CONTENTS

PART II. SPECIAL DERMATOLOGY

PART III. VENEREOLOGY

Chapter 3
PRINCIPLES OF DIAGNOSIS OF SKIN DISEASES

After studying the topic, the student should

know:

- algorithm for making a dermatological diagnosis;

be competent in:

- collecting complaints and anamnesis from a dermatological patient;
- examining a patient and determining the elements of the rash;
- describing the local status of a dermatological patient;
- identifying diagnostic phenomena and conducting basic clinical diagnostic tests (dermatographism, Koebner symptoms, Nikolsky's phenomenon, psoriatic triad, and Baltzer's test).

Dermatovenerology is a rare discipline that require knowledge of various branches of medicine, such as pathological physiology, pathological anatomy, microbiology, internal diseases, psychiatry, neurology, infectious diseases, etc.

The human skin is exposed to both exogenous and endogenous factors, and some result in pathological processes in the skin, presenting with various rashes and symptoms.

The most common exogenous factors are mechanical (friction, pressure, etc.), physical (high and low temperatures, radiation, electric current, etc.), chemical (acids, alkalis, lacquers, paints, washing powders, etc.), infectious (microbes, viruses), and parasitic (fungi, mites, fleas, etc.).

Often, skin disease is a manifestation of internal diseases. Among the endogenous factors, various visceral, vascular, endocrine, and nervous diseases, changes in mental status, etc., play an important role. In the development of skin diseases, a change in the immune status is of importance.

Exo- and endogenous factors can provoke the development of a particular disease, i.e., they are trigger factors. Skin pathology may develop against the background of exposure to certain factors and in a genetic predisposition. For example, prolonged exposure to the sun may cause lupus erythematosus. However, insolation does not provoke the disease in all people, but only in those with the genetic predisposition manifesting itself under the influence of an exogenous factor (insolation).

Such an endogenous factor may, for example, be a chronic streptococcal tonsillitis. Therefore, when choosing therapy for a patient, it is necessary to consider all such factors, try to identify foci of chronic infection, and conduct the systemic and local treatment simultaneously. Unfortunately, it is not yet possible to influence the genetic predisposition to the development of a particular disease. Despite the latest diagnostic technologies, the clinical and morphological assessment of changes in the skin and mucous membranes remains the main method of diagnosis. Clinically, the skin diseases form a certain symptom complex comprising subjective (symptoms) and objective (signs) manifestations. Symptoms are of different intensity and perception, manifested by itching, burning, pain, etc. Signs are detected by the physician during the examination of the patient.

To establish the diagnosis, the physician should perform a detailed collection of complaints and the disease history (anamnesis vitae and anamnesis morbi). First, the patient's **complaints** concerning the skin disease are clarified, as well as his subjective sensations: itching, burning, or soreness. In the diagnosis of skin diseases, itching is of particular importance; the physician determines its intensity, fluctuations during the day, and relationship with the time of day. For example, nocturnal itching is characteristic of scabies; with prurigo, the biopsy skin itch is observed, accompanied by deep excoriation. If itching is not associated with primary skin rashes, think about internal diseases; for example, itching can be a sign of diabetes mellitus, liver pathology (with increased levels of transaminases and bilirubin), kidney diseases (with azotemia), malignant neoplasms, etc.

After clarifying the complaints, the anamnesis is clarified.

3.1. THE LIFE HISTORY: ANAMNESIS VITAE

1. Age.
2. Place of residence.
3. Marital status.
4. Occupation.
5. Working and living conditions (occupational hazards).
6. Diseases history and concomitant somatic pathology.
7. Heredity (genetic history).
8. Allergic history.
9. Toxic habits.

The age of the patient helps with the diagnosis. In acne differentiation, acne prevails before the age of 30, and rosacea after 40–50 years. The *place of residence* is important for the diagnosis. For example, leishmaniasis is more common among residents of Central Asia (an endemic area for this disease).

It is necessary to request the *marital status*, in particular, when diagnosing scabies or sexually transmitted diseases, since examination and treatment are

conducted not only for the patient seeking medical help but also for all family members.

The patient's occupation can provoke the development of occupational skin diseases.

The history of diseases and concomitant somatic pathology affect both the disease and further therapy. Diagnosis of diabetes mellitus limits and even precludes for some patients the possibilities of treatment with systemic glucocorticoids (GCs). Hypertension and oncological diseases are contraindications for physiotherapy. In some patients, concomitant pathology determines the diagnosis. Thus, recurrent shingles often marker HIV infection or somatic malignancy, prompting an oncological investigation alongside treatment.

Genetic history is important for the diagnosis of various skin diseases (psoriasis, atopic dermatitis, ichthyosis, etc.)

Allergic history is associated with both the diagnosis and the treatment. If toxicoderma is suspected, a detailed recent drug history is important. Note that some patients do not consider vitamins or analgesics taken for headaches as medications, or dietary supplements that cause toxicoderma. To avoid an allergic reaction to a drug, it is important to discover the allergic history with deep forms of the disease, secondary pyoderma, or venereal diseases requiring antibacterial therapy. Medications may change the disease, leading to an incorrect diagnosis. For example, anti-chlamydia antibiotics before a smear obtaining cause false-negative results of culture.

Bad habits provoke various diseases. Rhinophyma is often observed in alcohol abusers. Drugs (for example, heroin) can trigger autoimmune pemphigus. Alcohol and drugs also lead to a sluggish course and frequent relapses.

History taking includes the timing of the onset of the skin disease and its relationship with provoking factors, seasonality, periodicity, causes of exacerbation, and results of previous therapy.

3.2. THE DISEASE HISTORY: ANAMNESIS MORBI

1. The skin disease duration.
2. Determination of the provoking factor at the first appearance and subsequent exacerbations of the rash.
3. Determination of the primary localization of rashes.
4. Dynamics of the skin process.
5. Season changes of the disease.
6. Frequency of relapses.
7. Previous treatment, its effectiveness and tolerability.

The skin disease duration affects the clinical picture of skin pathology.

It is important to *determine the provoking factor at the first appearance of a rash and at subsequent exacerbations*. The eczema exacerbated in stress urges a psychiatric consultation and additional therapy, and connected with dietary deviations, prompts an explaining the importance of following a hypoallergenic diet to the patient.

If *the disease is seasonal,* the therapeutic tactics may be corrected. Exacerbation of psoriasis in the summer excludes the phototherapy to this patient. Often, the onset and subsequent exacerbations of lupus erythematosus are observed during the peak of sun exposure (in central Russia, from March to the end of July).

Frequent relapses of a skin disease can reflect both the ineffectiveness of the therapy and the immunosuppressive state of the patient.

The previous treatment, its effectiveness and tolerability, determine the future individual therapeutic approach to the patient.

After collecting the anamnesis, the skin and visible mucous membranes are examined carefully, and the local status is described. It is important to examine the entire skin and visible mucous membranes, and not only the areas shown by the patient (patients fix the physician's attention on what is bothering them at the moment).

The examination allows identifying the rash, determining its elements, differentiating the primary rashes on the unchanged skin (primary elements) from the rashes resulted from the further development of the primary elements (secondary elements).

Dermatovenereologists describe the skin and mucosal lesions in a certain sequence.

3.3. LOCAL STATUS: STATUS LOCALIS

First, the origin of the rash is determined: inflammatory or non-inflammatory. The type of rash can be determined by pressing: the inflammatory rash disappears immediately and returns to its original color when pressure is relieved.

Determine the rash quantitatively: abundant, few, solitary lesions, or a single focus.

When localizing the rash, its predominant location is revealed (for some diseases, this is of paramount importance in diagnosis), less affected areas, and places free from rashes.

The symmetry or asymmetry of rashes is noted.

By the primary elements, the rash is divided into monomorph (one type of primary element) or polymorph (several types of primary elements; the "true" polymorphism). If there are several types of secondary rash elements in the skin, the polymorphism is called "false" or "evolutionary".

Describing the rash element, the following characteristics are recorded:

- The size in millimeters or centimeters (or sometimes comparatively: the size of a pinhead, a pea, a grain of lentils, etc.);
- Shape (determined when viewed from the side): flat, hemispherical, or conical;
- Outline of the element (when viewed from above): rounded, oval, polygonal (polygonal), polycyclic, etc.;
- Boundaries: clear (sharply defined), fuzzy (vague);
- Color: various shades of red, brown, yellow, purple, and other components of this color palette are possible;
- The surface of the rash: smooth, shiny, rough, and with additional signs (for example, an umbilical depression in the center);
- Consistency (on palpation): soft, dense, dense-elastic, woody, etc.;
- Mutual arrangement of rashes: disseminated, grouped, prone to fusion with the formation of rings, linear, and other variants.

Ensure the assessment of dermographism.

Note the condition of the visible mucous membranes. If a rash appears on them, it is described with the same parameters.

Examine and describe the condition of the hair and nail plates.

Apparently unchanged, healthy skin reflects both the state of internal organs and skin pathology. The following parameters of healthy skin are evaluated: coloration, turgor, elasticity, sebaceous excretion, perspiration, and subcutaneous fat. The skin can become pallor and yellowish in oncological patients; some skin diseases are paraneoplastic ones, occurring in somatic malignancies. In such cases, an oncological search is necessarily conducted. A decrease in sebum and sweat secretion in patients with atopic dermatitis (AtD) decrease the skin elasticity and turgor. In acne, on the contrary, the skin of the face and neck-collar area glitters and glistens, showing the increased sebaceous excretion and perspiration.

The correct diagnosis is helped by special diagnostic phenomena (scraping, rubbing, vitropression, diascopy, pressure with a probe, lubrication with oil or iodine, etc.) in combination with other methods. For example, the *layer-by-layer scraping of rash elements* (*grattage*) allows identifying a pathognomonic psoriatic triad. With multicolored (bran-like) lichen, iodine test (or Baltzer's test) is conducted *of lubrication of the foci with 5% iodine tincture*; the horny layer loosened by the fungus is colored more intensively than the surrounding skin.

Diascopy (vitropression) is used in the diagnosis of the cutaneous form of tuberculosis: when pressed with a slide on a tubercle, its color becomes yellowish-brownish (the "apple jelly" phenomenon). Other additional research methods are presented in the relevant chapters.

In several diseases, instrumental studies are conducted to clarify the diagnosis using a dermatoscope or a Wood's lamp (fluorescence of lesions in mycoses). Allergic skin tests are used for allergic dermatoses and occupational dermatoses. Skin tests include scarification, intradermal (immediate type hypersensitivity), drip, and application (delayed hypersensitive response) tests.

Microscopy is conducted to detect pathogens (scabies mite, pathogenic fungi, pale treponema, gonococcus, etc.) and Tzanck cells in impression smears with acantholytic pemphigus. For example, to diagnose a smooth skin fungal lesion, scales are taken with a scalpel from the lesion; to diagnose onychomycosis, nail pieces are taken; to diagnose the hair lesion, a piece of hair is treated with alkali (10–30% KOH or NaOH), then transferred to a slide in a drop of glycerin, covered with a cover glass, and microscopied. To detect pale treponemas, tissue fluid from the bottom of a hard chancre is examined in a microscope with a dark-field condenser.

A culture is used to clarify the species of fungi, sexually transmitted infection (STI) pathogens, and in pyoderma, to determine the microflora and its sensitivity to antibiotics.

In skin oncology, cytological studies (impression smears, scarification, etc.), and recently also dermatoscopy, are a necessary addition.

Of the laboratory tests, the most important is pathohistological examination (light and electron microscopy, immunohistochemical studies, etc.) of skin or mucous membrane biopsies taken from the lesions. The choice of the most informative lesion is important. With psoriasis or lichen planus, for example, it is a formed papule or plaque; with true acantholytic pemphigus, an apparently unchanged skin in the upper shoulder girdle is biopsied. The biopsy is performed under local anesthesia after the patient's allergic history check. To get the material, wedge-shaped biopsy with a scalpel or puncture punch biopsy is used. Next, the biopsy material is fixed in 10% Formalin and referred to the pathology laboratory, where, after pouring the material into paraffin, sections are prepared from the biopsies and stained with hematoxylin and eosin. For some skin diseases, additional dyes are used: Van Gieson, toluidine blue, etc.

Direct and indirect immunofluorescence is used to diagnose autoimmune diseases (lupus erythematosus, bullous dermatoses). The test detects fixed autoantibodies characteristic of this pathology in certain structures of the epidermis. Direct immunofluorescence reveals the fixation of immunoglobulins in the skin or mucous membranes. For example, with true acantholytic pemphigus, IgG antibodies are fixed in the intercellular bonding substance of the spinous layer, and with Lever's bullous pemphigoid, they are found on the basement membrane. The indirect immunofluorescence detects antibodies in blood or bubble fluid, but often produces inaccurate results.

In the differential diagnosis of lymphoproliferative diseases (lymphomas, pseudolymphomas), a main method is molecular genetics to determine the clonality of the infiltrate, that should be evaluated always with the clinical, histological, and immunohistochemical studies. Recently, confocal microscopy, a non-invasive diagnostic method, has been increasingly used to assess morphological changes in lesions in dermatoses.

Examination of a patient with a skin disease includes complaints, case history, examination, laboratory tests (hematological, serological, blood chemistry, immunological, etc.), and instrumental examination of the functions of body organs and systems.

A complete blood test, urinalysis, blood chemistry may show a somatic disease provoking the development of dermatosis. Thus, leukopenia (decrease in leukocyte counts) with an increase in ESR in the complete blood count are observed in systemic lupus erythematosus (SLE). With prolonged quinoline treatment of the cutaneous form (SLE), leukopenia is possible without an increase in ESR, and an increase in leukocytes (leukocytosis) along with an increase in ESR indicates an inflammatory reaction. When treating patients with AtD or psoriasis with cyclosporine, one should study the urine and blood creatinine, since this drug causes changes in the kidneys in some patients. Changes in the blood bilirubin, transaminases are often accompanied by itching; such disorders in psoriasis are a contraindication for PUVA therapy.

3.4. GENERAL CLINICAL EXAMINATION

The skin reflects the state of body organs and systems. Some somatic diseases (hypertension, coronary heart disease, neoplastic diseases of internal organs, etc.) contraindicate physiotherapy; therefore, besides the examination by a dermatologist, the patient should be consulted by "narrow" specialists: therapist, gynecologist, endocrinologist, oncologist, etc. The recurrent boils show the need to exclude diabetes mellitus and consult an endocrinologist, chronic angular cheilitis requires consultation with an otolaryngologist; the varicose eczema should be examined by a phlebologist; and pink acne and perioral dermatitis should be additionally examined by a gastroenterologist.

Patients with syphilis should be examined during both early and late syphilis, to exclude damage to the nervous and cardiovascular systems and other body organs and systems.

Skin diseases are characterized by a long and torpid course with frequent and regular relapses, violating a patient's quality of life. Stress often becomes a provoking factor in the disease or its exacerbation. The people surrounding the patient may not reveal his somatic diseases, but the skin diseases cannot

be hidden and provoke various psychogenic reactions in some patients, urging them to consult a psychiatrist.

In the skin diseases, not only the skin should be treated but also body organs and systems.

All the studies help to determine the objective state of the skin and establish the correct diagnosis. A main diagnostic criterion is the analysis of primary and secondary morphological elements, manifesting externally the pathological processes in the skin.