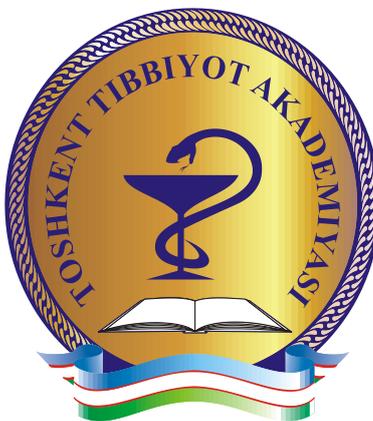


**MINISTRY OF PUBLIC HEALTH OF THE REPUBLIC OF UZBEKISTAN**

**TASHKENT MEDICAL ACADEMY**

**DEPARTMENT OF EYE DISEASES**



**CASE – TECHNOLOGY**

**On subject of the course «The Diseases of the Cornea»**

**Department «Eye diseases»**

***CASE solves the problem, what is the approach of the general practitioner to the patients with keratitis***

**Educational-methodical recommendations for students**

**TASHKENT - 2013**

**MINISTRY OF PUBLIC HEALTH OF THE REPUBLIC OF UZBEKISTAN**  
**TASHKENT MEDICAL ACADEMY**

**«Approve»**

**Vice rector for academic affairs**

**prof. \_\_\_\_\_ Tashaev O.R.**

**«\_\_\_\_» \_\_\_\_\_ 2013**



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Reviewed and approved at the educational methodical meeting of the department of eye diseases dated on « 28» february. Protocol № 12.

## Pedagogical annotation

**The course of study:** «Eye diseases»

**The subject:** «The Diseases of the Cornea»

**The aim of the present case:** deepening and extending the knowledge of the causes of diseases associated with the diseases of the cornea. Developing the ability to assess and analyze the situation at admission of patients with the keratitis. Skills and abilities of choosing tactics of diagnosis, emergency care.

**Expected results from the course** – according to the results of case, the students get the skills of:

- ✓ assessing and analyzing the situation in diseases of the cornea
- ✓ selecting the correct actions of the algorithm for diagnosis
- ✓ developing the logic thinking
- ✓ taking a reasoned decisions in diseases of the cornea
- ✓ independent emergency
- ✓ sending to a hospital for further examination and treatment

**For successful solution of the present case** a student must know

- the main causes of diseases of the cornea.
- the causes of the genesis of diseases of the cornea.
- differential diagnosis of diseases of the cornea with other diseases.
- methods of diagnosis, formulation and justification of the survey on the level of rural medical center and central regional hospital.

**The present case reflect the real situation of primary level**

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### **Case characteristics according to the typological criteria.**

The present case is classified as a desk, a plot. It is short, structured. This case is a question, a task.

**According to the didactic purpose, the case** is training, stimulating thinking in real situation in the condition of rural medical center and urban medical center.

**Case can be used in:** Ophthalmology, Infection, Emergency conditions.

## CASE I

### «Diseases of the cornea»

#### Introduction

The problem of diagnosis and subsequent treatment of the cornea is important for general practitioners, who are constantly faced with the need to give a diagnosis and determine the further tactics and treatment of patients with such complaints.

Patients with serious pathologies such as keratitis, it is necessary to give first medical aid by family doctor or divisional therapist who can further send the patients to an ophthalmologist for consultation.

Thus, the relevance of the diseases of cornea justifies the need to know their causes, timely diagnosis, emergency care in conditions of rural medical center and central regional hospital and hospitalization.

**The aim** of the present case is to develop the users of the case, the student's abilities of analyzing the situation at corneal syndrome. Skills and abilities of choosing tactics of diagnosis, emergency care.

Decision of the supposed case allow the students to reach the following **study results**:

- ✓ To develop the ability of assessing and analyzing the situation in the diseases of cornea.
- ✓ To practice the skills of selecting the correct actions of the algorithm for diagnosis.
- ✓ To master the skills necessary for emergency
- ✓ To develop the logic thinking
- ✓ To take a reasoned decisions in "red-eye" syndrome without reducing visual acuity
- ✓ To overtake the skills of independent taking decision at present situation (treatment or sending to a hospital for further examination).

**Situation:** A patient of 43 years, 3 days ago he suffered from a sore throat with a high body temperature, and after 2 days he was started to bother photophobia, tearing, redness and pain in the right eye. He did not take treatment. Visual acuity was 0.6.

Total blood test	<ul style="list-style-type: none"><li>• Haemoglobins – 142 g/l;</li><li>• Erythrocytes – <math>4-5 \times 10^{12}/l</math>;</li><li>• Leukocytes – <math>11,2 \times 10^9/l</math>;</li><li>• Erythrocyte Sedimentation Rate (ESR) – 25mm/h.</li></ul>
Total urine analysis	<ul style="list-style-type: none"><li>• Quantity – 130 ml;</li><li>• Color – pale-yellow;</li><li>• Relative density of urine – 1016;</li><li>• Transparency – transparent;</li><li>• Reaction – acid;</li><li>• Protein –abs;</li><li>• Bile pigments – negative;</li><li>• Epithelium – 2-3 in visual field;</li><li>• Leukocytes – 3-4.</li></ul>

### The data of the instrumental survey

External examination of the eye by the side lighting	<p><b>OD</b> - blepharospasm, lacrimation, photophobia. Eye is moderately annoyed. Mixed injection vessels sclera is noted. There are many dotted infiltrates of grey color on the epithelial layer of the cornea. Corneal sensitivity is reduced. The anterior chamber is in medium depth. Iris color and pattern has not changed. Pupil d = 2,5 mm, is round, reaction to light is alive.</p> <p><b>OS</b> - calm. Environment is transparent. Visual acuity = 1.0</p>
Ophthalmoscope	<p><b>OD</b> – is not ophthalmoscopied through clouded cornea.</p> <p><b>OS</b> – fundus of the eye is within the age norm.</p>
Intraocular pressure	Intraocular pressure = T = N

### Questions and tasks

1. Put the diagnosis and justify it?
2. How do you think, which pathologies are to be taken with differential diagnosis?
3. What kind of research is necessary and possible to make in a given situation in the conditions of rural medical center and central regional hospital?
4. What is your tactics at the time of the situation?
5. What are the possible complications?

**Tasks:** On the basis of the patient's condition, it is needed to make a preliminary diagnosis, to make necessary methods of diagnosis, to take reasoned decision for further management of patients with the diseases of the cornea.

## **Educational and methodological material:**

### **The diseases of the cornea.**

#### ***Anatomy of the cornea***

A normal cornea: transparent (specular), shiny, spherical, is shaped of a certain value (horizontal meridian 11-12 mm, vertical meridian 10-11 mm, thickness at the center of 0.4 - 0.1 mm, on the periphery of 0.8 - 1.0), without vascular, highly sensitive.

Layers of the cornea (5):

- stratified squamous neuroepithelium
- front plate boundary (Bowman's membrane)
- corneal stroma
- endothelium (Descemet's membrane)
- endothelium

#### **Corneal syndrome is:**

1. Subjectively - foreign body sensation, lacrimation, photophobia, blepharospasm may be provided.
2. Objective: pericorneal injection.

#### **Clinic and classification of keratitis.**

The cornea is the most important optical structures of the eye. Since the cornea is located in an open eye slit, it is most exposed to light, heat, bacteria, foreign bodies, so there may arise a variety of morphological and functional disorders. Particularly posttraumatic and inflammatory pathologies of the cornea are unfavorable, as they are often not strictly isolated as a result of community blood supply and innervation of the cornea and other parts of the eye.

*Keratitis* is about 0.5% of the eye disease, but because of the evident residual opacity it often leads to the reduction of vision (up to 20% cases of blindness and low vision).

Leading sign of keratitis - the presence of an inflammatory infiltrate in the different parts of the cornea. It is characterized by diverse shapes, sizes, different depth, color, sensitivity, vascularization. The cardinal symptoms of keratitis are photophobia, blepharospasm, lacrimation, foreign body sensation in the eye (debris), pain, and pericorneal injection. Due to the fact that the inflammation of the cornea is characterized by loss of transparency, there is a varying degree of reduced vision. Color of infiltrates depends on their cellular composition. So with a small number of white cells, the infiltrates are gray, with the increase of purulent infiltration of corneal opacity it becomes yellowish, and after its disappearance – it will have whitish hue. Fresh infiltrates have vague boundaries, and in the process of reverse development - clearer. At superficial keratitis, the epithelium in infiltration is destroyed, exfoliated and fret. Deep infiltration can also be ulcerated. Most often, in the field of corneal infiltrates limb are fitted or they grow into superficial or deep vessels. Superficial vessels have a bright red color. They are tree-like branch and anastomose. Deep vessels penetrate into the thickness of the cornea and sclera of episcleritis. They are less painted, look like brushes, as well as a straight course. The most common outcome of keratitis - corneal opacity. It is caused by degeneration of its deep connective tissue structures and, as a rule, is not exposed to the complete regression.

#### **Here are the etiological classification of keratitis:**

1. Bacterial keratitis
  - a) staphylo-, pneumo-, diplo-, streptococcal keratitis
  - b) tuberculous keratitis
  - c) syphilitic keratitis
  - d) malarial, brucellosis and other keratitis.

2. Viral keratitis
  - a) adenoviral keratitis
  - b) herpetic keratitis
  - c) measles, smallpox and other keratitis
3. Infectious (toxic) - allergic keratitis
  - a) phlyctenular (Scrofulous) keratitis
  - b) allergic keratitis – polynosis
4. Metabolic keratitis
  - a) amino acid (protein) keratitis
  - b) avitaminotic keratitis
5. Other
  - a) mycotic keratitis
  - b) neuroparalytic keratitis
  - c) posttraumatic keratitis

### **Bacterial keratitis.**

**Corneal ulcer serpens** (Ulcus serpens). The disease is characterized by severe incisive pains in the eyes, lacrimation and suppuration, photophobia, blepharospasm, it is expressed by a mixed injection and chemosis, infiltration in the cornea has a greyish-yellowish color. On the first day it breaks, resulting in a disk-shaped ulcer with purulent crater bottom, one edge of the ulcer - is regressive, smooth, the other – is progressive, saped, yellow, this place is always marked diffuse opacities and infiltration of the cornea. Progressive edge is growing rapidly, and within a few days ulcer blocks most of the cornea. Vessels to the ulcer is not suitable, there is increasing pain in the eye, iris color is yellow-green, the pupil receives an irregular shape because of powerful rear adhesions. Hypopyon of yellow color and liquid consistency, composed of fibrin and leukocytes is formed at the bottom of the anterior chamber. Lysis of the cornea and its perforation might be started. If the infection through perforated hole is got into the eye, then panofthalmit will be developed. Corneal ulcer **treatment** consists primarily of general and local application of shock doses of antibiotics and sulfanilamides. One should immediately eliminate the pain in the eye by dropping of anesthetics, better than 2% solution of novocaine, every hour. Antibacterial, neurotrophic, regenerative and other drugs in the form of drops and ointment are administered into the conjunctival sac before subsiding process. Prior to instillation of the eyes they are pre-washed with weak solutions of disinfectants. Simultaneously vitamin drops mydriatic drugs are used. With the rapid course of the process, when there is a danger of perforation of the cornea, cryogenic and diathermocoagulation progressive edge, paracentesis and anterior chamber lavage broad-spectrum antibiotics are provided, with pain does not subside in the eye appoint parabolbar procaine blockade. Salicylates antisensitizers are applied internally. At recovery a resorbable therapy (dionin, lidaza, etc.) in the form of drops and electrophoresis are provided. Hormones and enzymes in the active stage of the disease are contraindicated, and they are useful in the regeneration stage. Subsequently, leukoma can be eliminated by keratoplasty or keratoprosthesis.

*Tuberculous keratitis.* Hematogenous metastatic keratitis are included into tuberculous keratitis. Clinically there are two main forms of tuberculous keratitis - a deep diffuse and limited keratitis. Usually one eye is affected. Diagnosis is based on clinical and laboratory data and information about previous illnesses.

*Deep diffuse keratitis* (keratitis profundus diffuses) shows a mixed vascular injection of the eyeball with a predominance pericorneal, low photophobia and lacrimation. The cornea looks polymorphonuclear diffusely cloudy. In the depths of the corneal clouding, the infiltrates of different sizes in grayish-yellow are seen. In the field of the limb, newly formed vessels is extended to these infiltrates. On the corneal endothelium the grayish-yellow precipitates are revealed. The course of the disease is long, marked by remission. Corneal opacities are not inclined to enlightenment. Vision is significantly reduced.

*Deep limited (sclerosing) keratitis* (keratitis profundus circumscriptus) is developed with symptoms of eye irritation. A sector-shaped area of marked hyperemia and edema is appeared more often in the outer half of the sclera near the limb. Single or multiple infiltrates of gray-white become to spread from this sector into the medium and deep layers of the cornea. Epithelium was elevated over them and "stud." Corneal vascularization initially is lightly expressed. Course of the disease is long, relapses are provided. Diffuse, whitish "tongue-shaped" corneal opacity, localized at the limbus are remained on site of infiltration. Adjacent sclera has slate-gray color, and thinned.

Treatment of metastatic tuberculosis keratitis is held by oculist with TB specialist. It includes general and specific topical antibacterial and antisensitizers in combination with a complex of B vitamins. a high-calorie diet with restriction of carbohydrates and salts is prescribed. Along with the instillation of antibiotics, the use of corticosteroids, mydriatics, salicylates, sulfonamides is recommended. Resorbable therapy is early started to hold. Prognosis is favorable.

*Syphilitic keratitis* (keratitis syphiliticus) can be congenital or acquired. It is very rare, usually developing in congenital syphilis. The process has a parenchymatous nature. Phenomena of inflammation is occurred in the corneal stroma. Children at the age of 5 and older usually get a disease. Keratitis is often one of the symptoms of the triad of Hutchinson.

Three consecutive periods are seen at the clinic of parenchymatous keratitis:

1. Progressive period or period of infiltration, is characterized by the fact that a gray matte opacity is suddenly appeared in limbo. Gradually, opacity is reached the center, and the cornea becomes cloudy as the frosted glass, but ulceration is not occurred. The phenomena of irritation in the beginning are less pronounced with increasing infiltration, photophobia, blepharospasm, lacrimation and pain are appeared. In the process the iris is involved, visual function is greatly disturbed. Infiltration period lasts about 3-4 weeks.
2. In the period of vascularization, blood vessels are begun to grow in the cornea. They are located in the deeper layers, go straight with the air brushes. Sometimes their number is so great that the cornea is like a blind cherry. Vision is greatly reduced. The process is accompanied by iridocyclitis and lasts 6-8 weeks.
3. Regressive period is characterized by a decrease irritation and inflammation subsided. The cornea becomes lighter, vision is restored. This period is lasted for one year.

During syphilitic keratitis both eyes are usually affected.

Diagnosis is based on positive serological reactions (Wasserman, Nonne-Appelt, etc.), as well as five specific clinical features: 1) cyclic, 2) a bilateral lesion, 3) lack of corneal ulceration, and 4) the associated iridocyclitis, 5) restoration of vision.

Acquired syphilitic keratitis is one-sided, a course is lighter and duration is less. Prognosis is favorable.

Treatment of syphilitic keratitis is performed in STI clinics. A specific antibiotic therapy, drugs of mercury, arsenic, etc. is conducted Local treatment is dropping of antibiotics, salicylates, vitamins, cyclophosphamide, atropine. In early stages, corticosteroids in the form of instillation and subconjunctival injections are used. With the subsiding of the process, a resorbable treatment is prescribed.

### **Infectious-allergic keratitis**

*Phlyctenular keratitis* is a result of tuberculosis intoxication. Phlyctena is a substrate of non-specific inflammation, there is no pathogen. It is composed of epithelioid, lymphoid and giant cells, resembling papule. Bubble under the influence of proliferative processes is transformed into a knot. There are several types phlyctenular keratitis: phlyctenular superficial, deep infiltrated, fascicular, pannus, necrotic.

Predominantly a *fascicular keratitis* or "wandering" phlyctena was found. This forms the boundary infiltration with progressive edge, facing the center. Infiltration is spread, accompanied by blood vessels, resembling a comet. The process is accompanied by severe corneal syndrome and increased sensitivity of the cornea. The disease is seasonal, lasting 1-2 months. Treatment is

aimed at eliminating allergic reactions and desensitization. General treatment in TB specialist (streptomycin, ftivazid etc.).

### **Viral keratitis**

Ophthalmoherpes is central to other viral diseases of the eye on the frequency of prevalence and severity of outcomes. The first generalization of the frequency of herpesvirus prevalence of eye diseases and comparison with the epidemiological research in other countries has assumption – pose that the number of patients with ophthalmic approximately 400-500 thousand a year.

In recent years, the attention of researchers aimed at studying heavy ophthalmic, often recurrent, often resulting in a significant loss of vision and blindness. These studies have identified a number of causal factors and consistent heavy flow, improve the etiologic diagnosis and more effective treatment, both by expanding the arsenal of antiviral drugs, and by the active use of means and methods of pathogenetic therapy.

It is known that the herpes simplex virus (herpes simplex) is one of the filter, neurodermotropic viruses that are present in the human body from an early age, getting contact-household and airborne. Infection with herpes viruses can be judged by a high titer of specific antibodies. Usually, the majority of children are born with antibodies due to the high content of their mothers. In the first six months of life, they disappear, which causes the greatest sensitivity to the virus. Almost all adults are healthy carriers of the virus and are always sources of infection.

Activation of the virus and reduce the body's resistance is influenced by factors such as fever in various infections, cool, emotional stress, vaccination, overheating, ultraviolet irradiation, neuroendocrine changes, etc.

The disease often has the character of a system of destruction: the skin, mucous membrane, the central and peripheral nervous system, liver and eyes. Herpetic keratitis is a manifestation of neural infections in the eye of the properties of the virus and the reactivity of the patient.

In connection with the polymorphism of clinical manifestations of herpes infections of the eye have been developed different classifications of the disease. Is the most appropriate classification of YF Maychuk (1973-1980).

According to this classification are distinguished: primary herpes in which the body no antibodies to this virus and herpes postprimary when infection has already occurred and formed a number of antibodies.

It is clinically distinguished:

*Vesicular keratitis.* In this form of the cornea in any department because of its epithelium detachment serous fluid appear single or multiple proliferate gray bubbles. They eventually burst, forming ulcers. Corneal sensitivity is reduced. Epithelial regeneration is slow, due to violation of the trophic. If the process involves the anterior limiting membrane, after keratitis is corneal opacity.

*Dendritic keratitis.* This form occurs primarily in the form of epithelial keratitis, but usually extends deep into the stroma. The spread of the infiltrate, usually along the nerve trunks. In the process involves the choroid, precipitates, usually small, are perifocal respectively pathological process in the cornea (often precipitates location creates a picture tree form, exactly matching the infiltration in the surface layers). In half of cases are reported from the folds of Descemet's membrane. If the process is spreading in the stroma of the cornea, at the same time captures most of the surface, creating a picture of a geographical map, the so-called *chart-forming keratitis*. Just as a tree with the defeat of the stroma, this form of the disease is a profound and accompanied by varying degrees of involvement in the pathological process of vascular tract. **Chart-forming keratitis**, because of the significant sites deepitelizirovannyh cornea more susceptible to other forms of complications such as secondary bacterial or fungal infection. Both forms of the disease accompanied by pain, blepharospasm, especially when joining trigeminalgia. At the same time, these forms of the disease the most easy-to-diagnose. Their characteristic changes in the surface layers of the cornea are unique to ophthalmic.

*Stromal keratitis* are of 3 types. One of the most characteristic - disciform keratitis. Deep infiltration, gave the name of the disease is formed, usually in the center of the cornea in the

form of a disc. Sometimes, in the surface layers, respectively disk observed roughness or "stud" epithelium or small bubbles in the form of its detachment. The disk can be located paracentral, the disease can occur atypically.

In addition to disc-to stromal keratitis include: *focal* and *diffuse* to form preferentially localized focus in the deep layers or marked diffuse infiltration throughout the stroma. Of paramount importance is the state of the surface layers of the epithelium. Distinguish stromal keratitis with or without ulceration.

Stromal herpetic keratitis almost always accompanied by iritis or iridocyclitis.

*Herpetic corneal ulcer* often develops from the superficial keratitis tree propagation process in the deeper layers, but can be fatal and any other form of ophthalmic at the wrong medication or for other reasons.

An ulcer is characterized by sluggish and prolonged course, the pain is very rare, the disease is very serious. Despite treatment can be complications in the form of descemetocoele.

*Herpetic keratouveitis* - a form of the disease, in which there is the phenomenon of keratitis, but dominated by changes in the vascular tract. A characteristic feature of this form of ophthalmic is an infiltration in the stroma of the cornea are in different layers and different sizes can be ulceration in the surface layers of the cornea, Descemet's membrane folds - precipitates exudate in the anterior chamber, neovascularization in the iris, posterior synechiae. Perhaps the development of bullous, keratopathy, increased intraocular pressure. In the long developed superficial and deep vascularization horn, possible complications of cataract.

Orientation ophthalmic therapy involves the following effects:

1. In defense of the virus has not damaged tissues.
2. On tissue damaged by a virus.
3. On the accompanying inflammation.
4. On collagen necrosis seeks cornea.
5. Scars on damaged tissue.
6. The specific protective factors.
7. The factors of nonspecific resistance.

The choice of treatment is determined by a complex clinical form and stage with the previous treatment, the general condition of the body and the presence of concomitant disease.

After the introduction into clinical practice idokouridina (IDU) worldwide intensive research of the antiviral activity of various drugs, which resulted in chemotherapy, in addition to the interferon inducers interferon-forming and specific vaccines and immune gamma globulin, stood out in the direction of antiviral therapy on eye diseases.

Studies the authors noted the therapeutic efficacy of adenine arabinoside (ARA-A), 5-bromuridina and also oksolina, tebrofena, florenalja, gossypol.

The authors have developed new ophthalmic antiviral drug florenalja: eye drops long-acting (on polyacrylamide and Poliglyukin), and a solution for subconjunctival injection. With 1% solution of polyacrylamide proposed as drug base was interferon inducer and effective drug in the treatment of herpeovirus with chronic and phenomena epiteliopathy cornea.

Significant progress in the treatment of ophthalmic related to the clinical use of highly concentrated preparations of leukocyte interferon and its inducers. Interferonogen use for the treatment of the most severe forms of herpetic keratitis has a pronounced advantage over the treatment of antiviral chemotherapy (IDU oksolina, tebrofen, bonafton etc.).

The positive therapeutic effect was observed with intramuscular prodgjozana 50-100 mg 1 time in 3 days, at a dose pyrogenal 50-100 ug / ml for the scheme.

Antiherpetic vaccine use in treatment of patients with severe forms of herpetic keratitis was ineffective. At the same time, the author was a high vaccine efficacy in the prevention of recurrence of ophthalmic.

The successful application in the treatment of ophthalmoherpes physical methods are found: X-ray therapy, ultrasound, diadynamic, medicaments  $\bar{\cup}$  venous electrophoresis, phonophoresis.

Positive effect on the course of severe herpetic keratitis marked with magnetic therapy. An alternating magnetic field significantly reduces pain and photophobia, improves trophic cornea. The development of microsurgical techniques has expanded the indications for early implementation of therapeutic keratoplasty, contributing to its radical and effective.

Over the past years the tendency of complex use of antiviral therapy and mikrohirurical methods.

This is due to the benefits and efficacy of a number of new microsurgical techniques compared to traditional methods (thermocoagulation, mechanical scraping, etc.).

### **Exchange and other keratitis**

*Avitaminotic keratitis.* In this case, the observed changes of the skin, mucous membranes and eyes. Occurs when a severe gastrointestinal disease, lung disease, sepsis, etc. The disease begins with prexerosis when disappears layer tears in the eye slit. Appears matte and dull corneal surface haze.

Epithelial xerosis at which stage the semilunar in dry patches, exfoliates the corneal epithelium (hyperkeratosis). In this case, there is a lack of vitamins PP, B1, B2. eye drops. Treatment consists of treating the underlying disease, the general and local administration of vitamins. Weather favorable.

*Fungal keratitis* or keratomycosis resemble indolent chronic keratoconjunctivitis with scanty discharge. Diagnosis is based on the detection of fungi laboratory methods. Such subacute keratitis occur with mild corneal syndrome. In the cornea reveal gray-whitish filamentous or crumby loosely dry infiltration with smooth contours but with yellowish perifokal zone. The course is long, stubborn. Symptomatic treatment and medical antimycosis (amfoteratsin, trihomitsin) prescribe Nistatin, sulfa drugs, zinc with resorcinol. Mechanotherapy is hold followed cauterization ether alcoholic solution of brilliant green, priotherapy etc.

## **II. Guidelines for the students**

### **2.1 Problem:**

The choice of approach and determination of need for hospitalization of patients with the diseases of the cornea in rural medical center and urban medical centers.

### **2.2. Sub-problem**

1. Analysis of the appearance
2. Analysis of the history and pre-event which is an etiological factor in the development of the diseases of the cornea
  3. Analysis of the examination
  4. Selection of the required methods of diagnostics
  5. Correlation of the results and making a differential diagnosis
  6. Coming into a solution of the problem in rural and urban medical centers

### **2.3. Algorithm of the solution**

1. Analysis of the appearance includes the following surveys:
  - examination of the face and the skin of the eyelids
  - examination of the eyeball
2. The analysis of the anamnesis
  - family and social history
  - ophthalmologic status
  - duration and nature of pains
    3. Analysis of the examination
      - external examination of the eye
      - visometry
      - biomicroscopy
      - inspection by the lateral illumination
      - inspection by the passing rays

- Ophthalmoscopy
- 4. Choosing the correct methods of laboratory diagnosis
  - Complete blood count
  - Complete urinalysis
- 5. Correlation of the results and making a differential diagnosis with other diseases included in the diseases of the cornea.
- 6. Coming to a solution of problems in rural and urban medical centers
  - emergency action
  - treatment if necessary
  - emergency hospitalization

### **Instructions to work independently on analyzing and solving the practical situation**

#### **Sheet on analyzing the situation**

<b>Stages of work</b>	<b>Recommendations and advices</b>
1. Introduction with the case	First, look through the case <ul style="list-style-type: none"> <li>• While reading do not try to analyze the situation</li> </ul>
2. Introduction with the given situation	Read an instruction once more, select the paragraphs that seemed important to you.  Try to describe the situation. Determine that it is important and what is secondary.
3. Identification, formulation and justification of the key problems and sub-problems	Problem:  The choice of approach and determination of need for hospitalization of patients with the keratitis in rural medical center and urban medical centers.
4. Diagnostic analysis of the situation	<b>By analyzing please reply to the following questions:</b> <ul style="list-style-type: none"> <li>• What is the ocular pathology, accompanied by corneal syndrome?</li> <li>• What nosologies need to make a differential diagnosis? Give a comparative description</li> <li>• Determine the most probable cause of the diseases of the cornea.</li> <li>• What are the diagnostic methods must be applied, make a plan and justify a survey on the level of rural medical center and central regional hospital.</li> <li>• Identify the approach to further management of patients with the diseases of the cornea.</li> </ul>
5. Selection and justification of the ways and means to solve the problems	List all the possible ways of solving this problem in this situation
6. Development and	Put the diagnosis, determine how to solve the problem in terms of urban

resolution of the problem situation	and rural medical centers
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**Table assessment of individual work with case**

Participants	Criteria and indicator of assessing				
	Analysis of the current situation max 1,0	Justification of the problem max 0,5	Choice of the ways and means of solving the problem max 0,5	The detailed design of measures to implement solutions max 0,5	Total scores (max 2,5)*
1.					
2.					

\* 2,0 – 2,5 scores – «excellent», 1,5 – 2,0 scores – «good»,

1,0 – 1,5 scores – «satisfactory»,

less than 1,0 score – «not satisfactory»

**The system of assessment of options to address the group.** Each team receives two points of evaluation. It can give them all at once to one embodiment of a decision or divided into two (1:1 0,5:1,5, etc.), not including an assessment of its own variant of the solution.

1. All the scores for each alternative solution are added. The winner is the solution with the highest number of points. In controversial cases, you can take a vote.

**Table assess of the options to address the group, the score**

Group	Alternatives to solve the problem			
	1	2	3	№
1.				
2.				
Amount				

**Assessment of presentation of the proposed solutions**

Group	Completeness and clarity of presentation (1 – 20)	Visibility provided by the presentation (1 – 20)	The involvement and activity of members of the group (1 – 20)	The originality of the proposed solutions (1 – 20)	Eligibility for legal standards (1 – 20)	Total amount of scores (max 100)
1.						
2.						

### VARIANT III. SOLUTION OF THE CASE BY TEACHER - CASEOLOGIST

1. Put the diagnosis and justify it?
2. How do you think, which pathologies are to be taken with differential diagnosis?
3. What kind of research is necessary and possible to make in a given situation in the conditions of rural medical center and central regional hospital?
4. What is your tactics at the time of the situation?
5. What are the possible complications?

1. Based on the complaints: lacrimation, photophobia.

Based on history: acute illness is begun, against the disease. Based on objective clinical data - instrumental studies: blepharospasm, tearing, photophobia. Eye is moderately annoyed. Mixed injection of vessels sclera is noted. On the cornea at the epithelial layer there are many dotted infiltrates in grey color. Corneal sensitivity is reduced. The anterior chamber is of medium depth. Iris color and pattern has not changed. Pupil d = 2,5 mm, round, reaction to light is alive.

- Complete blood count:
  - Hemoglobin - 142 g / l;
  - Red blood cells -  $4-5 \times 10^{12} / L$ ;
  - White blood cells -  $11.2 \times 10^9 / L$ ;
- ESR - 25 mm / h

**A preliminary diagnosis** is fixed: OD Shaped herpetic keratitis.

2. Differential diagnosis should be done with the following ophthalmopathology: conjunctivitis, bacterial keratitis, iridocyclitis.

**Table of differential diagnosis**

Symptoms	Conjunctivitis	Keratitis	Iridocyclitis

Photophobia	+	+	+
Lacrimation	+	+	+
Injection	Superficial	Deep (mixed)	Deep (mixed)
Blepharospasm	+	+	+
Cornea	Transparent, sensitive, specular	Edematic, there are infiltrates, sensitivity is possibly reduced	Edematic, there are precipitates
Anterior Chamber	Of medium depth, liquid is transparent	Of medium depth, liquid is transparent	Of medium depth, liquid is turbid - hypopyon
Iris	Picture & color is not changed	Picture & color is not changed	Color is changed, picture is inked
Pupil	Round, black, reaction to the light is vital	Round, black, reaction to the light is vital	Form is changed because of synechia, black, reaction to the light is flabby

**3. The followings are important surveys at rural medical centers:**

- A. Complete blood count
- B. Complete urinalysis
- C. Visometry
- D. Inspection of the eyeball by side illumination
- E. Determination of the sensitivity of the cornea
- F. Ophthalmoscope
- G. Palpator determination of intraocular pressure.

The followings are important surveys **at central regional hospitals:**

- A. Biomicroscopy
- B.

4. Locally: Okuferron eye drops by 2 drops for 5 times a day, Midriacil by 1 drop for 2 times a day, Zovirax eye ointment 3% for 4 times a day; internally: Voltaren tablets by 1 tablet for 1 time a day after eating. Urgent consultation of ophthalmologist;

5. The following complications of herpetic keratitis: iridocyclitis, endophthalmitis, panophthalmitis.

## 6. IV. Case-technology of study on practice

### 4.1 Model of study technology

Subject	The diseases of the cornea
Number of hours – 2 hours	Number of pupils: 10 persons
Form of training session	- Exercise to broaden and deepen the knowledge, skills working out the tactics of patients with the diseases of the cornea
Plan of practical studt	<ol style="list-style-type: none"> <li>1. Introduction to the training session</li> <li>2. Updating of knowledge</li> <li>3. Working with the case in mini - groups</li> <li>4. Presentation of the results</li> <li>5. Implementation of practical skills</li> <li>6. Discussion, evaluation and selection of the best options strategies</li> <li>7. Conclusion. Evaluation of groups and students, the degree of achievement of educational activities</li> </ol>
The purpose of educational activities: advancing knowledge of tactics of treatment of patients with the diseases of the cornea. Developing the ability to assess, analyze the situation, the choice of tactics, diagnosis, emergency care, efficient transportation of patients with the diseases of the cornea in the primary care level.	
<p>The tasks of the teacher:</p> <ul style="list-style-type: none"> <li>• to consolidate and deepen the knowledge to assess and analyze situations and the general condition of patients with the diseases of the cornea</li> <li>• to develop the ability to select the correct action of the algorithm for diagnosis.</li> <li>• to develop the skills to provide emergency</li> <li>• to develop skills of independent decision-making in the management of patients with the diseases of the cornea in rural and urban medical centers</li> </ul>	<p>Results of study activity:</p> <ul style="list-style-type: none"> <li>• assess and analyze the situation and the general condition of patients with the diseases of the cornea</li> <li>• ability to select actions for diagnosis.</li> <li>• develop skills of independent decision-making in the management of patients with the diseases of the cornea in rural and urban medical centers</li> <li>• produce a sequence of actions for emergency assistance if necessary</li> </ul>
Method of study	Case-stages, discussion, practical method, organizers
Средства обучения	Case, guidelines
Study	Individual, frontal, work in groups

Conditions of study	Audience with the technical equipment adapted for group work
Monitoring and assessment	Seeing a blitz poll presentation mutual assessment, assessment

**Flow chart of educational activities based on the case.**

Stage and content of the work	Activity of	
	Teacher	Students
<b>Preparatory stage</b>	<p>Explains the purpose of case - the stage and its influence on the development of professional knowledge. Distributes materials of the case and presents the algorithm for the analysis of the situation.</p> <p>Gives the task to analyze their own and to place the results in the "List of the situation analysis"</p>	<p>They are listening.</p> <p>They study the contents of the case independently and fill a sheet of the situation individually.</p>
<b>Stage I. Introduction into the training session (10-15 min)</b>	<p>1.1. Referred to the theme session, plan, its purpose, objectives and expected results of training activities.</p> <p>1.2. Introduces the agenda of the lesson and the results of the evaluation criteria (see the instructions for students)</p>	<p>They are listening.</p> <p>They are making necessary notes.</p>
<b>Stage II. Primary 60 min</b>	<p>2.1. Justifies the statement of the problem and the choice of the situation - relevance. Conducts blitz-poll in order to enhance students' knowledge on the topic:</p> <ul style="list-style-type: none"> <li>• To list the causes of red eye syndrome without reducing of visual acuity?</li> <li>• What are possible complications of the diseases of the cornea?</li> </ul> <p>2.2. Divides the students into groups. Reminds the content and objectives of the case. Introduces (reminds) the rules of group work and discussion rules.</p> <p>2.3. Gives the task, specify the correct perception of the job:</p> <ul style="list-style-type: none"> <li>• What nosologies need to make a differential</li> </ul>	<p>They reply to the questions, discuss and ask the questions for clarification.</p>

	<p>diagnosis</p> <ul style="list-style-type: none"> <li>• Diagnostic methods used in rural and urban medical centers</li> <li>• Further tactics of GPs of patients with the diseases of the cornea</li> </ul> <p>2.4. Coordinates, advises, manages training activities.</p> <p>Evaluates the results of individual work: Sheets on the analyzing of the situation.</p> <p>2.5. Presentations on the results of the work done by the decision of case study, discussion.</p> <p>Organizer of the discussion: asks the questions, cues, reminds the theoretical material.</p> <p>2.6. Organizer - an algorithm of actions of GPs in a given situation</p> <p>2.7. Tells his/her own version of case study solutions</p>	<p>They are divided into the groups.</p> <p>They discuss, conduct a joint analysis of individual problems, determine the most important aspects of the situation, main problems and their solutions, process the results of decisions</p> <p>They represent solutions to the problem issues 10-15 min after the end of the presentation, choose the best option</p> <p>They develop a unified system, the discussion</p>
<p><b>Stage III.</b> <b>Summarizing studies, analysis and evaluation</b> <b>20 min</b></p>	<p>3.1. Summarizes the results of training activities, announces a joint assessment of individual work.</p> <p>Analyzes and evaluates the group, marks the positive and negative aspects.</p> <p>3.2. Emphasizes the importance of case - the stage and its influence on the development of the future expert</p>	<p>They are listening.</p> <p>They can make self-assessment and mutual assessments</p> <p>They explain their opinions</p>