

**MINISTRY OF HEALTH OF UKRAINE
POLTAVA STATE MEDICAL UNIVERSITY**

Department of general surgery

**METHODICAL INSTRUCTIONS
FOR STUDENT SELF-DIRECTED WORK
WHEN PREPARING FOR AND DURING PRACTICAL CLASS
POLTAVA STATE MEDICAL UNIVERSITY**

Study discipline	General surgery
Module №1	INTRODUCTION TO SURGERY. SURGICAL EMERGENCY CONDITIONS. FUNDAMENTALS OF ANESTHESIOLOGY AND INTENSIVE CARE
Content module 4.	Injury and damage.
Lesson theme №17	Infected wounds. Stages of the wound process. Treatment of an infected wound depending on the stage of the wound process. Clinical analysis of a patient with an infected wound
Years of study	<i>III</i>
Faculty	International

Poltava

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1. Relevance of the topic :

Patients with surgical infections are a significant portion of patients with surgical inpatient and outpatient departments. Number of inflammatory processes of various tissues, despite the success of the conservative, surgical treatment is increasing every year and represents an average of 3-15%, and according to some authors reaches 30%. Currently 35-40% of surgical patients are patients with purulent-inflammatory diseases. Therefore, there is no doubt the relevance of this problem.

2. Learning Objectives :

1. Learn the modern types of wound infection:

1. Aerobic monoinfection .

A. Gram-positive: stafilokokovaya , streptococcal , pneumococcal , tifoparazitarnaya .

B. Gram : kolibatsillyaris , Pseudomonas , Proteaceae , meningococcal , gonococcal .

2 . Normal body monoinfection :

a) clostridial ;

b) non-clostridial .

3 . Mixed infection :

a) anaerobic - aerobic association;

b) normal body - normal body of the association;

C) aerobic - normal body of the association.

2. Know common etiologic and pathogenetic mechanisms of local surgical infections.

3. Know of bacterial contamination of the wound.

4. Tecnic wound healing in purulent wound.

5. Healing wounds by secondary intention .

6. Know modern methods for comprehensive treatment of infected wounds.

7. To be able to apply for funds for local and general treatment of infected wounds in a different phase of wound healing processes that use it .

8. Know risk factors and means of prevention of surgical site infection.

3 . Basic knowledge , skills , habits, necessary for studying the topic (interdisciplinary integration)

The names of disciplines	acquirements
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1. microbiology	Apply the necessary preparation, based on the characteristics of pathogens of purulent infection. Determine the resistance of vegetative flora to the temperature, beam energy, chemicals, antibiotics. Conduct bacteriological research.
2. biochemistry	Know metabolism. To be able to interpret analysis of blood, urine, blood glucose and urine.
3. pharmacology	The ability to write prescriptions. Compare pharmacological action of necessary antiseptics
	Violation of trophic tissue. Compare the features of post-mortem changes of the skin, changes in the tissues in purulent disease.
4. pathological anatomy	Physiology of wound healing. Define local clinical signs of inflammation in the wound.

The student must have an idea :

- The mechanism of inflammatory and purulent infection ;
- Local clinical manifestations of inflammatory and purulent infection ;
- The general reaction to inflammation ;
- Modern classification of pyogenic infection;
- A non-specific resistance of the organism ;
- On general provisions and principles of purulent surgery ;
- About the anatomical and physiological characteristics of the areas where localized pathological process .

The student should know :

- Determination of wound healing ;
- The main etiologic and pathogenetic factors of infection in the wound ;
- The penetration and spread of infection to the patient ;
- Local clinical manifestations of infection in the wound ;
- Pathological changes in tissues in purulent pathology;
- Different kinds of dressings ;
- Types of drains ;
- Know the basic classes of antiseptics , medicines and their use ;
- The indications for surgical treatment of local septic wounds and its basic principles ;
- Types of anesthesia, which is used in the surgical treatment of purulent wounds.

The student should be able to:

- Diagnosis of septic disease;
- Distinguish the phases of wound healing in purulent wound;
- Perform a secondary surgical treatment of purulent cavities of skin and subcutaneous tissue ;
- Ensure the hygiene of the body, underwear and bed linen ;
- Give the patient functionally advantageous position in bed ;
- To formulate the principles of integrated local treatment of purulent diseases and perform individual stages .

Mastering practical skill of student :

- Learn to clean festering wounds with antiseptic solutions ;
- Learn the technique of collection of material on the sensitivity of microorganisms to antibiotics;
- To master certain techniques in the surgical treatment of acute surgical soft tissue infections (local anesthesia , incision of the soft tissues) ;
- To carry out an audit of the wound ;
- Master the techniques bandaging a patient with purulent pathology , observing aseptic and antiseptic .

4. Tasks for self-study in preparation for the lesson .

4.1. The list of basic terms , parameters, characteristics, which the student must learn in preparation for the class:

term	definition
antisepsis	a set of tools and organizational methods to combat existing infection in the wound.
	manufacture of absorbent fabric of different products that are used in surgical practice for drying wounds, stop bleeding, removal of wound exudate to impose and consolidate the dressing.
dressing	penetration of microbes in the human body (microbial contamination).

4.2 . Theoretical questions for the class :

1. Define the concept of bacterial- contaminated and infected wounds.
- 2 . Determine the classification of wound healing in purulent wound.
- 3 . Identify the principle of treatment of purulent wounds depending on the phase of wound healing .
- 4 . Acquainted with the methods of surgical treatment of purulent wounds,
- 5 . Identify the method of surgical treatment of purulent wounds / drainage , laser treatment , etc. / .
6. Identify methods for sampling the contents of the wound to bacterial inoculation.
7. Explain the meaning of " microbial numbers" cytologic picture of the wound content , Ph - wounds.
8. Indications for the closure of granulating wounds.
9. Classification of antibiotics and basic principles of their application
10. Organization care of patients with surgical infection.

4.3. Praktical work (task) that are used in class:

1. Transporting patients.
- 2 . Laying the patient on the operating table, according to the area of the operation.
- 3 . Processing of the surgeon's hands ;
- 4 . Prepare a kit for the surgical treatment of septic wounds ;
- 5 . Prepare a kit for washing the wound and drainage ;
6. Establish a system for continuous washing of purulent wounds.
7. Technique of the dressings (bandages previous removal , removal of necrotic tissue and pus film processing operation field , etc.);
8. Dressing ;

9. Specimen collection for bacteriological culture and sensitivity to antibiotics .

5 . The content of the topic.

The emergence and development of infection in the wound is determined by:

- the presence of purulent infection pathogens in sufficient concentrations ;
- the nature and extent of tissue damage ;
- the presence of blood clots in the wound , foreign bodies , non-viable tissue .

"**Critical level**" of bacterial contamination of wounds is the number of microorganisms 10^5 per 1 g of tissue , the excess of which can be accompanied by the penetration of infection into the deeper layers of the wound with the breakthrough of the demarcation of the shaft and the development of septic complications.

" Critical level " can be much less in the presence of the wound a large number of dead tissue , foreign bodies as well as in violation of protective responses, humoral and cellular factors of natural resistance and immunological reactivity .

Under these conditions, the development of purulent- inflammatory wound healing process can take place in conditions of presence of microorganisms 10^3 - 10^4 per 1 g of tissue.

The degree of risk of surgical wound infections is determined by:

- susceptibility of the patient and the severity of his condition ;
- degree of contamination of the wound ;
- duration of surgery ;
- inadequate use of drugs for local or systemic treatment;
- failure to comply with the principles of infection prevention runs in the final phases of treatment and after discharge from the hospital.

It is important that the microflora of advanced wounds resistant to commonly used antibiotics .

Under these conditions , for the topical treatment of wounds more appropriate to use:

- combinations of drugs that have multidirectional spectrum of antimicrobial activity (eg streptotsid with nitazolom) ;
- new synthetic antimicrobials (eg , ofloxacin) , which has not formed a high resistance of microorganisms ;
- antiseptics (dioxidine , miramistin and others) , to which no natural or acquired resistance of micro-organisms (including their hospital strains) .

The first step in the treatment of wounds must have adequate primary surgical treatment .

. **Secondary debridement** - held for secondary indications in cases where after primary surgical treatment of the wound develops an inflammatory process with the formation of pus cavity and secondary necrosis.

The methods that increase the efficiency of the surgical treatment of the wound and its subsequent treatment are:

- The use of hypertonic solutions ;
- The use of antiseptic solutions ;
- Drainage of the wound (active or passive) .

- The imposition of medical dressings with drugs in modern hydrophilic bases , which provide the combined effect of :

- antimicrobial
- pain
- the anti-inflammatory
- Controlled dehydration .

Medicines that are used for the topical treatment of wounds, are divided into two main groups:

- Oil-based monotherapies with unidirectional (antimicrobial, wound healing , etc.), the action to which they belong streptocidal , gentamicin , eritromitsinovaya , furatsillinovaya , Methyluracil ointment , liniment sintomitsina and others ;
- monotherapy on synthetic hydrophilic water-soluble bases (Chloramphenicol - Darnica gel , cream Dermazin , etc.);
- combination of drugs :
 - A) fat-based (Vaseline , lanolin , an oil or balsamic) , to which belong the ointment " Algofin " , " Fastin - 1 " , balsamic liniment for Vishnevsky , etc.;
 - B) based on synthetic :
 - The first generation (based on a combination of polyethylene oxide 400/1500 , and Levomekol Levosin) ;
 - Modern drugs for advanced water-soluble synthetic bases (consisting of propylene glycol , polyethylene oxide , and proxanol 400) - solution - Dioksizol Darnica , ointments Oflokain - Darnica , Nitatsid - Darnica , Miramistin - Darnica , Streptonitol - Darnica , Metiluratsil - Darnica , gel - Pantestin Darnica) it is carried out a comprehensive impact on the basic pathogenesis runs the process.

Comparative characteristics of sorption and permeation ability of different bases of drugs for the local treatment of wounds.

UNBALANCED diffusion processes

A) hydrophobic base

B) BASIS POLIETILEPOKSIDNAYA (Lanolin , Vaseline) (combination of PEO - 400 and 1500)

BALANCED diffusion processes

A) hydrophilicity hyperosmolar

B) a hydrophilic GEL

BASIS (PEO -400 , 1,2 propylene glycol or emulsion base

Proxanol -268) and 1- PHASE OF WOUND , 2 -PHASE OF THE WOUND

- EKSUDAT - DRUG

In the current multicomponent formulations applied hydrophilic base which is water soluble mixture solvents and polymers , polyethylene oxide 400 (PEO -400) , 1, 2 proshlenglikolya and proxanol -268 .

PEO -400 - is a water-soluble derivative of ethylene and has a low toxicity and severe osmolality properties. It is well applied to a wound surface , it is distributed evenly , which improves the contact with the ointment the wound tissues and contents well mixed with wound exudate . Characterized by slow diffusion deep into the cells. PEO -400 molecules can penetrate into the deep of tissues where they are distributed in 2 hours after treatment . Creating complexes with antimicrobial compounds , PEO -400 holds them in Glibin damaged tissue - the main places of localization of microbes. This is fundamentally different drugs that are based on PEO . of fat-based ointments that do not affect the deep flora.

An important feature of PEO is mediated nekrolitichnoe action that leads to rejection of necrotic eschar penetration through cracks in the exclusion zone in the periphery and there is an increase in the volume of liquid which expands necrotic tissue.

1, 2 -propylene glycol - rapidly introduced into fabric and creates a balance between osmolality and drug cell cytoplasm

PEO -400 - slowly being introduced deep into the cells;

- Improves the contact of the drug with the contents of the wound ;

- Educational complexes with antimicrobial substances and carries them deep into the tissues;

- Has expressed an osmolality activity.

Proksanol -268 - provides surface wetting runs , spreading over it , the penetration of a necrotic eschar ;

- Provides a uniform and continuous absorption

B - STATE OF WOUNDS IN THE TREATMENT

Sorption WOUND content without over-drying of the granulation tissue and oppression POWER WOUND

PENETRATION antimicrobial agent into tissue depths in complex with PEO - 400

In the 1 and phase - purulent necrotic due to the presence of pain , necrotic tissue and purulent exudate in the wound , severe infiltration , high-level bacterial contamination appropriate use of drugs , which carry combined action - antimicrobial , analgesic, anti-inflammatory and dehydration .

Under these conditions , depending on the severity of pain , the degree and nature of the exudation of microflora appropriate use of combination therapies for advanced hydrophilic bases - Dioksizol - Darnica solution or ointment Oflokain - Darnica . Drugs provide double the analgesic effect (inhibition of local anesthetic and production of mediators of pain) , so unlike anesteziina , novocaine , lidocaine cropped pain for 24 hours.

After the relief of pain (in the first 1-4 days after debridement) , the main link in the pathogenesis of wound healing process , while maintaining a high microbial contamination , have expressed overhydratation tissue (sub-phase exudation) , which , under conditions of inadequate treatment policy may result in deepening of eating disorders followed by the development of tissue necrosis. In this regard , it is appropriate use of combination therapies on the hydrophilic synthetic base that have a strong and long-lasting effect of dehydration during the day .

Among these , drugs Levomekol has certain limitations to the use of which is due to unbalanced basis advantageously unidirectional diffusion (of wound ointment).

After the relief of pain in the sub-phase exudation appropriate use of drugs Nitatsid - Darnica or Miramistin - Darnica .

6. Materials for self-control.

A.Voprosy for self-control .

1. Give a general description of purulent infection .
- 2 . What are the clinical manifestations of chronic inflammatory diseases.
- 3 . Pathways to exogenous and endogenous infection in surgical patients .
- 4 . The volume of surgical care in purulent dressing .
- 5 . Types of drains (tubes , glove , rubber , composite , etc.) .
6. The common treatment of infection in the wound.
7. The basic rule of contaminated surgery .
8. Secondary debridement .
9. The basic principles of integrated treatment of local infections of surgical diseases assignments :
10. What are the phases of wound healing.
- 11 . List the clinical manifestations of the local inflammatory response ..
- 12 . Specify the method of surgical treatment of purulent wounds.

6.3 . Tests for self-control (basic knowledge) .

1. What are the conditions that contribute to the development of surgical infection in humans

- A. The presence of saprophyte
- B. presence of the " entrance gate " for infection
- B. maintaining the integrity of the skin
- G. absence of specific immunity to the pathogen of surgical infection
- D. a high antibody titer

2 . What are the protective barrier of the local reaction of the body , which is formed during the development of acute surgical infection

- A thickening of the fascia
- B. swelling of the spinal cord
- B. bundle of pleural
- G. Pyogenic shell
- D. leukocyte shaft

3 . Called secondary wound infection , which may :

- A case of violation of aseptic technique at the time of first aid
- B. during the first 3-5 days after injury
- C. in the absence of bandages during transport the victim to hospital
- G. at the time of injury
- D. in violation of aseptic technique when bandaging

4 . In primary infection with germs into the wound across with :

- A pair of tweezers in the surgical treatment
- B. surgeon's hands
- V. wounded skin
- G. suture
- D. from aseptic dressings

5 . After some time, the germs in the wound begin to show its activity in relation to macroorganism ?

- A. 1-4 hours
- B. 6-8 hours
- V. 10-12 hours
- G. 24 hours
- D. 3-5 minutes

6. For local signs of inflammation is characterized by all the signs , other than:

- a) swelling
- b) cyanosis
- c) pain
- g) hyperemia
- d) a local temperature increase

7. What is the maximum allowed duration of the primary surgical treatment of wounds from the time of injury ?

- A. to 12 hours
- B. 24 hours
- B. 48 hours
- G. before signs of infection
- D. to 8 days after the injury

8. Topical treatment of purulent wounds in purulent necrotic phase of wound healing process should have the following properties except :

- A. dehydration
- B. locally irritating
- B. proteolytic
- G. antimicrobial
- D. anesthetic

9. Drainage of the wound can be?

- A. The active
- B. pin
- B. partial
- G. complete

D. sterile

10 . Festering wound in the first phase of inflammation is characterized by all except:

- A high microbial contamination
- B. the presence of granulation tissue
- V. pronounced disturbances of local microcirculation
- C. pronounced perifocal edema
- D. presence of purulent exudate

11. What drug is indicated for the local treatment of purulent wounds in the first phase of wound healing ?

- A liniment for balsamic Vishnevsky
- B. ointment on the basis of water-soluble
- B. saline
- G. ointment fat-based
- D. preparation based sorbent

12. One of the main tasks of the local drug treatment of purulent wounds in purulent necrotic phase is?

- A. inhibition of infection
- B. creation of anaerobic conditions in the wound
- B. stimulation of reparative processes in the wound
- G. Protection of granulation drying
- D. prevention of secondary infections

13. One of the objectives of the local drug treatment of purulent wounds in the granulation phase ?

- A. removal of necrotic tissue
- B. adsorption products of microbial and tissue decay
- B. anesthesia
- G. prevention of secondary infection of wounds
- D. activation of necrotic tissue rejection

14. Enter phase of wound healing process for Dacenko BM:

- A. anaerobic
- B. rejection
- B. healing
- G. purulent necrotic
- D. inflammatory

Case reference for the source of knowledge

1. What drugs are used in I, II, III , phases of purulent wounds?

2 . In what period of the inflammatory phase is desirable to use proteolytic enzymes?

3 . When antibiotics are used and what the purpose of prevention of purulent process?

4 . In a patient with a festering wound in the thigh to the identified bacteriogramme stick of blue- green pus . Which would you suggest antiseptic topical treatment?

5 . For the treatment of bacterial contamination of the wound suggested methods of treatment without surgery.

Is it appropriate to the chosen strategy ? If not, why not ?

6. Before autodermaplastic of granulative wounds determined that the type of smear cytology regenerative society . Is it advisable to carry out the planned operation? If not, why not ?

7. " Microbial number " - the number of microorganisms per 1 g of tissue in which there is a festering wound is :

- a) 10^3 w / per 1 g of tissue ;
- b) 10^4 w / per 1 g of tissue ;
- c) 10^5 / o for 1g tissue ;
- d) 10^6 m / s per 1 g of tissue ;
- e) 10^7 m / s per 1 g of tissue.

8. In the treatment of purulent wounds of the core is :

- a) surgical treatment ;
- b) antibacterial therapy ;
- c) application based on the hydrophilic ointments ;
- d) all of the above components .

9. Identify the components of an advanced surgical treatment of purulent wounds.

10 . For any phase of wound healing is characterized by increased vascular permeability ?

11 What physiotherapy techniques and the phase in which you apply ?

12. In carrying out dressing the patient , O., 2 days ago operated on the boil front surface of the right thigh , the wound is observed the presence of necrotic masses of pus , infiltration of its edges . What phase of wound healing is characterized by these features ? What features should have drugs for the local treatment of purulent wounds in this phase of wound healing ?

13. Six days ago the patient N. performing surgery : Disclosure and drainage of postinjectional abscess upper-external quadrant of the right buttock . In the wound is determined by the presence of serous exudate , the development of granulation tissue, which gradually performs sides and bottom of the wound. What phase of wound healing is

characterized by these features ? What are the main requirements are put forward to the preparations for topical treatment of purulent wounds in this phase ?

7. References:

General:

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Additional:

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 2. SM Genyk, MV Prokopishin, VM Rat and others. Case Studies on hirurgii.Ivano-Frankivsk, "Lileya-NV" - 2003.
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8. The distribution points are awarded to students:

At mastering topic number 17 to content module 4 for training activities for students rated a 4-point scale (traditional) scale, which is then converted into points as follows:

rating	Points
5 (excellent)	5
4 (good)	4
3 (satisfactory)	3
2 (poor)	0

Guidelines prepared

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