ПРОФИЛАКТИЧЕСКАЯ МЕДИЦИНА

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ASEPSIS IN MEDICAL COSMETOLOGY PRACTICE

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The importance of a package of aseptic measures in medical cosmetic practice has been analyzed in a modern light. The treatment system of healthcare facilities is considered and updates are provided for new agents of chemical disinfection and presterilization preparation. Sterilization procedures and methods are also provided. The article is supplemented with a table "Characteristics of antiseptics depending on the type of cosmetic procedures" with a view towards its active practical use. Refs 9. Table 1.

Keywords: asepsis, antisepsis, cosmetology, treatment system of healthcare facilities, cosmetic procedures and agents.

ДЕЗИНФЕКЦИОННО-СТЕРИЛИЗАЦИОННЫЕ МЕРОПРИЯТИЯ В КОСМЕТОЛОГИИ

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С современных позиций проанализировано содержание понятий асептика и антисептика, значение комплексов этих мероприятий в медицинской практике и, в частности, в косметологии при выполнении различных процедур. Рассмотрена трехстадийная система обработки изделий медицинского назначения, представлены распределенные по группам новые средства для химической дезинфекции и предстерилизационной подготовки, приведены алгоритмы и методы дезинфекционно-стерилизационной обработки косметологического инструмента. Статья дополнена таблицей «Особенности антисептики в зависимости от вида косметологических процедур». Библиогр. 9 назв. Табл. 1.

Ключевые слова: асептика, антисептика, косметология, косметологические процедуры и средства обработки.

Formulating the title of the article, the authors re-think about the terms and concepts, and came to the conclusion that, at the current stage, changes of methodological approaches in the field of preventive medicine require to clarify some fundamental definitions, namely, under ***asepsis*** we mean a set of organizational, planning, technical, regime,

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epidemiological and clinical measures aimed at creation and maintenance of ***minimally contaminated environment*** in a hospital, where disinfection and sterilization play the leading role [1–3].

Asepsis issues, among other reasons, maintain a high level of hospital-acquired (nosocomial, iatrogenic) or in-hospital morbidity (healthcare-associated infections — HAI), bringing significant injury to human health and exacerbating enough already considerable health problems associated with the quality of healthcare delivery [4].

Regarding the concept of ***antisepsis***, V. V. Shkarin [5] defines it, in a greater degree, clinical focus — *"A set of preventive measures aimed at elimination of microorganisms in a wound, on the skin surface of the surgical and injection area, medical staff hands»*.

Infectious safety of patients and staff of aesthetic medicine institutions should be considered as an important social and economic problem, directly affecting the quality of services. Treatment issues in respect to cosmetic tools, accessories, equipment and other not less important objects (e.g., surfaces, personnel hands, injection area) is of high priority in the framework of preventive measures aimed at eliminating of inoculability, primarily through the blood — HIV infections and hepatitis B and C.

Disinfection state in cosmetology is closely dependent on the design features of tools and accessories. When organizing and implementing the control, you need to be well-informed about the principles and mechanisms of exposure of hardware cosmetology on patient's body, especially in terms of contact with the skin, the risk of violating its integrity, which determines the scope and nature of the disinfection measures.

It should be noted that, in course provision of cosmetic services, staff of aesthetic medicine institutions does not always have information about the presence of infectious diseases in patients, especially blood-borne ones. Hence, in case of low-quality instruments decontamination, there is a high risk of transmission of "parenteral" infections from one patient to the next. It is also a high risk of infection of the staff, both due to possible traumatization and other ways and means of transmission due to close contact with a patient. Quality guarantee of instrument treatment should be provided by a differentiated approach to the means and methods of decontamination depending on the instrumentation materials and designs, as well as of the character of cosmetic procedures (Table).

Meanwhile, in the cosmetic practice, you can often see not enough competent application of methods and means of disinfection and sterilization. To a large extent, it is caused by lack of sufficient knowledge of official guidelines in this area of infection control that does not allow to select and apply appropriate methods of disinfection and sterilization considering the above circumstances.

According to the requirements of the national legal framework, **three-stage** system of medical appliance treatment must be provided, i.e., all appliances used for invasive procedures or manipulations, which may damage the mucous membranes or skin, are subject to **disinfection,** presterilization preparation (cleaning) and **sterilization** after any use [6, 7].

All medical appliances intended for repeated use, which are used during the procedure and are in contact with patient's intact skin or mucosa, are subject to **disinfection**. After disinfection, medical appliances can be used as intended or, when indicated, should be treated by presterilization cleaning and sterilization.

Disinfection shall be exercised using mechanical, physical or chemical method. The choice of method is conditioned by the functional purpose, design features, instrumentation properties and coating [8].

*Table. Ase***ptic characteristics depending on the type of cosmetic procedures**

Method name	Method prescription	Intervention level	Type of applied instrumentation	Characteristics of deactivation mode
Mesotherapy	Intradermal injection of microdoses of drugs to create the "Depot" in the abnormal focus area or in the immediate vicinity of it	The depth of injection is from 0.5 to 2 mm	1. Reusable injector (mesopistol) with a removable disposable syringe. 2. Single-use syringes	1. Treatment of the injector (not in contact with the skin surface). 2. Treatment of finger grips (contact with the skin surface). 3. Treatment of the surgical area 4. Treatment of staff hands. It is not recommended to use alcohol-containing preparations for treatment of hands and the surgical area, as they decompose the used drug. You may use preparations with chlorhexidine, miramistin, octenisept, in case of bleeding — hydrogen peroxide. To disinfect an injector, it is recommended to use a group of quaternary ammonium compounds, and it is recommended to use a physical or chemical method for sterilization of the grips
Injection techniques: botulinum toxin, fillers	Subcutaneous, intradermal, intramuscular drug injection	The depth of injection is from 0.5 mm to 0.5 cm	Single-use syringes	1. Treatment of the surgical area 2. Treatment of staff hands. Recommendations for treatment are similar to those of mesotherapy
Permanent makeup (longtime-liner, tattoo)	Injection of color pigment in the surface layers of skin	The depth of injection is from 0.1 to 0.5 mm	1. Single-use needles. 2. Reusable paint collection rods with disposable hollow needles	1. Treatment of the surgical area 2. Treatment of staff hands. 3. Treatment of reusable rod. You shall use alcohol-containing preparations for treatment of hands and the surgical area, for reusable rod — quaternary ammonium compounds, in case of bleeding — hydrogen peroxide
Needle lipolysis	The effect of intradermal electrolipolysis by means of entering of needle-shaped electrodes subcutaneously or in the subcutaneous fat	The depth of injection is from 0.1 to 5 cm	Single-use needle-shaped electrodes	1. Treatment of the surgical area 2. Treatment of staff hands. You shall use alcohol-containing preparations for treatment of hands and the surgical area, in case of bleeding — hydrogen peroxide

Continuation of Table

Method name	Method prescription	Intervention level	Type of applied instrumentation	Characteristics of deactivation mode
Electrolysis	The effect of electrolysis	The depth of injection is from 0.5 mm to 1.0 cm	Single-use needles	1. Treatment of the surgical area 2. Treatment of staff hands. 3. Treatment of reusable rod. To disinfect surfaces of surgical area and hands of personnel, it is recommended to use alcohol-containing preparations
Piercing	Entering of a sterile disposable hygienic earring by means of a pistol	The depth of injection is from 0.5 mm to 1.0 cm	1. Piercing pistol. 2. Single-use sterile hygiene earrings	1. Treatment of the surgical area 2. Treatment of staff hands. 3. Treatment of reusable rod. To disinfect surfaces of surgical area and hands of personnel, it is recommended to use alcohol-containing preparations
Electrode lipolysis	The effect of epidermal electrolipolysis	Epidermally	1. Single-use individual self-adhesive electrodes. 2. Reusable skin electrodes	Treatment of reusable skin electrodes. To disinfect surfaces of reusable skin electrodes, use quaternary ammonium compounds, chlorine-containing preparations
Electro-lymphatic drainage	The effect of electro-lymphatic drainage	Skin application of electrodes	1. Single-use individual self-adhesive electrodes. 2. Reusable skin electrodes	Treatment of reusable skin electrodes. To disinfect surfaces of reusable skin electrodes, use quaternary ammonium compounds, chlorine-containing preparations
Electrical myostimulation	The effect of electrical myostimulation	Skin application of electrodes	1. Single-use individual self-adhesive. electrodes. 2. Reusable skin electrodes	Treatment of reusable skin electrodes. To disinfect surfaces of reusable skin electrodes, use quaternary ammonium compounds, chlorine-containing preparations
Microcurrent (stimulation current) therapy	The effect of microcurrent lymphatic drainage, face and body lifting	Skin application of electrodes	1. Single-use individual electrodes. 2. Reusable skin rubber electrodes. 3. Reusable handpieces	Treatment of reusable skin electrodes. To disinfect surfaces of reusable skin electrodes, use quaternary ammonium compounds, chlorine-containing preparations, chlorhexidine digluconate
D'arsonvalization	The effect of the high frequency pulse current to the skin	Epidermally	Electrodes for d'arsonvalization	Treatment of electrodes for d'arsonvalization. To disinfect surfaces of reusable skin electrodes, use quaternary ammonium compounds, chlorine, alcohol-containing preparations

Continuation of Table

Method name	Method prescription	Intervention level	Type of applied instrumentation	Characteristics of deactivation mode
Ultrasound therapy	The effect of ultrasonic peeling, phonophoresis, ultrasound massage	Epidermally	1.Ultrasonic transmitters. 2. Reusable handpieces	Treatment of ultrasonic transmitters. To disinfect surfaces of ultrasonic transmitters, use quaternary ammonium compounds, chlorine-containing preparations, chlorhexidine digluconate
Microdermabrasion	The effect of skin microdermabrasion	Superficial epidermal effects, possible deepen to the papillary dermis and pinpoint bleeding	1. Reusable cap. 2. Single-use cap. 3. Reusable handpiece	1. Treatment of reusable cap. 2. Treatment of reusable handpiece. For treatment of reusable products, use quaternary ammonium compounds, chlorine-containing compounds, chlorhexidine digluconate. **3-stage treatment in case contact with blood:** 1) disinfection; 2) presterilization cleaning — combining in one stage (to use quaternary ammonium compounds); 3) sterilization — glutaric, ortho-phthalic aldehydes
Infrared therapy	Effect of thermotherapy with infrared radiation	Skin bandaging	Reusable skin bandages	Treatment of reusable skin bandages. To disinfect surfaces of reusable skin bandages, use quaternary ammonium compounds
Pressing massage	The effect of lymphatic drainage	Skin bandaging	Skin bandages	Treatment of reusable skin bandages. To disinfect surfaces of reusable skin bandages, use quaternary ammonium compounds.
Vacuum massage	The effect of vacuum exposure	Epidermally	Reusable glass or plastic flasks	Treatment of reusable glass or plastic flasks. To disinfect surfaces reusable glass or plastic flasks, use quaternary ammonium compounds, chlorine-containing preparations
Actinothermal therapy (LHE)	The effects of actinothermal hair removal, face and body skin rejuvenation, actinothermal treatment of acne and psoriasis	Epidermally	Single-use racks	Disinfection of the device surfaces, including by wipes, impregnated with quaternary ammonium compounds

Continuation of Table

Method name	Method prescription	Intervention level	Type of applied instrumentation	Characteristics of deactivation mode
Brushing	The effect of mechanical peeling	Epidermally	Reusable brushes with synthetic or natural bristles	Treatment of reusable brushes with synthetic or natural bristles. To disinfect reusable brushes with synthetic or natural bristles, use quaternary ammonium compounds
Endermologie (LPG) / Lipomassage	The effect of mechanical stimulation of body tissues	Epidermally	Reusable handpiece, contacting with skin through special individual suit	Treatment of reusable handpieces. To disinfect reusable handpieces, treatment of the handpiece parts contacting with the surface of the suit shall be made with use of surface disinfectants-quaternary ammonium compounds
Liftmassage / Endermolift	The effect of mechanical stimulation of facial tissues	Epidermally	Reusable handpiece	Treatment of reusable handpiece. Disinfection of reusable handpiece shall be made by quaternary ammonium compounds, including including by wipes, impregnated with quaternary ammonium compounds
Electrophoresis, Desincrustation	Creation of conditions for effective penetration of therapeutic agents into the skin, for deep skin cleansing	Epidermally, intradermally, subdermally, intramuscularly, the depth of injection is from 0.5 to 2.0 mm	Reusable electrodes	Treatment of reusable electrodes To disinfect reusable electrodes, treatment by quaternary ammonium and alcohol compounds shall be performed
Biostimulation device «Futura Pro»	Adhesive stimulation with electrodes	Epidermally	Single-use individual adhesive electrodes. In order to reduce the price of the procedure, sometimes they are used repeatedly, but for one patient	Treatment of skin electrodes. To disinfect surfaces of reusable skin electrodes, use quaternary ammonium compounds, chlorine-containing preparations, chlorhexidine digluconate, including in the form of wipes impregnated with quaternary ammonium compounds
Oxygen therapy, “Bio-Oxygen” device	Skin enrichment with oxygen, administration of low molecular weight concentrates into the skin using oxygen jets	Epidermally	Reusable contact applicators, metal (face) or glass (body)	To disinfect surfaces of reusable contact applicators, use quaternary ammonium compounds, chlorine-containing preparations, chlorhexidine digluconate, including in the form of wipes impregnated with quaternary ammonium compounds

End of Table

Method name	Method prescription	Intervention level	Type of applied instrumentation	Characteristics of deactivation mode
RF-lifting and RF-lipolysis	RF heating of the dermis and hypodermis. A series of 3 pulses, the first pulse ablative	Epidermally	Reusable contact metal applicators; fractional single-use RF-handpiece (controlled skin microdamages) — possible contact with blood	To disinfect surfaces of reusable contact applicators, use quaternary ammonium compounds, chlorine-containing preparations, chlorhexidine digluconate, including in the form of wipes impregnated with quaternary ammonium compounds. **3-stage treatment in case contact with blood:** 1) disinfection; 2) presterilization cleaning — combining in one stage (to use quaternary ammonium compounds); 3) sterilization — glutaric, ortho-phthalic aldehydes

It is known that human immunodeficiency virus (HIV), as compared to other viruses (hepatitis B, C and enteroviruses contagions), is less resistant to chemical disinfectants, therefore means for inactivation of parenteral hepatitis viruses, have the required viricidal action on HIV as well. It was identified [9] that all microorganisms, in proportion to increasing resistance to various chemical disinfecting agents, can be ranked as follows: *human immunodeficiency virus → hepatitis B → herpes simplex virus → lipid (medium-sized) viruses → vegetative bacteria → fungi → nonlipid (small) viruses → Mycobacterium tuberculosis → bacterial spores.*

Immediately after the application, instrumentation shall be immersed in a container with a disinfectant so that the solution completely covers the appliances, and the thickness of the solution layer over the appliances must be at least one centimeter.

Disinfection by means of wiping (including use of tissues officially registered with the Ministry of Health) may be used for the medical equipment and medical supplies, which are not directly in contact with a patient, or the design features of which do not allow using the immersion method.

Thus, the purpose of disinfection is to destroy pathogenic and opportunistic pathogenic microorganisms that shall be achieved by using mechanical, chemical and physical methods of exposure to bacterial flora.

Chemical disinfection shall be performed with drugs of different chemical groups depending on the nature of their constituent active substances (AS). Considering this, modern disinfectants are distributed over the following topical groups:

1) a group of oxigen-containing drugs;

2) derivatives of peroxyacid (peracetic, peroxyformic acids);

3) quaternary and tertiary ammonium compounds (Q, A, C, and T, A, C);

4) derivatives of alcohols;

5) guanidine derivatives;

6) phenol-containing ones.

The second stage of treatment of medical instruments is **presterilization instrumentation cleaning** that shall be carried out after disinfection, whether in the combined mode (disinfection and presterilization cleaning are combined in a single step and performed with the drugs specially registered for this purpose by the Ministry of Health) and aimed at completely removal of residual protein and fat contamination, residues of drugs, etc. The effectiveness of subsequent sterilization directly depends on completeness and quality of presterilization cleaning, therefore the regulations introduced in practice the mandatory quality control of presterilization cleaning carried out both by the institution and experts of Rospotrebnadzor. In particular, these are tests registering blood residues on the instruments — azopyrame and amidopyrine tests, and the tests detecting trace amounts of detergents: phenolphthalein and pH tests (using of Likont indicator strips).

For presterilization cleaning, you can use detergents and enzymatic cleaning agents.

Sterilization is elimination of **all** types of microbial flora and viruses, including sporous forms, by means of physical or chemical exposure. All medical products contacting with patient's blood, a wound surface and mucosa and may cause solution of its continuity, are subject to sterilization. Sterilization is a complex process, for the successful implementation of which, the following requirements have to be met.

1. Efficient cleaning of instrumentation from organic and inorganic pollutants.
2. Appropriate packaging materials.
3. Compliance with the rules of asepsis at packing of healthcare products.
4. Compliance with the rules of a sterilizer loading with packages of medical products.
5. Adequate quality and quantity of the material to be sterilized per a batch.
6. Efficient operation and monitoring of the sterilizing equipment.
7. Compliance with the rules of storage, handling and transportation of sterilized material.

The process of sterilization of medical instruments and products from the end of an operation to sterile storage or to following application comprises performing actions in a specific sequence. All stages on the basis of manual or mechanized cleaning must be strictly followed to ensure sterility and long life of the instruments. Schematically, it can be represented as follows.

1. Using of an instrument is finished.
2. Disinfection (or combined treatment mode — disinfection and presterilization cleaning by special preparation, usually from the group of quaternary ammonium compounds, in one step) manually or in a washing machine.
3. Presterilization and mechanical cleaning of the instrument.
4. Checking for damage.
5. Packing of the instruments.
8. Sterilization.
9. Sterile storage / use.

In case of application of sterilization packaging (wrapping paper or sterilization containers), the instruments can be stored in sterile state from 24 hours to 6 months.

Sterilization of medical appliances is carried out by physical (steam, air, infrared) or chemical (with use of chemical solutions, gas, plasma) methods in accordance with current regulatory and procedural documents. At that, the appropriate sterilizing agents

and types of equipment allowed for use in the prescribed manner (the Ministry of Health certificate of state registration of medical products) are used. The choice of an adequate method of sterilization depends on the characteristics of products to be sterilized. Sterilization shall be carried out following the modes specified in the instruction for use of the particular agent, and in the operator's manual of the sterilizer of a particular model.

Chemical sterilization method using solutions of chemicals may be used to sterilize only those products in which design thermolabile materials are used which do not allow using the other methods of sterilization.

For chemical sterilization, aldehyde or oxygen-containing solutions, peracetic acid derivatives are used. To avoid diluting of treatment solutions, especially those used repeatedly, the immersed products should be dry.

When sterilization is made by chemicals solutions, all manipulations shall be conducted strictly aseptically; sterile containers are used for product sterilization and washing from drug residues by sterile drinking water.

In case of chemical sterilization method using chemicals solutions, the sterilized products washed with sterile water shall be used directly for intended purpose, or placed on a sterile table for a period of not more than 6 hours; they also can be placed in the UV cabinet for sterile instrument storing.

When sterilization is made by **physical method** — steam, air, gas exposure, the products are sterilized in a packaged form, using disposable sterilization packing materials or reusable containers that are allowed for a particular method of sterilization in the prescribed manner.

Bactericidal chamber equipped with ultraviolet lamps, may be used only with the aim of instrument storage to reduce the risk of secondary contamination by microorganisms in accordance with the instruction manual. It is forbidden to use such equipment for the purpose of disinfection or sterilization of instruments.

Conclusions

As it follows from the research performed, it is not so much objects for the abovementioned three-stage treatment in the medical cosmetology and beauty centers due to active introduction of technologies based on disposable instrumentation. In Table all kinds of current cosmetic procedures are analyzed and given, the characteristic of the degree of intervention and the instrument type are given, that allows us to evaluate objectively and recommend treatment mode for different categories of objects.

Thus, from the full range of cosmetic manipulations, we can only mark the following: *Radio frequency RF-lifting and RF-lipolysis and microdermabrasion procedure,* implementation of which is carried out with the use of reusable instruments in contact with patient's blood, and therefore, necessity of 3-stage treatment is obvious.

In beauty centers, the most popular procedures are still classic manicure and pedicure, made by reusable instruments, however, absence of special medical knowledge in the field of disinfectology with the staff of these institutions does not allow to organize effective disinfection and sterilization measures, that puts these facilities to one of the first places by risk exposure of transmission of blood-borne infections to the population and staff.

Besides instrumentation, the objects of disinfection and sterilization exposure are as follows:

1) surfaces in manipulative offices;

2) injection area, hand skin, mucous, both customers' and staff's;

3) waste.

Thus, the quality of provision of cosmetic services to the population is largely determined by the competent organization of disinfection mode based on the selection of optimal products, technologies of cosmetic procedures (degree of invasiveness of the intervention Table).

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