

**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**

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 №19	Burn disease. Treatment of a burn in a hospital, depending on the period of burn disease. Types of surgical operations used in the treatment of burns.
Years of study	<i>III</i>
Faculty	International

Poltava

Content module 4.	Injury and damage.
Lesson theme №19	Burn disease. Treatment of a burn in a hospital, depending on the period of burn disease. Types of surgical operations used in the treatment of burns..

1. Relevance of the topic :

Thermal injuries are a type of injuries occur relatively often : burns - 3%, electrocution - 2.5% of accidents.

In case of burns of any location and etiology of the wound process proceeds according to the general laws of tissue damage . Burns are more likely to be domestic (they make up 92 %), less work-related injuries .

Of the total number of affected 15 % are children under 15 years , half of them are injured in 3-4 years.

According to the World Health Organization, the custody of the frequency rank third among other injuries , and in some countries - the second , behind only the transport injury.

The relevance of thermal injuries is determined by a relatively high frequency in their home and at work , the severity of the burn injury , complexity and duration of treatment of patients with burns , frequent disability and high mortality .

Even in peacetime, the overall mortality rate for burns in adults according to the burn center of Kiev in 2000 was 7.5 % (Prof. M. Felt Yu) , in 2005 - 9 % , which is equal to the average indicators of mortality in Europe.

In recent years, the number of burns in Ukraine has decreased to an average 145 thousand cases per year (MY Felt) . In the United States during peacetime care receive 6-8 % of people dying from them each year 10 thousand people.

Urgency of the problem is defined and its crucial importance for the modern military surgery . In wartime, the guardianship is obtained by burning military equipment (tanks , planes , infantry fighting vehicles), and the use of incendiary mixtures.

2 . Learning Objectives :

1. Determine the depth of burns by degrees.
2. Demonstrate methods for determining the area of injury and severity of the condition of the patient with burns.
3. Determine burn disease and its periods.
4. Study pathogenesis, clinic, diagnosis of burn shock.
5. Master pathogenesis, clinic, treatment of burn toxemia.
6. Study pathogenesis, a clinic of burn septicotoxemia.
7. Pathogenesis, burn reconvalescence clinic.
8. Organize first aid activities for the victim with burns.
9. Prescribe local conservative treatment for burn wounds.
10. Calculate the volume and composition of infusion therapy for patients in a state of burn shock.
11. To determine the indicators for prompt treatment of the victim with burns.

12. Determinated indications for surgical treatment of patients with burns.

Basic knowledge , skills , habits, necessary for studying the topic (inter-disciplinary integration)

The names of the preceding disciplines	The skills
1. AnATOMIYA human histology and embryology	Describe the anatomical and histological features of the structure of external coverings of man.
2. Organic and inorganic chemistry	Identifies the chemical structure of substances that have antiseptic properties.
3. Biological physics	To know about the consequences of their interactions with other organic and inorganic compounds, and environmental factors.
4. Microbiology	Define and identify the parameters of the physical factors of the action of the thermal factor: supports the skin and tissues, the specific heat, thermal conductivity.
5. Patofiziologiya	Describe the major groups and properties of the bacterial flora that plant grows on the wounds. Pathogens that cause sepsis and septic.
6. Propedeutic Internal Medicine	Pathophysiological responses and tissue damage during inflammation, the pathogenesis of burn shock, the pathogenesis of toxemia, sepsis
7. Latin	Symptomatology know, to be able to carry out the clinical, laboratory and instrumental diagnostics.

The student must have an idea :

- Changes in local tissue burns ;
- The general reaction of the body burns ;
- Modern classification of burns ;
- 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 :

- Definition and classification of burns ;
- Methods for determining the area of the burn ;
- Ways to predict the flow of burns ;
- Local and general changes in the body burns ;
- Definition of burn disease , etiopatogenez and clinical picture of each stage.

The student should be able to:

- To assess the depth of the burn, the burn area to define , assess the severity of the burn ;
- To carry out primary processing burn surface ;
- To carry out the local treatment of burns ;
- Master the method of calculating the infusion program suffered from burn shock with the Parkland formula ;
- To make complex treatment interventions at different stages of burn disease .

The mastery of the practical skills of students:

- To determine the depth of the lesion ;
- Demonstrate the methods for determining the area affected in patients with burns;
- To organize the arrangements for the provision of first aid to the victim with burns;
- Master the classical techniques of bandaging a patient with burn disease , observing aseptic and antiseptic .
- To determine the burn diseases and her periods ;
- To make a diagnosis of burn shock ;

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:

4.2 . Theoretical questions for the class :

1. Determination of burn diseases
2. The classification of the depth of damage - the current classification , the international classification .
3. Determination of the area affected by the rule Wallace (" nine") .
4. Determination of the area affected by other methods.
5. Stages of evacuation of burn victims (where and who provides assistance) .
6. First aid for burns .
7. Treatment at the stages of evacuation (skilled and specialized care) .
8. Complication of burns .
9. Periods of burn disease .
10. Burn shock . Pathogenesis. Clinic .
11. The treatment of burn shock .
12. Burn toxemia . Pathogenesis.
- 13.. Clinic and treatment of burn toxemia
14. Septic and pathogenesis.
15. Clinic and treatment of Burn septicotoxemia .
16. Convalescence , the principles of treatment.
17. Combustiology and create burn centers in Ukraine.

4.3. Practical work (tasks), which are carried out in class :

- Diagnose the depth of burns defeat.
- Diagnose burns over an area of damage.
- Provide first aid to the injured on the burn .
- To provide first medical aid to victims with burns .
- Determine the period of burn disease .
- Set the examination of the patient .
- Assign treatment of burn shock .

- Provide medical treatment of burn wounds according to the phases of wound healing .

- Know the basic group of drugs for the local treatment of wounds.
- Provide local treatment of wounds in order to prepare them for autodermplasty .
- Take swabs - crops on the microflora and their sensitivity to antibiotics.
- Remove and bandage .
- Perform necrotomy with deep burns .
- Transporting patients to the dressing .
- Placing the patient at the dressing table according to the zone of the dressings.
- Processing of hands to perform ligation .
- To be able to put on a sterile gown .
- Prepare a kit for washing the burn wound and drains ;
- Technique of the dressings (bandages previous removal , removal of dead tissues and pus film processing operation field , etc.).
- Apply roller bandages.
- Taking the material on the bacteriological control .

5 . The content of the topic.

Burn disease

Burn disease is the body 's complex response to burn injury. This condition occurs in superficial burns if they employ more than 30% of the body in adults; In case of deep burns (3 - 4th degrees) - more than 10% bodies in adults and 5% in children.

Determination of the depth of burns.

Determination of the depth of burns in the CIS is carried out according to the classification adopted by the XXV Congress of Surgeons of the Soviet Union in 1961.

Burns are divided into superficial (I, II , III- A of degree) and deep - III -B and IV degree. Typically the patient are both superficial and deep burns. Superficial burns with proper conservative treatment heal on their own , deep burns - need skin grafts .

At the 20th Congress of Surgeons of Ukraine (September 2002 , Ternopil) proposed the following changes that are closer to the international classification :

- Grade I - it burns epidermalis (formerly I and II degree) ;
- II degree - it's dermal superficial burns (former and III degree) ;
- III degree - deep dermal burns (formerly b III degree) ;
- IV degree - subfascially burns (formerly IV degree).

This classification is responsible for the destruction of the international deep .

First degree burns appear red and swollen skin (persistent arterial congestion and exudation) .

Second degree burns are characterized by the appearance of blisters that are filled with clear yellowish fluid. Under delaminations epidermisom remains bare his basal layer .

Third degree burns are divided into two types: on the degree of burns III A and III B.

III A degree burns (superficial dermal) - this is the skin lesions , but not in all its depth (thickness) is often limited by the defeat of the germ layer epidermis , sometimes necrosis occurs and the surface of the dermis , while maintaining its deeper layers of skin cells and appendages.

For burns III B level (deep dermal burns) sphacelating entire thickness of skin and forms a necrotic eschar .

IV degree burns are accompanied by necrosis, not only the skin but also deep lying tissue - subcutaneous tissue, fascia , tendons , muscles, and bones.

Burns I-II -III A degree - superficial (dermal), and they can be self epitelisation through epithelial cellular elements of the skin that have been preserved . Burns IIIB - IV degrees - deep, restore the integrity of the skin can be achieved only through surgery .

Determination of the area burned. The surface area of the human body is from 16000 to 20000 cm² with an increase of 160-200 cm and a normal weight .

Offered a lot of images of determining the area of burns: The method Vilyavina GD, table Postnikov BM method Dolinina VA (graphically) , the "rule of palm " , " rule of nines ."

The phases of wound healing process of burn wounds :

a) The primary alteration

b) phase exudation - lasts from 1 to 3-5 days after the burn, characterized by edema , leukocyte infiltration in the burn area .

c) phase of secondary alteration and demarcation - lasts from 5 to 8-10 days , is characterized by dissociation of dead tissue from living and reducing edema.

g) the phase of wound cleansing of necrotic tissue - lasts from 10 to 15-17 days , is characterized by suppuration and necrosis of tissue rejection , on the border with the formation of healthy granulation tissue , that is, young connective tissue.

d) the phase of regeneration or repair epitelisation and reorganization of the scar) - comes after 17-21 days , is characterized by scarring and epitelisation burn wound and can be very long . It can speed up to surgery - skin grafting .

Prognostic index (PI) is defined as sum of age

Victim and total burn area

< 60 - forecast favorable

61-80 - forecast relatively favorable

81-100 - forecast doubtful

> 100 - unfavourable forecast

The Frank index (IF) is derived from the addition of surface area

Burns with triple area of deep:

< 30 - forecast favorable

31-60 - forecast relatively favorable

61-90 - forecast doubtful

> 91 - the forecast is unfavourable.

The severity of the lesion is also affected by the localization of the burn. Especially exacerbates the condition of the victim 's airway burn.

Airway burn has the same effect,
As deep skin burn, area 10-15%

Burn disease :

The clinical picture of burn disease excrete 4 periods :

- The first period of burn shock (1-3 days);
- the second period of acute burn toxemia (3-12 days);
- The third period of burn septic (until full recovery of the skin) ;
- fourth period of convalescence (since the restoration of the skin to restore the functions of organs and systems) .

Such a division of burn patients for periods of one side is conditional, and on the other - allows you to assign a directed remedies and manipulation during the treatment .

Burn shock - this is the first period of burn disease .

Pathogenetic factors of burn shock :

1. Severe pain .
- 2 . Reduction of BCC and the deterioration of the rheological properties of blood .
- 3 . Endogenous intoxication and multiple organ failure.

Severity of burn shock :

- Easy to burn shock ;
- Burn shock of moderate severity ;
- Severe burn shock
- Extremely heavy burn shock

Burn toxemia - the second period of burn disease . A few hours after the thermal trauma victims with burns sharply increase the toxic properties of blood serum.

The clinical picture is characterized by a variety of disorders of the organs and systems: dysfunction of the central nervous system (physical inactivity , stupor , delirium, agitation - psychosis) ; hyperthermic response (up to 39-40 ° C), shortness of breath , deafness heart sounds , hypotension, tachycardia constant , decrease systolic and diastolic blood pressure, polyuria, izostenuriya in urine - red blood cells , white blood cells , protein , cylinders , impaired GI motility (intestinal paresis , flatulence) , and reducing the total protein - hypoproteinemia , dysproteinemia , anemia , leukocytosis with a shift to the left of the formula , the emergence of toxic grain white blood cells , lymphopenia .

Burn septicotoxemia is a direct continuation of the second period of burn disease , when attached to toxemia festering wounds, fusion and rejection of necrotic tissue . Developed bacteremia , and with a significant decrease in the body's defenses - septicemia .

Necrotic tissue become a breeding ground for microorganisms and turned into a reservoir Duration of microbes and their toxins in the blood stream.

Clinical manifestations of septic : burn wounds fester , weakness , inversion of sleep , hyperthermia hectic character purulent - resorptive fever , persistent tachycardia , decreased systolic and diastolic blood pressure , lower levels of total protein , hypo-and Dysproteinemia , increased catabolic processes , weight loss , anemia , leukocytosis with a shift to the left of the formula , reduced secretion and concentration of kidney function , impaired gastrointestinal motility , infectious complications including local (flegmon,

lymphadenitis , abscesses, sores) , common (sepsis , pneumonia , pleurisy , myocarditis, peritonitis, etc.)

Burn septic does not develop only in those patients with deep burns , who in the early period (2 - 10 times after injury) completely remove necrotic tissue and the wound is closed autografts .

End of septic occurs within 1-2 months after the full restoration of the skin. Pri that sepsis is accompanied by a systemic inflammatory response , the frequent development of multiple organ failure

The period of convalescence is after restoring the skin. The length of his varied, depending on the degree of degenerative and inflammatory processes in organs , treatment time can range from baked 2-3 months to several years. Treatment fired - a comprehensive and includes general therapy , local treatment of burn wounds and surgical methods.

General treatment for burn disease:

1. The fight against pain:

- creation of rest, treatment with petroleum jelly (ointment) and dressing;
- non-narcotic analgesics;
- parenteral administration of non-narcotic analgesics, sedatives drugs, antipsychotics;
- narcotic analgesics.

2. Treatment of burn shock:

- ensuring airway patency;
- catheterization of the central vein and the beginning of the infusion;
- applying dressings to burnt surfaces;
- catheterization of the bladder;
- the introduction of the probe into the stomach.

3. Treatment of acute toxemia:

- infusion therapy;
- detoxification therapy;
- treatment of acute renal failure;
- correction of acidosis.

4. Prevention and treatment of infectious complications:

- antibacterial therapy;
- stimulation of the immune system.

Specialized medical care.

Treatment of acute burn toxemia, septicotoxemia, prevention and treatment of burn exhaustion, local treatment of burn wounds and their. The consequences are carried out in specialized hospitals. Infusion-transfusion therapy is one of the leading places in treatment of patients with extensive burns. Evans recommended introducing liquid in the **first day** according to the scheme:

$$V = 2 \text{ ml} \times m \text{ (kg)} \times S \text{ (\%)} + 2 \text{ L of 5\% glucose solution}$$

V - volume of infusion therapy

m - body weight

s - burn area 2-4 degrees

On the **second day**, the volume of the transfused liquid decreases by half, from 3-4 days, patients additionally take the liquid orally.

Wallis proposed a scheme for determining the volume of fluid in a burn shock in children:

$$V = 3 m (\text{kg}) \times S (\%)$$

m - body weight

s - burn area

This is the amount of fluid that a child needs to enter during the first 48 hours after a burn. This volume does not include the physiological need for water (700-2000 ml per day, depending on the age of the child).

The outcome of treatment is determined by the healing of burn wounds. If possible, a PCP is performed, including primary necrectomy (before scab rejection) and primary skin grafting.

In other cases, a burn wound is carried out under dressings until the scab is rejected or placed in a room with a laminar flow of sterile air. After scab rejection and granulation preparation, skin grafting (secondary grafting) is performed. To close an extensive skin defect, a mesh flap is used, which increases by 5-10 times when stretched. When, in addition to the skin, it is necessary to transplant the underlying tissues, a graft on the feeding leg is used (a sharp graft, a migrating Filatov stalk, or a graft with feeding vessels).

6. Materials for self-control. A. Questions :

1. To give a general description of the main historical stages of formation and development Combustiology .
- 2 . Give the definition of burns.
- 3 . Classification of burns.
- 4 . Define the burn disease .
- 5 . Periods of burn disease .
6. Extent of burn shock .
7. The volume of first aid for burns .
8. Treatment of burn disease .
9. The phases of wound healing flow of burn wounds.
- 10 . Local treatment of burns.
11. Surgical treatment of burns in hospital (Burn Center) .
12. Biomaterial for dermoplastic group .
13. To give a general description of types dermoplastic temporary coatings.

objectives:

1. Determine the area of the burn.
- 2 . Determine the depth of the burn.
- 3 . What are the percentage , according to the rule of nines , is head of an adult .
- 4 . Calculate the required amount of liquid on the Parkland formula .
- 5 . Prepare a set for primary surgical treatment of burn wounds ;
6. list medicines for the topical treatment of burns .

Case Studies :

1. What determines the degree of severity of pain in burn wound ?
- 2 . How are burns 1st degree clinically ?
- 3 . What percentage of the adult human body is ahead?
- 4 . What is the main pathogenetic mechanism of burn shock ?
- 5 . What is characteristic of burn shock .
6. Specify the method of determining the area of the burn clinic .
7. Spend the burn surface treatment of burn shock .
8. Provide first aid to the patient with alkali burns .
9. What are the means to cleanse the wounds of necrosis .
- 10 . What used to dry necrotic eschar .

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

1. In the burn unit patient is delivered , P. , 28 years old, who suffered burns boiling water 2:00 ago on 20 % of the surface area of the body. What period of burn disease of the victim ?

- A. toxemia
- B. shock
- C. shock and toxemia
- D septic
- E. convalescence

2 . In the burn unit patient is delivered , P. , 28 years old, who suffered burns boiling water 2:00 ago. The fired two upper limbs and hip. What is the area of the burn from the victim ?

- A. 55 %
- B. 25%
- C. 27%
- E. 35 %
- D.37%

3 . In the burn unit patient is delivered , P. , 25 years old, who suffered burns a flame to 2:00 , the victim fired two upper limbs and hip circularly circularly . What period of burn disease of the victim ?

- A.Toxemia
- B. shock
- C. shock and toxemia
- D , septic
- E.convalescence

4 . In the burn center patient appealed . Flame burn received 5 days ago , did not apply for medical aid , was treated independently. The patient fired left and right shin

circularly epidemis missing dermis nezhiznesposobnaya.Nasmork , nausea , chills, fever.
What period of burn disease of the victim ?

- A. Toxemia
- B. shock
- C.shock and toxemia
- D , septic
- E. convalescence

5 . In the burn unit delivered to the victim V., 28, with burns of the trunk and lower extremities. Injured three weeks ago , was treated at CRH. What period of burn disease of the victim ?

- A.Toxemia
- B. shock
- C. shock and toxemia
- D , septic
- E.convalescence

6. In the burn unit delivered to the victim V., 28, with burns of the trunk and lower extremities circularly . Injured three weeks ago , was treated at CRH. What percentage of burns victim ?

- A. 20%
- B. 30 %
- C.36 %
- D. 45%
- E. 72 %

7. In the burn unit delivered to the injured with burns on 30 % of the surface area of the body. Trauma got 2 an hour ago . What kind of therapy should appoint ?

- A detoxifying
- B. anty-shok
- S. hemostatic
- C. antibacterial
- D. desensebilisation

8.B burn center of CRH brought a patient with a burn on the thigh area 5 % , injured 5 days ago in flames. Complaints of pain in wounds , temperature - 39 C0 perifocal of wounds. What kind of therapy should be assigned ?

- A. analgesic and anti shock
- B. detoxifying and hemostatic
- c. analgesic and desensitization
- D. detoxifying and antibacterial
- E. hemostatic .

9. In the burn center of CRH brought a patient with a burn on the thigh area 5 % , injured 5 days volume flame. Complaints of pain in wounds , temperature - 39 C0 perifocal of wounds. What are the means for the local treatment of wounds appropriate to have ?

- A. region of 5% of wounds treated with tincture of iodine + aseptic bandage
- B. wound treated with a solution of hydrogen peroxide 3% + aseptic bandage
- C. necrotic funds - 40 % salicylic acid
- D. wound-healing agents - actovegin , solcoseryl
- E. hyperosmolar antiseptic ointment - miramistin , oflokain .

10 . A patient 48 years old flame burn both hands , the palms and the back of the hands are peeling and blistering epidermis filled with serous fluid . Forearms are not affected . What is the most reliable diagnosis ?

- A. Thermal burn Brush 1 - 2 degree
- B. Thermal burn brush degree 3b
- C. Thermal burn brush 2 - degree 3a
- D. Thermal burn brush 1 degree p
- E. Thermal burn brush 4 degree

11. Burn disease with chemical burns with a few exceptions :

- A. occurs in burns 1- 3st
- B. occurs in chemical burns of the esophagus and the stomach
- C. does not arise
- D. occurs in burns heavy metal salts

12. First aid for chemical burns of the esophagus and stomach :

- A. Multiple careful washing with water through a tube
- B. reception deep into " mash " , which consists of hydrocortisone
- C. bougieurage esophagus
- D. A converters lavage through a tube

Case studies for emerging knowledge

1. In the burn center has addressed a patient who received a pin burn motorcycle exhaust pipes . Injury was 10 days ago . The wound in the leg in a dry , unresponsiveness necrotic eschar on the area of 1%. What are the means for the local treatment should be applied ?

2 . Emergency medical doctor who examined the child age 5 months , two hours after the injury, diagnosed: thermal burn boiling water II-III degree of the lower extremities , perineum , back to 20 (, second degree burn shock . How will the amount of first aid?

3 . Parents are a child of 5 years to a doctor clinic with a diagnosis of burn back the I-II degree of up to 6 % of the first degree burn thigh to 5%. The child's condition of moderate severity. Which tactic is to elect a doctor?

4 . Chemical plant worker , working with corrosive , inadvertently poured it on his clothing , get a chemical burn right thigh and lower leg . After removing the clothes found: on the anterior surface of the inner right thigh , anterior surface of the right leg with the transition to the rear of the foot portions yellow - gray , sometimes snatches epidermis . Tactile and pain hypoesthesia affected skin . Where to start first aid to the victim ?

5 . Patient S. , 68 years old , she turned to a local doctor with complaints of pain and the presence of bubbles in the area of the left knee, which appeared after applying a compress with some solution. After inspecting the patient diagnosed as a chemical burn II - III degree . 2% cross section of the knee. What is the most purposeful organization - therapeutic tactics for this patient?

6. At the scene of the fire you inspected the affected male 36 years. Consciousness darkened , bloated face and hands , nose and lips burned . Breathing shallow , periodically marked cough, expectoration of sputum mixed with ashes . Your diagnosis ?

7. Pupil during a lesson of chemistry accidentally broke the flask with sulfuric acid. Urgent measures ?

8. In the burn center patient appealed A., 20 years old, who received a flame burn for 15 % of the surface area of the body II-III degree , the injury to 2:00 . For medical aid did not address patient complains of pain in wounds , runny nose , chills , nausea , lack of urine. What is the treatment for it is expedient to appoint ?

9. On examination, the patient in the emergency department burn center revealed that the patient dressings on wounds, pus- soaked blue- green color. What antiseptics should be applied ?

10.The clinic patient appealed to burn right forearm II degree, the area burned 1%. The patient was conducted toilet burn surface with a solution of furacillinum 1:5000. What antiseptic should be applied for the topical treatment of this patient ?

11. The patient was 42 years of burn injury fire at the plant. The victim complains of a burning pain in the left upper extremity. On examination, the skin of his left hand from the wrist to the shoulder hyperemia , numerous bubbles of clear liquid . Where it is necessary to send the victim for treatment?

12. In the burn center patient appealed P., 45, with burns boiling water right hand , which was 3 days ago . The bandage was soaked thick purulent discharge . Which tools should be used ?

7. References:

General:

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8. The distribution points are awarded to students:

At mastering topic number 19 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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