bathing according to local protocol. If the newborn has a central line, it is recommended to bathe with heated sterilized water.

7. Antibiotic ointment

Do not routinely use antibiotic ointment at the catheter insertion site.

8. Additional measures proven to be effective in reducing central line infection rates

When the CLABSI rate remains high after implementation of the basic bundle, one or more of the following measures should be used:

8.1. Dry bathing: bathing the patient with wipes dipped in2 % chlorhexidine without using water.

8.2. A disposable antiseptic cap for the end of the catheter)for example, an alcohol cap)

8.3. Catheters covered with antiseptic/antibacterial coating.

9. Documentation

9.1. Documentation of central line insertion

9.1.1. It is the responsibility of the inserting doctor and the assisting nurse to document in the patient's medical record.

9.1.2. The documentation must include: insertion date, indication for line insertion, line type, anatomic site

9.2. Daily documentation
9.2.1. Presence of a central line
9.2.2. Indication
9.2.3. Clinical assessment of the line area
9.2.4. Assessment of the condition of the dressing and need for replacement

10. Surveillance of infection rates and monitoring of compliance with guidelines
10.1. CLABSI rates should be monitored according to periodically updated NHSN definitions.
10.1.1. CLABSI surveillance will be performed in accordance with the current requirements of the Ministry of Health.
10.1.1.1. Surveillance of CLABSI rates in ICUs is required.
10.1.1.2. CLABSI surveillance is recommended in every unit where central lines are used.
10.2. Compliance with guidelines for central line insertion and maintenance
10.2.1. Implement a checklist for central line insertion in accordance with guidelines (example in Appendix 2).
10.2.2. The infection control staff should perform observations of the processes of inserting short-term and long-term lines, maintenance, dressing changes, replacement of an infusion set, disinfection of the line before injections or blood drawing. The frequency of observations will be determined based on CLABSI rates.
10.2.3. When the CLABSI rate is above the national target, conduct investigations of the insertion process, ongoing line maintenance and training, and use one or more of the additional measures described in section 8.

11. Reporting
11.1. Internal reporting - surveillance results will be reported at least once a month to the relevant departments and the medical institution's management.
11.2. Reporting to the National Center for Infection Control –surveillance of CLABSI and insertion and maintenance processes will be reported each month. Audits of counting of central line-days – according to guidelines that are periodically updated.

Part 2: Guidelines for preventing infections associated with peripheral venous lines

A peripheral venous line is the most common means of infusing fluids, medications and blood products in hospitalized patients. During line insertion and maintenance, pathogens may enter the bloodstream and cause infectious complications including bactermia, infectious thrombophlebitis, endocarditis and infections in implanted devices. These complications involve significant morbidity, increased length of hospital stay and mortality.

1. Indications for inserting a line
1.1. Whether a line needs to be inserted must be considered individually for each hospitalized patient.

1.2. Insertion of a line is required for intravenous treatment (such as when fluids or medications cannot be given orally) but should not be a routine procedure for every hospitalized patient.
1.3. Peripheral venous lines are intended for short-term treatment.
1.4. Midline catheters are intended for intravenous treatment lasting 7 days or more.
Midline catheters are not intended for parenteral nutrition.

2. Choosing the insertion site and the type of peripheral venous line
2.1. The choice of vein and line type depends on several factors such as: the patient's age, the indication for inserting a line, the patient's hemodynamic state and the condition of the veins.
2.2. The table below lists the appropriate peripheral line type, according to indication

Catheter size	Catheter length (mm)	Flow rate (ml/min)	Time for infusing 1 liter of saline (minutes)	Indications
24G	14	26	**38**	Thin veins, for infusing fluids slowly, for premature infants, children, the elderly, and oncology patients.
24G	19	22	**45**	
22G	25	35	**28**	Small and fragile veins, for administering intravenous treatment including cytotoxic drugs. Also suitable for children.
20G	25	65	**15**	For general use
20G	32	60	**17**	
18G	32	105	**9.5**	For large volumes of fluids, blood products, or medications
18G	45	100	**10**	
16G	50	210	**5**	For trauma patients, when rapid administration of fluids/blood products is required

2.3. Avoid using a "butterfly" to infuse medications or fluids. A butterfly is not stable in the vein and, therefore, there is a greater danger of leakage (extravasation) and needle-sticks of the healthcare staff.

2.4. Sites for inserting a peripheral line
2.4.1. Adults
2.4.1.1. The preferred site is the superficial veins in the forearm
2.4.1.2. It is best to use the patient's non-dominant arm, especially if the line will be used for several days.

2.4.1.3. It is best to avoid inserting the line close to areas that bend (for example, elbows) because of an increased risk of local trauma or inflammation of the veins (phlebitis).

2.4.1.4. For hemodialysis patients, it is recommended to avoid inserting peripheral lines on the front side of the elbow or in the cephalic vein because these veins may be used later for creating a fistula or a venous implant. It is recommended to use the veins on the back of the hand.

2.4.1.5. Avoid as much as possible inserting a peripheral line into the legs. There is a greater risk of phlebitis and blood clots (DVT). If it is absolutely necessary to insert a line into the leg, change the insertion site as soon as possible.

2.4.1.6. In an emergency situation when another vein cannot be found, a line can be inserted into the external jugular vein.

2.4.1.6.1. Change the location of the line as soon as possible.

2.4.2. Children

2.4.2.1. The preferred sites are the back of the hand (but not the fingers) and the forearm.

2.4.2.2. In newborns and infants, it is possible to consider inserting a line in the scalp. In infants who cannot walk yet, it is also possible to insert a line in the foot.

3. The procedure for inserting a peripheral venous line is escribed in detail in Appendix 3.

3.1. Repeat insertion attempts

3.1.1. A new line must be used for each insertion attempt.

3.1.2. The insertion site must be disinfected again using a new pad.

3.2. Use of ultrasound for line insertion

3.2.1. Use of ultrasound can be helpful in patients whose veins are difficult to find.

3.2.2. The device must be cleaned and disinfected after each use according to the manufacturer's instructions.

3.2.3. Transillumination can be used for newborns/premature infants.

3.3. Local anesthesia : Local anesthesia at the insertion site)for pain relief, especially in children(using a local anesthetic cream may leave a protein layer on the skin surface that cannot be removed byan alcohol-based disinfectant. The residue must be removed by gentle rubbing with soap and water before disinfecting the skin and inserting the line.

3.4. Skin disnfection:

3.4.1. Skin disinfection before peripheral line insertion will be done using a disinfectant in a single-use, single-patient packet.

3.4.1.1. Adults: It is recommended to disinfect the skin using a product with alcohol 70% or iodine or povidone-iodine solutions.

3.4.1.2. Infants and premature infants: products allowed for use are listed in the Medical Director's Circular 19/2014, "Update of guidelines for disinfection of skin and vascular lines in premature infants and newborns" (https://www.health.gov.il/hozer/mr19_2014.pdf)

3.4.2. Do not re-palpate the insertion site after the skin has been disinfected. If necsessary, don sterile gloves.

4. Maintenance of peripheral venous lines
   4.1. Each day, assess whether the line is needed and document the indication.
   4.2. Consider removing a line that has not been used for 24 hours.
   4.3. Each time there is a connection to the line, the opening must be disinfected. It is recommended to use a connector and not to inject directly into the upper opening.
   4.4. Each day, assess the condition of the line and check for signs of infection (see Appendix 4, "Assessing Peripheral Veins – VIP")
   4.5. For patients at risk, such as infants, premature infants, and patients receiving products that can cause tisue damage (blisters or ulceration) if the ifusion leaks outside of the veins, monitor frequently (every 1-2 hours or according to local policy).

5. Frequency of replacing peripheral venous lines
   5.1. Adults: It is recommended to replace the line every 4-5 days.
      5.1.1. If it is difficult to insert a peripheral line, consider leaving the current line in place while performing careful daily assessments for signs of infection.
   5.2. Children: Replace lines once every 7 days. Performing careful assessments for signs of infection once per shift.

Part 3: Guidelines for preventing infections associated with arterial lines

1. Arterial lines are vital for hemodynamic monitoring of severely ill patients.

2. Arterial lines can be a source of bacteremia. The rate of infections associated with these lines is similar to that of central lines.

3. Recommend insertion sites
   3.1. **Adults**: radial artery, dorsalis pedis (less preferred)
   3.2. **Children**: radial artery, posterior tibial, dorsalis pedis
   3.3. Avoid inserting an arterial line into the brachial artery because of the vascular anatomy of the arm. There is a risk of ischemia and necrosis of the limb. Use of the femoral artery increases the risk of infection.

4. Procedure for inserting an arterial line
   4.1. Insertion of a line into the femoral artery must be done using full sterile technique (see Table below)
   4.2. Insertion of a line into a peripheral artery will be done using aseptic technique. There is no need for a sterile gown for the staff performing the insertion and there is no need for a full sterile covering for the patient (see Table below)
   4.3. It is recommended to use ultrasound during the insertion.

Component	**Femoral arterial line**	**Peripheral arterial line**
Protective equipment for the staff	√ cap that covers all the hair on the head √ surgical mask that covers the mouth and nose √ face shield/protective goggles √ sterile gloves √ sterile gown √ standardized kit	√ cap that covers all the hair on the head √ surgical mask that covers the mouth and nose √ face shield/protective goggles √ sterile gloves
Covering for the patient	Full sterile covering for the patient (from head to toe)	Small sterile covering around the insertion site
Product for disinfection	Skin disinfection with alcohol 70% with chlorhexidine (recommended concentration: 2%, minimum concentration 0.5%) in a single-use, single-patient packet	
Dressing	At the end of the insertion, place a sterile dressing on the line's exit site. A transparent dressing, sterile gauze, or a chlorhexidine-coated dressing may be used.	

5. Maintenance of arterial lines
   5.1. Monitoring
      5.1.1. Conduct daily assessments of the need for an arterial line
      5.1.2. Assess the condition of the line and check for signs of infection at least once per shift.
      5.1.3. After each use, make sure that there is no blood on the line and the port.
   5.2. Flushing system: use a closed flushing system
   5.3. The number of actions should be reduced to the minimum.

6. Replacing an arterial line – there is no recommendation to routinely replace an arterial line

7. Collecting blood samples: the connector must be disinfected with a product containing alcohol 70% in a single-use, single-patient packet for 15 seconds. Alternatively, use a disposable antiseptic cap.

8. General: Do not wet the opening of the line with tap water.

Part 4: Guidelines for changing dressings for vascular lines (central venous lines, peripheral venous lines, and arterial lines)

1. For dressing changes, is recommended to use a ready-made kit that includes all the necessary materials.

2. Dressing changes will be performed according to the type of dressing and the anufacturer's instructions.

3. Use a transparent, semi-breathable dressing that allows easy inspection of the line.

4. If the insertion site is bleeding, use a gauze pad.

5. Change the dressing when it becomes dirty, wet, or is not fully attached to the skin.

6. Dressing changes for central venous lines/ femoral arterial lines
   6.1. Dressing changes will be done using aseptic technique that includes: hand hygiene, donning sterile gloves, a surgical mask that covers the nose and mouth. (A checklist for dressing changes is in Appendix 5.)
   6.2. When caring for long-term lines, it is recommended that the patient also wear a mask.
   6.3. Skin disinfection with alcohol 70% with chlorhexidine (recommended concentration: 2%, minimum concentration 0.5%) in a single-use, single-patient packet.
   6.4. Replace sutureless securement together with the dressing change, according to the manufacturer's instructions.

7. Dressing changes for peripheral venous lines/ peripheral arterial lines
   7.1. Dressing changes will be done using aseptic technique that includes: hand hygiene, donning clean gloves.
   7.2. Skin disinfection with alcohol 70% (with or without chlorhexidine) in a single-use, single-patient packet.

8. Frequency of dressing changes
   8.1. Transparent dressings - according to the manufacturer's instructions
   8.2. Gauze dressing – every 48 hours
   8.3. If the gauze pad us under the wings for support and to prevent pressure on the skin, but the insertion site is covered with a transparent, semi-breathable dressing ans the line exit site is visible, change the dressing every 3-7 days.
   8.4. The dressing should be changed immediately if it is wet, loose, or contaminated.

Part 5: Guidelines for maintenance and replacement of tubing and devices accompanying vascular lines (central venous lines, peripheral venous lines, and arterial lines)

1. Avoid unnecessary actions in order to prevent contamination of the system.

2. Using closed infusion systems reduces the risk of infection.

3. Frequency of tubing changes
   - 3.1. Infusion sets that are continuously connected to the line: change once every 96 hours
   - 3.2. Infusion sets that are not continuously connected to the line should be covered with a sterile cap and the set should be changes at least once every 24 hours.
   - 3.3. Blood products
     - 3.3.1. The frequency of set changes will be acording to the manufacturer's instructions.
       - 3.3.1.1. There are not enough data in the professional literature regarding the required frequency of set changes. According to the guidelines of the American Association of Blood Banks, the set should be changed after 4 hours.
       - 3.3.1.2. It should be noted that a standard filter is suitable for up to 4 units of blood. Check the manufacturer's instructions.
   - 3.4. Parenteral nutrition - once every 24 hours, including the extender
   - 3.5. If the line insertion site is changed, the infusion set must be replaced.

4. Before every connection, the opening of the line must be disinfected for 15 seconds using alcohol 70% (with or without chlorhexidine) in a single-use, single-patient packet.

5. <u>Needleless connectors</u>
   - 5.1. Many research studies have shown that using a connector on the opening of the line decreases the risk of hospital-acquired bloodstream infections. It is recommended to close with a connector any openings of the line that are not in continuous use.
   - 5.2. There is no need to use a connector on a contuous infusion set.
   - 5.3. Choose a connector that has the best structure in terms of infection prevention.
     - 5.3.1. Avoid using connectors that have a mechanical valve with positive pressure.
   - 5.4. Disinfect the connector by rubbing for 15 seconds before connecting to the line.
   - 5.5. Replacing the conector (see Appendix 6)
     - 5.5.1. For patients who are not getting continuous intravenous treatments – change the connector according to the manufacturer's instructions
     - 5.5.2. When there is blood or discharge inside the connector
     - 5.5.3. Before drawing blood for a blood culture from a central line, in order to prevent contamination
     - 5.5.4. When giving blood products or TPN, follow the manufacturer's instructions. There are not enough data in the professional literature to make a recommendation about how often the connector should be changed.

6. Antiseptic caps
   6.1. Several studies have found that use of antiseptic caps is effective in preventing line-associated bloodstreaminfections.
   6.2. The cap is disposable and once it is removed, it cannot be used again.
   6.3. Use according to the manufacturer's instructions.

7. Collecting blood from a line for blood cultures
   7.1. It is recommended not to draw blood from central venous lines, peripheral venous lines, or arterial lines because of the risk of contamination.
   7.2. If there is no alternative, remove the needleless connector before drawing blood and disinfect the opening of the line with a pad soaked in 70% alcohol in a single-use, single-patient packet. Draw the blood using aseptic technique that includes hand hygiene, a mask, and sterile gloves. Close the opening with a new sterile connector.
   7.3. Instructions for inserting a needle into a port-a-cath can be found in Appendix 7.

Appendix 1: An example of the procedure for inserting a long-term or short-term central venous line or central arterial line

1. Equipment

1.1. A work surface (Do not place equipment on the patient's bed.)
1.2. Skin disinfectant - alcohol 70% with chlorhexidine (recommended concentration: 2%, minimum concentration 0.5%) in a single-use, single-patient packet
1.3. A standardized kit for central line insertion that includes the required personal protective equipment (sterile gown, cap, surgical mask, covering, and sterile gel for ultrasound)
1.4. A central line
1.5. 2 pairs of sterile gloves

2. Procedure

2.1. Assisting staff

- Must wear a cap that covers all hair on the head and a surgical mask that covers the nose and mouth
- Cleaning the work surface (Do not place equipment on the patient's bed.)
- Hand hygiene
- Opening sterile packages
- Disinfecting the ultrasound machine using an approved product for disinfecting medical equipment

2.2. Staff performing the insertion

- Must wear a cap that covers all hair on the head and a surgical mask that covers the nose and mouth before beginning the procedure
- Hand hygiene
- Don sterile gloves
- Disinfect the patient's skin in a large radius from the insertion site outward using alcohol 70% with chlorhexidine (recommended concentration: 2%, minimum concentration 0.5%) in a single-use, single-patient packet
- Disinfection should last 30 seconds. Wait until the alcohol evaporates. (Do not dry the skin with a sterile pad.)
- Remove sterile gloves and perform hand hygiene.
- Don a sterile gown and new sterile gloves.
- Cover the patient with a sterile sheet from head to toe. (It is recommended to start by covering the area closest to the staff performing the insertion.)
- Cover the ultrasound probe with a sterile cover.
- Use sterile gel under and over the cover.
- Insert the line.
- If the skin needs to be disinfected again, use alcohol 70% with chlorhexidine (recommended concentration: 2%, minimum concentration 0.5%) in a single-use, single-patient packet and wait for the skin to dry.

- The staff performing the insertion will place a sterile dressing over the insertion site before removing sterile gloves.
- Remove gloves and perform hand hygiene.

Appendix 2: An example of a checklist for central venous line insertion

Data to be filled in at every insertion of a short-term central venous line

Department _____

Patient name _____

Patient ID number _____

Date and time _____

Line site: subclavian jugular femoral other

Side: right left

Number of lumens: 1 2 3 >3

Required steps	**Yes**	**No**
A ready-made kit that includes all the necessary equipment was used for insertion		
The doctor inserting the line wore a cap and a surgical mask that covered the mouth and nose		
The doctor inserting the line performed hand hygiene and donned sterile gloves		
The skin around the insertion site was disinfected using alcohol 70% with chlorhexidine (recommended concentration: 2%, minimum concentration 0.5%) in a single-use, single-patient packet		
Waited for skin to dry before beginning the insertion		
The doctor inserting the line removed the sterile gloves and performed hand hygiene		
The doctor inserting the line donned a sterile gown and a new pair of sterile gloves		
A large sterile sheet covered the patient from head to toe		
The supervising doctor wore a cap and surgical mask*		
The assisting doctor or nurse wore a cap and surgical mask		
A dressing was placed on the insertion site before removing sterile gloves		
Ultrasound was used throughout the insertion process		
The ultrasound probe was covered with a sterile cover, with sterile gel under and over the cover		

*The supervising doctor must also wear a sterile gown if entering the sterile field

Doctor inserting the line _____

Doctor supervising the insertion _____

Nurse/doctor assisting _____

Appendix 3: An example of the procedure for inserting a peripheral venous line

1. **Equipment**
   - 1.1. A work surface (Do not place equipment on the patient's bed.)
   - 1.2. Skin disinfectant - alcohol 70% in a single-use, single-patient packet
   - 1.3. Clean gloves
   - 1.4. A sterile dressing for the insertion site
   - 1.5. A sterile cap for the opening of the peripheral line
   - 1.6. A standardized kit for central line insertion that includes the required personal protective equipment (sterile gown, cap, surgical mask, covering, and sterile gel for ultrasound)
   - 1.7. A peripheral venous line (venflon) of the appropriate length
   - 1.8. Single-use tourniquet

2. **Procedure**
   - 2.1. Clean the work surface
   - 2.2. Hand hygiene
   - 2.3. Open the equipment
   - 2.4. Apply the tourniquet
   - 2.5. Disinfect the patient's skin
   - 2.6. Perform hand hygiene and don sterile gloves
   - 2.7. Insert the line
   - 2.8. Affix the line
   - 2.9. Remove gloves
   - 2.10. Hand hygiene
   - 2.11. Document the insertion in the patient's chart

Appendix 4: Assessing peripheral veins – VIP score (Visual Infusion Phlebitis score)

0	**The insertion site appears healthy**
1	**Phlebitis suspected** One of the following is present: slight pain near insertion site, slight redness near the insertion site
2	**Early stage of phlebitis** Two of the following are present: pain near insertion site, redness, swelling
3	**Medium stage of phlebitis** All of the following are present: pain along the vein, redness, induration
4	**Advanced stage of phlebitis** All of the following are present and severe: pain along the vein, redness, induration, palpable venous cord
5	**Severe thrombophlebitis** All of the following are present and severe: pain along the vein, redness, induration, palpable venous cord, high fever

Appendix 5: An example of the procedure for changing the dressing of a central venous line/arterial line

1. **Equipment**
   - 1.1. A kit for dressing changes that includes all the necessary equipment or**,** alternatively:
     - 1.1.1. Skin disinfectant - using alcohol 70% with chlorhexidine (recommended concentration: 2%, minimum concentration 0.5%) in a single-use, single-patient packet
     - 1.1.2. Clean gloves
     - 1.1.3. Sterile gloves
     - 1.1.4. Surgical mask
     - 1.1.5. Sterile dressing
     - 1.1.6. Sterile surface

2. **Procedure**
   - 2.1. Don a surgical mask. (If the line is for long-term use, the patient should also don a surgical mask.)
   - 2.2. Clean the work surface. (Do not place equipment on the patient's bed.)
   - 2.3. Hand hygiene
   - 2.4. Open the equipment on the sterile surface in the patient's station
   - 2.5. Disinfect the hands and don clean gloves
   - 2.6. Remove the old dressing, being careful to keep the line affixed (so it does not come out) and throw it in the trash.
   - 2.7. Remove gloves
   - 2.8. Perform hand hygiene and don sterile gloves
   - 2.9. Skin disinfection
   - 2.10. Disinfect the patient's skin in a large radius from the insertion site outward. Wait for the alcohol to evaporate. (Do not use a pad to dry the skin.)
   - 2.11. Wait 30 seconds for the skin to dry.
   - 2.12. Apply the sterile dressing.
   - 2.13. Throw any used, disposable equipment into the trash.
   - 2.14. Remove gloves and mask and perform hand hygiene.
   - 2.15. Document the dressing change and assessment of the insertion site in the patient's chart.

Appendix 6: An example of the procedure for replacing a needleless connector for a central venous line, midline, or arterial line

1. **Equipment**
   - 1.1. A designated surface for opening equipment (not on the patient's bed)
   - 1.2. A sterile surface
   - 1.3. A sterile needleless connector for each lumen
   - 1.4. Sterile gloves
   - 1.5. Surgical mask
   - 1.6. A sterile pad with 70% alcohol in a single-use, single-patient packet

2. **Procedure**
   - 2.1. Don a surgical mask.
   - 2.2. Clean the work surface.
   - 2.3. Hand hygiene
   - 2.4. Open the sterile field.
   - 2.5. Prepare the sterile equipment on the work surface.
   - 2.6. Close the line in the designated spot. Disconnect the tubing and throw it away.
   - 2.7. Perform hand hygiene and don sterile gloves
   - 2.8. Remove the old connector.
   - 2.9. Clean the opening of the line for 15 seconds using the alcohol pad in a circular motion.
   - 2.10. Attach the new, sterile needleless connector and make sure that it is closed completely
   - 2.11. Remove gloves, perform hand hygiene, and document the connector change in the patient's chart.

Appendix 7: An example of the procedure for inserting a needle into a port-a-cath

1. **Equipment**
   - 1.1. A work surface (Do not place equipment on the patient's bed.)
   - 1.2. Skin disinfectant - alcohol 70% with chlorhexidine (recommended concentration: 2%, minimum concentration 0.5%) in a single-use, single-patient packet
   - 1.3. Sterile gloves
   - 1.4. Waterproof sterile covering
   - 1.5. Sterile tweezers
   - 1.6. Surgical mask
   - 1.7. A designated needle (for example, GRIPPER) in the appropriate size
   - 1.8. Sterile syringe and needle (Pre-assembled syringes filled with heparin and saline may be used.)
   - 1.9. Red caps for covering the syringe
   - 1.10. A single-use vial of saline
   - 1.11. A single-use heparin lock + sterile pads - for flushing
   - 1.12. Sterile dressing for the line insertion site

2. **Procedure**
   - 2.1. Don a surgical mask.
   - 2.2. Clean the work surface.
   - 2.3. Hand hygiene
   - 2.4. Open the sterile field.
   - 2.5. Open the packet of disinfectant
   - 2.6. Hand hygiene
   - 2.7. Disinfect the opening of the vial and then draw up the saline and heparin
   - 2.8. Cover the end of the syringe with the red cap. (Do not place the syringe intended for flushing the line in the sterile field.)
   - 2.9. Perform hand hygiene and don sterile gloves.
   - 2.10. Disinfect the patient's skin using no-touch technique in a radius larger than the size of the dressing. The disinfection should last 15 seconds. Wait for the skin to dry at the insertion site.
   - 2.11. Attach the flushing syringe to the end of the tubing and flush the tubing until the air comes out. Close the clamp. (Keep the syringe attached to the needle.)
   - 2.12. Use the non-dominant hand to hold the port that is under the skin. Inset the needle at a 90 degree angle into the port. Do not insert the needle more than once.
   - 2.13. Open the clamp.
   - 2.14. Check the placement by drawing up blood and flushing.
   - 2.15. If the needle is to remain in place, remove the clips that are holding the needle and use a dressing to hold the needle in place.
   - 2.16. If the needle was inserted only to perform a flush (once per month), after it is removed, cover the insertion site with a dry sterile pad or a sterile dressing.
   - 2.17. Throw away trash
   - 2.18. Remove gloves and perform hand hygiene
   - 2.19. Document the procedure in the patient's chart.