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Interdisciplinary approach to the management of patients with perforating dermatosis (clinical case)

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Keywords: acquired perforating dermatosis, multimorbidity, histological examination, treatment.

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The aim of this work is to describe a clinical case of acquired perforating dermatosis within the context of an interdisciplinary approach to patient management, taking into account a comprehensive therapeutic and dermatological diagnostic and therapeutic algorithm.

Materials and methods. A personal observation is described of a 70-year-old patient with clinical manifestations of acquired perforating dermatosis and multimorbid somatic pathology, the verification of which was carried out taking into account the results of laboratory and instrumental diagnostic methods. The dermatological diagnosis was established based on the morphological assessment of a skin biopsy.

Results. A clinical case of a patient with skin lesions of the trunk and upper extremities is described. Visual manifestations of dermatosis are represented by a papular rash with a central depression, erosions, hyperkeratotic changes, and pronounced itching, which in general mimic a wide range of nosologies: from lichen planus, prurigo to multiple keratoacanthomas. Given such clinical non-specificity of the pathological process on the skin, only morphological diagnostics can contribute to the final verification of the dermatological diagnosis. In addition, an important aspect was the assessment of the patient's somatic status, which revealed the presence of multimorbidity, in particular concomitant cardiovascular pathology, chronic kidney disease, cryptogenic liver cirrhosis, and portal hypertension. The general therapeutic direction of this disease is to compensate for the underlying somatic pathology. That is why, given the clinical complexity of the condition, patients in this category require the mandatory involvement of physicians from related specialties. In this case, the patient requires constant therapeutic support, including in the conditions of an inpatient ward. Given the severe general status of the patient, it was decided, in parallel with the treatment of somatic pathology, to have a rather gentle effect on the efflorescence, only with the use of systemic antihistamines and topical therapy with glucocorticosteroids. The positive dynamics within the skin justify the expediency of continuing the planned comprehensive therapeutic tactics.

Conclusions. Morphological examination is the gold standard for verifying pathological processes in the skin. Considering the rather variable nosologies in the context of multimorbidity in one patient, as well as the clear dependence of the course of dermatosis on somatic pathology, a mandatory stage in the management of such patients is the joint interdisciplinary work of specialists of both dermatological and therapeutic profiles.

Ключові слова: набутий перфоративний дерматоз, мультиморбідність, гістологічне дослідження, лікування.

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Міждисциплінарний підхід до ведення пацієнтів із перфоративним дерматозом (клінічний випадок)

В. А. Візір, Г. І. Макуріна, О. В. Демиденко, Л. О. Городокіна

Мета роботи – описати клінічний випадок набутого перфоративного дерматозу в контексті міждисциплінарного підходу до ведення пацієнтів, враховуючи комплексний терапевтичний і дерматологічний діагностично-лікувальний алгоритм.

Матеріали і методи. Описано власне спостереження за пацієнтом віком 70 років із клінічними проявами набутого перфоративного дерматозу та мультиморбідною соматичною патологією, яку верифікували за результатами лабораторних та інструментальних методів дослідження. Дерматологічний діагноз встановлено на підставі морфологічного оцінювання біоптату шкіри.

Результати. Описано клінічний випадок пацієнта з ураженнями шкіри тулуба та верхніх кінцівок. Візуальні прояви дерматозу представлені папульозною висипкою з центральним западінням, явищами ерозування, гіперкератотичними змінами та виразним свербежем, що загалом імітують великий спектр нозологій – від червоного плоского лишаю, пруриго до множинних кератоакантом. Враховуючи таку клінічну неспецифічність патологічного процесу на шкірі, лише морфологічна діагностика може сприяти остаточній верифікації дерматологічного діагнозу. Крім того, важливим аспектом стало оцінювання соматичного статусу пацієнта, що дало змогу встановити мультиморбідність – супутню серцево-судинну патологію, хронічну хворобу нирок, криптогенний цироз печінки, синдром портальної гіпертензії.

Загальний терапевтичний напрям полягає в компенсації основної соматичної патології. Саме тому, зважаючи на клінічну складність стану, такі пацієнти потребують обов'язкового залучення фахівців суміжних спеціальностей. В описаному клінічному випадку пацієнт потребував постійної терапевтичної підтримки, зокрема в умовах стаціонарного відділення. Враховуючи тяжкий загальний стан хворого, вирішено паралельно із лікуванням соматичної патології досить щадно впливати на ефлорисценції – лише із застосуванням системних антигістамінних засобів і топічної терапії глюкокор-

тикостероїдами. Позитивна динаміка в межах шкірних покривів обґрунтовує доцільність продовження запланованої комплексної терапевтичної тактики.

Висновки. Морфологічне дослідження є золотим стандартом верифікації патологічного процесу на шкірі. Враховуючи досить варіабельні нозології в контексті мультиморбідності в одного пацієнта, а також чітку залежність перебігу дерматозу від соматичної патології, обов'язковим етапом в менеджменті таких хворих є спільна міждисциплінарна робота фахівців дерматологічного та терапевтичного профілю.

Perforating dermatosis is a general term for rare skin lesions, some variants of which are associated with somatic pathology. According to research, the incidence is 2.53 per 100,000 population per year [1]. However, these indicators may vary and depend on the comorbid background. The sample of hemodialysis patients in the study by S. E. Roldan–Contreras et al. with manifestations of acquired perforating dermatosis was 11 % [2]. While in the work of Z. Gao et al., among patients with this dermatosis, concomitant chronic renal failure was recorded in 18.9 % of people [3]. Not only is kidney damage seen in this condition, acquired perforating dermatosis can be associated with diabetes mellitus, thyroid disease, HIV infection, and malignant neoplasms [3,4,5].

Given the limited prevalence of these skin manifestations in the general population, their classification lacks a clearly defined structure. Therefore, "perforating dermatosis" is represented by a heterogeneous group that includes the following nosologies: serpiginous perforating elastosis, Kirle's disease, perforating folliculitis, and acquired reactive perforating collagenosis. Integrative in this case may be both potentially similar clinical manifestations in the form of papular efflorescences with a central depression, and histological parameters due to the transepidermal elimination of dermal structures. The latter, according to T. Kawakami et al., stands out as a separate differential aspect between clinical variants in the group of perforating dermatoses, taking into account the type of material involved in the pathological process: elastic, collagen fibers, or keratin [6]. In earlier works, A. J. García–Malinis et al. even reported the possibility of involving both types of fibers in pathomorphological evaluation [7].

Such visual and morphological similarity provides the logic of combining the above-mentioned skin manifestations under a unified definition of "Perforating dermatosis". At the same time, the interpretation of "acquired" additionally indicates the appearance in adulthood and the association with systemic pathology [8,9].

The key pathogenetic mechanisms of manifestation and progression of skin lesions that meet the criteria for acquired perforating dermatosis are also not fully defined, demonstrating multi-vector nature: ranging from microcirculatory disorders and oxidative stress to increased accumulation of glycation end products in the skin or excessive expression of transforming growth factor beta 3 (TGF-β3) [1,4,9]. Particular attention should be given to the study by B. Liu et al., which addresses the effective treatment of acquired reactive perforating collagenosis with dupilumab, a therapy targeting the IL-4 and IL-13 signaling pathways. The observed clinical outcome, manifested by the resolution of efflorescences and reduction of pruritus, opens new diagnostic and therapeutic perspectives regarding the potential involvement of Th2-type inflammation in the pathological process [10].

Therefore, considering the infrequent occurrence of this dermatosis, the diversity of classification criteria, the complexity of clinical and morphological verification, as well as its association with systemic pathology, such skin lesions require a comprehensive evaluation not only by dermatologists but also by specialists in internal medicine. Accordingly, broader awareness of the common "problematic aspects" of perforating dermatoses will facilitate their timely assessment and appropriate further management.

Aim

The aim of this work is to describe a clinical case of acquired perforating dermatosis within the context of an interdisciplinary approach to patient management, taking into account a comprehensive therapeutic and dermatological diagnostic and therapeutic algorithm.

Materials and methods

The assessment of visual manifestations of dermatosis was carried out at the Department of Dermatovenerology and Aesthetic Medicine of the Zaporizhzhia State Medical and Pharmaceutical University. A general examination and analysis of the severity of the patient, taking into account comorbid somatic pathology, was carried out with the involvement of specialists from the Department of Internal Medicine No. 2 of the Zaporizhzhia State Medical and Pharmaceutical University.

The final verification of the dermatological diagnosis was determined by morphological assessment of the skin biopsy. A punch biopsy with a diameter of 5 mm was performed. The material was immediately placed in 10 % buffered formalin solution (pH 7.4) with subsequent fixation for 24 hours, preparation of paraffin blocks, and sections 4 μm thick. Determination of histological patterns of dermatosis was carried out when evaluating sections stained with hematoxylin and eosin.

This work was performed in accordance with the ethical standards of IGH/GCP, the Declaration of Helsinki (1964 with amendments), the Council of Europe Convention on Human Rights and Biomedicine, and the legislation of Ukraine. The study was approved by the Bioethics Commission of the Zaporizhzhia State Medical and Pharmaceutical University (protocol No. 8 dated 19.06.2025).

Clinical case

A patient born in 1955 presented to a dermatologist with complaints of a rash primarily affecting the skin of the trunk and upper limbs. According to the patient, the first efflorescences on the back were noticed approximately four months before seeking specialized medical care.

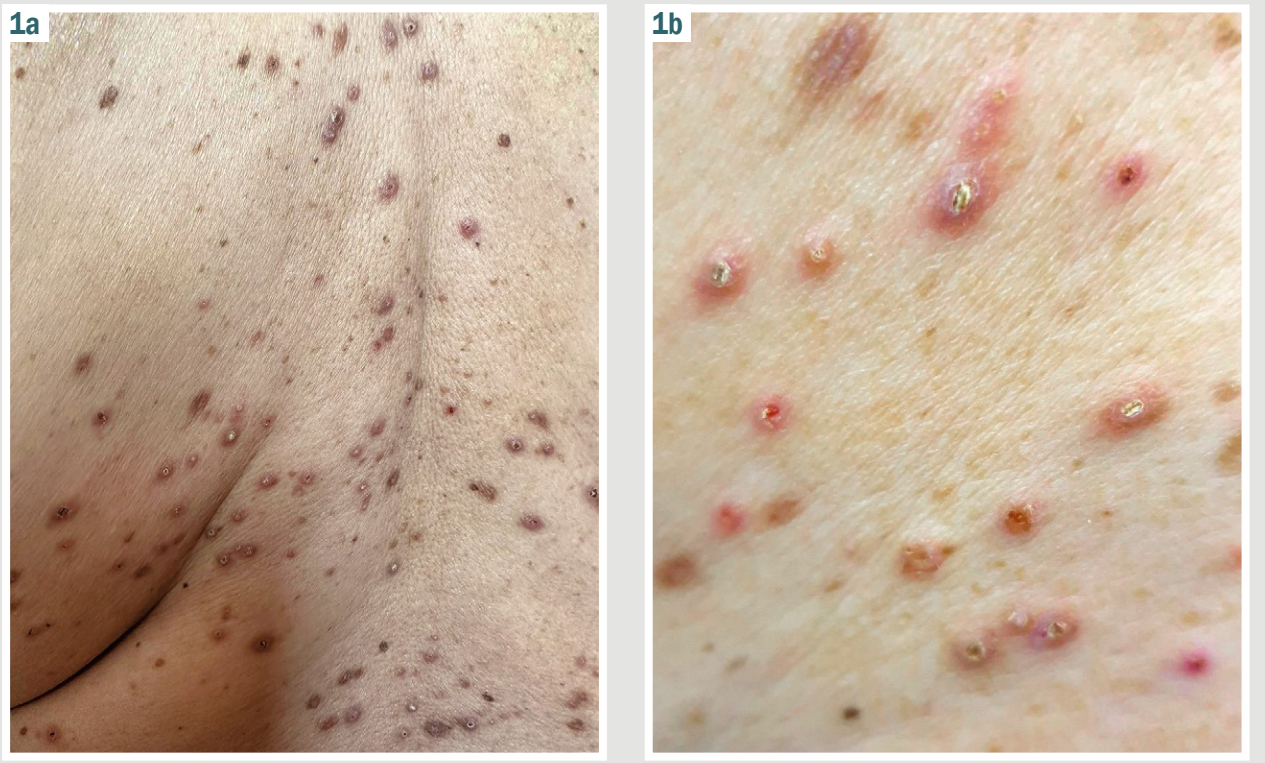


Fig. 1. Dermatosis manifestations observed during the baseline clinical assessment before initiating treatment.

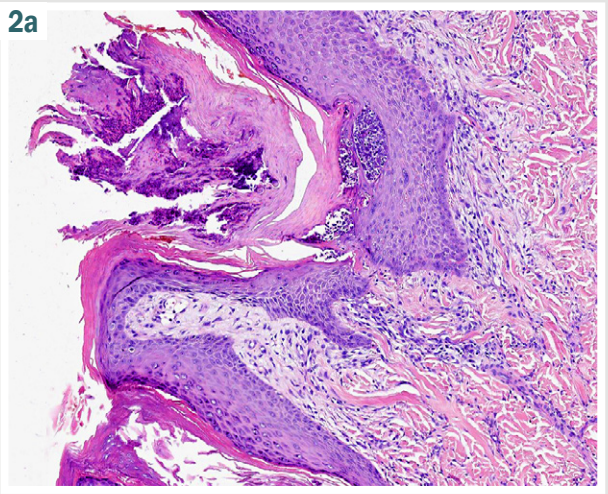
However, in addition to the rash, which became widespread, the dominant complaint was unbearable itching. This feeling accompanied the patient throughout the day, significantly disrupting both sleep and subsequent high-quality daytime functioning.

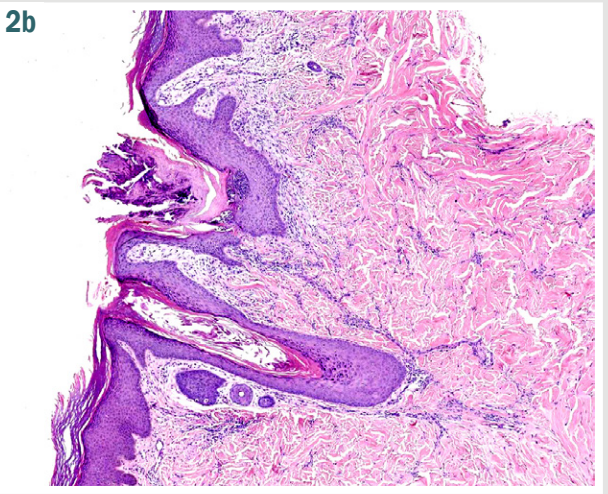
Objectively: the maximum concentration of rash elements is observed on the skin of the back, to a lesser extent, on the shoulders and forearms, where single morphological elements are present. Clinically, efflorescences are represented by hemispherical papules with a tendency to perifollicular formation, pink in color, some with a lilac-brown tint. Also noteworthy is the presence within the papular elements of a central depression, which is represented by erosion or hyperkeratotic changes *(Fig. 1)*. On the skin of the forearms, excoriations and the appearance in these places of new, but corresponding to the above description, elements are observed. The latter thesis meets the criteria of the Koebner phenomenon, which additionally indicates the activity and progression of the process. While the presence of scratching is an objective marker of itching, as one of the leading phenomena of this pathological condition on the skin.

The clinical manifestations observed gave rise to a broad range of potential differential diagnoses, including lichen planus, prurigo, and multiple keratoacanthomas. That is why the next diagnostic step in the context of the final verification of dermatological nosology was morphological examination. Thus, when evaluating a skin biopsy, the epidermis is identified with hyperkeratosis, hypergranulosis, and focal invagination of the epidermis is observed, which is filled with keratin masses and accumulations of neutrophils. In this area, transepidermal elimination of collagen and elastic fibers is observed. Moderate diffuse spongiosis is identified in the epidermis. In the adjacent dermis, there are cicatricial changes and focal moderate lymphohistiocytic infiltration. After performing additional sections of the material from the paraffin block, the histological picture did not change. When staining for elastic fibers, transepidermal elimination of elastic fibers is observed. Thus, this morphological picture, taking into account the clinical manifestations, most closely corresponds to acquired perforating dermatosis *(Fig. 2)*.

While awaiting the morphological assessment of the skin biopsy, the patient was urgently hospitalized in the internal medicine department with complaints of general weakness, inhibition, intermittent nosebleeds, shortness of breath on minimal physical exertion, abdominal distension, and lower limb edema.

From the patient's somatic history, it is known that he has been suffering from hypertension for over fifteen years, with maximum blood pressure spikes reaching 230/100 mmHg (with a baseline of 130/80 mmHg). However, in recent times, he has shown a tendency toward hypotension, with episodes of blood pressure dropping to 90/60 mmHg. Since 2023, the patient has exhibited clinical signs of heart failure stages IIB–III, including ascites and hydrothorax. He underwent inpatient treatment courses 2–3 times per year. Recently, there has been a marked increase in the frequency of hospitalizations due to decompensated heart failure. Critical aortic stenosis was detected on echocardiography, ascending aortic aneurysm with an ejection fraction of 27 %. Also in February 2024, coronary angiography was performed: right





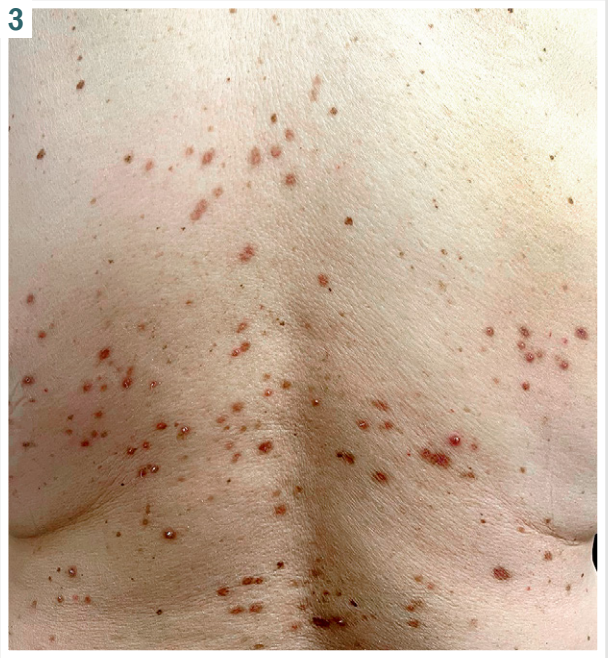


Fig. 2. Morphological features of acquired perforating dermatosis, H & E, Mag.: ×50.

Fig. 3. Clinical manifestations of dermatosis one week after the start of topical therapy.

coronary artery – stenosis 50–70 %, circumflex branch of the left coronary artery – stenosis 30–70 %, anterior interventricular branch – stenosis 60 %.

In August 2024, he was consulted by a cardiac surgeon with recommendations for further conservative therapy, taking into account the existing associated risks. In January 2025, he had erysipelas of the left lower limb, erythematous form against the background of obliterating atherosclerosis of the lower limbs. He takes empagliflozin, torasemide, xipamide, rivaroxaban and rosuvastatin on an outpatient basis.

At the time of the most recent hospitalization, the patient's general condition was severe. Height – 170 cm, body weight – 110 kg. Respiratory rate – 18 breaths per minute. Heart rate – 70 beats per minute, with an irregular rhythm. Blood pressure – 100/70 mmHg. Body temperature – 36.8 °C. There is lower legs edema to the level of the upper third of the anterior abdominal wall. Irregular heart sound, the tones are significantly muffled, a rough aortic systolic murmur and the accentuated pulmonary component of the second heart sound. Breath sounds are harsh over the lungs, without wheezing. There is abdominal distension due to ascites, and palpation of the internal organs is difficult.

The most clinically significant laboratory test results are listed below. In the general blood test: Hb – 106 g/L, erythrocytes – 3.6 × 10^{12}/L, platelets – 127 × 10^{9}/L, ESR – 12 mm/h, total protein – 57.7 g/L, albumin – 30.1 g/L, creatinine – 292.0 μmol/L, urea – 53.3 mmol/L, total bilirubin – 52.4 μmol/L, direct bilirubin – 30.8 μmol/L, uric acid – 752.7 μmol/L, prothrombin index – 52 %. General urine test: specific gravity – 1010, proteinuria – 0.108 g/L. According to electrocardiography data: voltage is normal, heart rate – 71 beats/min. Atrial fibrillation. Left bundle branch block. According to abdominal and renal ultrasound: echographic signs of hepatomegaly, ascites, portal hypertension, chronic cholecystitis, hepatic fibrosis, slight reduced kidney size, moderate thinning of the parenchyma.

Thus, the somatic condition is represented by the following diagnosis: Ischemic heart disease: stable angina pectoris, functional class III. Obstructive coronary artery atherosclerosis (Coronary angiography dated 14.02.2024: right coronary artery – 50–70 % stenosis; circumflex branch of the left coronary artery – 30–70 % stenosis; anterior interventricular branch – 60 % stenosis). Critical aortic stenosis. Tricuspid regurgitation III, pulmonary arterial hypertension III, permanent atrial fibrillation with controlled ventricular rate. CHA2DS2-VASc 3 point, HAS-BLED 4 point. Ascending aortic aneurysm. Essential hypertension, stage III, grade III with very high cardiovascular risk, left ventricular hypertrophy. Chronic kidney disease stage IV (glomerular filtration rate 26 ml/min/1.73 m^2). Hypertensive nephropathy. Heart failure stage D with reduced ejection fraction (38 %). Chronic heart failure III. Cryptogenic liver cirrhosis, Child–Pugh class C, portal hypertension. Ascites. Peripherial arterial disease. Encephalopathy of mixed genesis (metabolic, hypertensive, atherosclerotic). Anemia of chronic disease. Received inpatient treatment for a comorbid somatic condition: human albumin, empagliflozin, xipamid, rosuvastatin, pantoprazole, furosemide, enoxaparin, citicoline sodium.

Somatic compensation of comorbid pathology plays a key role both in the overall stabilization of the patient's condition and in the course of the potential resolution of the skin manifestations of perforating dermatosis. Therefore, the treatment of skin lesions, which serve as an additional burden and complicate the patient's overall condition, requires decisive yet gentle therapeutic measures. For this patient, the management algorithm for perforating dermatosis included the use of a second-generation non-sedating systemic antihistamine (fexofenadine 180 mg) once daily, along with a topical glucocorticosteroid – specifically, betamethasone valerate cream applied twice daily. Figure 3 shows the clinical manifestations of the dermatosis one week after the initiation of topical therapy: flattening of most rash elements is noted, and the patient reports a significant reduction in pruritus intensity. The use of topical therapy resulted in positive clinical dynamics, which allows further continuation of the application of corticosteroid cream, but once a day. However, taking into account the chronic relapsing course of acquired perforating dermatosis and its pathogenetic association with severe somatic comorbidity, such therapy should be considered only as one of the components of a comprehensive treatment strategy.

Long-term maintenance of the clinical effect and prevention of further progression of dermatosis are possible only under conditions of a multimodal approach, which includes targeted correction of concomitant somatic pathology, in particular, cardiovascular, nephrological, endocrine, and hepatobiliary. Systemic monitoring of the patient's general condition over time, combined with individualized dermatological management, is critically important for achieving sustained remission and improving disease prognosis.

Discussion

Acquired perforating dermatosis is a nosology that satisfies the professional interest not only of dermatologists but also of general practitioners. After all, on the one hand, there is a skin lesion, on the other hand, a comorbid pathology that does not claim to be secondary and stereotyped in management. Considering perforating dermatosis from the point of view of changes in the skin, it is worth focusing on the diagnostic complexity, starting with a visual assessment of the pathological process. Thus, the clinical pattern of papules with a centrally located depression and the formation of an erosive or keratotic surface is not pathognomonic for only one group of dermatoses. These visual characteristics may correspond to prurigo nodularis, folliculitis, keratoacanthoma, lichen planus, or pityriasis rubra pilaris. Whereas clinical manifestations with a tendency towards an annular, serpiginous arrangement mimic granuloma annulare, porokeratosis, or sarcoid-like changes [11]. On the other hand, the presence of intense itching and excoriations meets the criteria for both papulosquamous dermatoses and infectious skin lesions. The clinical case described by A. Agrawal et al. demonstrates the high mimicking potential among the aforementioned conditions: the visual manifestations during the differentiation between perforating dermatosis, nodular prurigo, and papulonecrotic tuberculid ultimately masked scabies upon final verification [12].

Acquired perforating dermatosis typically develops in the context of severe systemic disease, supporting its interpretation not only as an isolated dermatological entity but also as a clinical marker of systemic pathology characterized by marked metabolic or vascular disturbances.

According to the data presented in the study by Y. C. Edek et al., 65.26 % of the patients included in the cohort were verified to have a comorbidity in the form of diabetes mellitus, while arterial hypertension and cardiovascular diseases were recorded in 56.84 % and 45.26 % of those examined, respectively. In addition, there is a distinct emphasis on kidney and hepatobiliary system damage [9]. Comparing the above-mentioned data with our clinical case, the patient also presents with cardiovascular pathology, renal involvement, and hepatobiliary system disorders, which are consistent with the literature. However, such multimorbidity complicates the timely differential diagnosis of both somatic and dermatological conditions, affecting the scope of further diagnostic evaluation.

Acquired perforating dermatosis can occur in patients with a history of malignancy and may also represent an early clinical manifestation of a neoplastic process. Thus, N. Imran presented a clinical case of a patient with diabetes mellitus and end-stage chronic renal failure, in whom skin lesions phenotypically consistent with perforating dermatosis preceded the registration of regionally disseminated renal cell carcinoma [13]. This thesis emphasizes the potential role of various nosological forms from the heterogeneous group of perforating dermatoses as dermatological markers of paraneoplastic transformation, which expands the clinical significance of these conditions and requires their mandatory analysis in the differential diagnostic algorithm.

In light of current post-pandemic trends, it is important to consider the possible impact of coronavirus infection as a potential trigger for the emergence of cutaneous efflorescences of diverse etiology. Thus, S. Wang et al.

described a case of an asymmetric, unilateral skin process in the form of acquired reactive perforating collagenosis 3 weeks after recovery from COVID-19 [14]. The occurrence of exacerbation of dermatosis has also been demonstrated, but already after SARS-CoV-2 vaccination in a patient with comorbid but compensated background: renal failure, hypertension, diabetes mellitus, and a history of pulmonary tuberculosis [15].

Acquired perforating dermatosis can also be considered in the context of drug-induced pathological process, often through molecular targeted therapy [16,17,18]. In general, there are no gender preferences in perforating dermatoses; however, for nosologies associated specifically with taking medications, there is an emphasis on the male population over 50 years of age [15].

Special attention is required to discuss acquired perforating dermatosis within the framework of Wolf's isotopic response, which is characterized by the manifestation of efflorescences directly at the site of regression of the previous dermatosis, but of a completely different origin. Thus, the case described by X. H. Du et al. demonstrates the appearance of clinical manifestations of acquired perforating dermatosis within the area of herpes zoster resolution in a patient who, in accordance with the general trend, also had a more than 10-year history of comorbidity, namely diabetes mellitus [19].

The general therapeutic direction of this disease management is to compensate for the underlying somatic pathology. That is why, given the clinical complexity of the condition, patients in this category require the obligatory involvement of physicians from related specialties. In this case, the patient demonstrates a characteristic multimorbid condition necessitating ongoing therapeutic management, including periods of hospitalization for adequate medical support. Accordingly, restoring functional capacity through compensatory mechanisms is essential not only for the healing of skin lesions but also for sustaining the patient's overall life activity and systemic stability. If this condition is considered solely from the perspective of the pathological process affecting the skin, there is a specific arsenal of therapeutic agents available, ranging from topical corticosteroids and keratolytics to the systemic use of antihistamines, allopurinol, tetracyclines, retinoids, or phototherapy [20,21].

Understanding the pathogenetic mechanisms of this dermatosis contributes to the integration of both classical drugs, taking into account new approaches, emphases, and modern means of immunobiological therapy into treatment protocols. Taking into account the literature, individual cases of successful treatment of acquired perforating dermatosis with colchicine are described, suggesting a potential anti-inflammatory and antifibrotic activity [22,23]. Ye B. et al., one of the first to demonstrate the positive effect of itraconazole on acquired reactive perforating collagenosis, considering both its anti-inflammatory and antiangiogenic effects [24]. On the other hand, the active use of targeted biological therapy continues [25,26].

Thus, given the severe general condition of the patient in this study, it was decided to treat the efflorescences gently, in parallel with the treatment of somatic pathology, using only a systemic antihistamine and a topical corticosteroid. Positive dynamics within the skin allow us to continue the planned treatment regimen with an emphasis on a comprehensive approach to the management of this patient.

Conclusions

1. The diagnosis of acquired perforating dermatosis is often challenging due to the nonspecific clinical manifestations and the need for extensive differential diagnosis with other dermatoses. For this reason, morphological examination remains the "gold standard" for verifying the pathological process in the skin.

2. Familiarization with the clinical manifestations of rare skin lesions within the spectrum of perforating dermatoses by specialists from various medical fields, as well as recognition of their visual mimicking potential, contributes to a deeper understanding of dermatological pathology in the context of systemic body function.

3. Considering the rather variable nosologies in the context of multimorbidity in one patient, as well as the clear dependence of the course of dermatosis on somatic pathology, a mandatory stage in the management of such patients is the joint interdisciplinary work of specialists of both dermatological and therapeutic profiles.

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