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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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EROSIVE PUSTULAR DERMATOSIS OF THE SCALP (EPDS) – A CASE SERIES AND SHORT REVIEW

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Abstract.

Erosive pustular dermatosis of the scalp (EPDS) is an uncommon and possibly underreported chronic inflammatory skin disease within the spectrum of neutrophilic disorders. Although it has been reported in all ages, elderly people are more common affected. The surrounding skin often shows symptoms of chronic actinic damage. Histopathology is rather unspecific. The pustules and lakes of pus are sterile. Treatment includes anti-septic, anti-inflammatory topical therapy, in more severe cases oral steroids. Rarely systemic antibiosis or surgery are necessary. EPDS is an important differential diagnosis of non-melanoma skin cancer, bullous autoimmune disease, and soft tissue infections by bacteria or fungi. When untreated, scarring alopecia develops. We report on or own case series and present a narrative review on published cases since 2010.

Key words. Erosive pustular dermatosis of the scalp, non-melanoma skin cancer, histopathology, treatment, scarring alopecia.

Introduction.

Chronic, non-healing wounds of the scalp have a broad range of differential diagnoses such as non- melanoma skin cancer (NMSC), autoimmune blistering diseases, chronic inflammatory disorders (subcorneal pustulosis, pyoderma gangrenosum etc.), soft tissue infections by bacteria and fungi, skin picking syndrome, malignant and traumatic wounds. Medical history, pathology and laboratory investigations are necessary to confirm diagnosis.

Here we will focus on erosive pustular dermatosis of the scalp (EPDS), a non-infectious disorder more often seen in elderly adults. EPDS was first described by Pye et al. (1979), as a rare pustular, idiopathic, and inflammatory disorder of sun-damaged skin [1]. Although epidemiologic data are widely missing, reports from Australia suggest that the disease is more common than usually suspected [2].

The most common localization is the vertex, although other parts of the scalp may also be involved. EPDS has a variable clinical presentation from limited, erosive, and scaly lesions, bulky crusts and erosions with underlying pus, to crusted and hemorrhagic plaques. Pustules are not always present. EPDS often developed on sun-damaged skin, after trauma or surgery, and due to certain medical drugs. Androgenetic alopecia is often seen in affected males. It seems to be a cofactor for sun- damage to scalp skin. Confirmation of EPDS needs histology. Skin biopsies may present non-specific and specific features (Table 1) [3].

Trichoscopy may be helpful in diagnosis. An active and chronic phase of the disease can be differentiated. The active phase demonstrates perifollicular black-yellow crusts, brown-gray hyperpigmentation, tortuous and curved hair shafts, and hair tufts. The chronic phase is characterized by skin atrophy. The most specific finding seems the hair bulb visible through atrophic skin in combination with prominent telangiectasias [4].

Table 1. *Histologic features of EPDS [3].*

No	Non-specific features a variable combination of
1	epidermal atrophy
2	pustulation
3	scarring
4	subepidermal clefting
5	perifollicular granulomas
6	erosions
7	granulation tissue
	Specific features
	infundibular spongiotic pustules with neutrophils

The pathogenesis of EPDS remains obscure. There is an ongoing follicular vesiculation and pustulation, leading to erosions and thereafter a chronic non-healing wound. This accompanied is a continuous accumulation of dermal fibrosis. Neutrophils seem to play a crucial role [3]. Since trauma and previous surgery especially of skin cancer are risk factors for EPDS, the disease seems to develop on immunocompromised districts of skin [5]. EPDS can be described as a neutrophilic disorder of immunosenescence [6].

A common complication after delayed diagnosis and treatment is scarring alopecia [7]. Herpes zoster has been observed after immunosuppressive topical treatment of EPDS [8].

A less often reported complication of EPDS is secondary development of NMSC within these lesions. Negbenebor et al. (2022) presented a series of 6 patients with a mean age of 82-years, mostly Fitzpatrick's skin type I or II, who developed either squamous cell carcinoma (SCC; n=4) or basal cell carcinoma (BCC, n=2). Four patients had history of NMSC. Red flags for such a development are either nodular lesions or a rapid growth of lesion [9].

A variety of possible triggers of EPDS such as trauma, medical procedures or medical drugs are known (Table 2) [10-21].

Table 2. *Skin disorders and drugs associated with EPDS induction.*

Disease/ Medical drug	**Reference**
Disorders	
Field cancerization	[10]
Trichotillomania	[11]
Medical drugs	
Systemic	
Afatinib	[12]
Gefitinib	[13]
Nivolumab	[14]
Panitunumab	[15]
Sirolimus	[16]

Topical	
Aminolevulinic acid (Photodynamic therapy)	[17]
Imiquimod	[18]
Ingenol mebutate	[19]
Latanoprost	[20]
Oxygen	[21]

Patients and methods.

This is a retrospective case series. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. We searched the files of the Department of Dermatology and Allergology, Hospital Dresden-Friedrichstadt, Dresden, Germany, during the years 2012-2022. Diagnosis is based upon clinical suspicion, exclusion of other possible differential diagnoses, and histopathologic confirmation.

Diagnosis was based on the use of diagnostic criteria as recommended recently by Reschke et al. [10]. These include:

- chronic lesions on the scalp with purulent crusts on shiny granulation tissue
- elderly patients
- actinic damage and local damage by treatment of actinic keratoses
- easily detachable skin in the marginal areas
- excellent response to topical corticosteroids
- histopathology with prominent plasma cell infiltrate of the dermis and
- perivascular or whole dermal lymphocytic infiltrates.

Treatment response was defined as complete response (CR) by clearance of all crusts, granulation tissue and inflammation. Partial response (PR) was defined as at least 50% clearance of preexistent lesions and signs.

In addition, we performed a narrative literature review using PubMed© and Google Scholar© 2010- 2022. We restricted the timeline to include only the most recent approaches to define and treat EPDS.

Results.

We identified eight patients. The male to female ratio was 1.7. The age ranged from 55 to 91 years (mean 81 years). Table 3 summarizes the data. Clinical suspicion was field cancerization with multiple actinic keratosis or SCC in most cases and bullous pemphigoid in a single patient.

Histology revealed a hyperplastic epidermis, chronic granular inflammatory reaction with plasma cells, neutrophils and some eosinophils, edema, elastosis, variable fibrosis, capillary ectasia. In five samples pustules were observed, in four ulcerations. Lakes of sterile pus were noted in 3 patients. Clefts were not observed.

In all patients, microbiological swabs remained negative for bacteria and fungi.

Clinical presentation was highly variable (Fig. 1) but chronic actinic damage was evident among all patients.

Treatment and outcome are summarized in table 3. A complete remission could be achieved in seven patients. We missed data on long-term course since the patients were lost for follow-up.

Discussion.

We report a case series of eight patients with EPDS. All of them were older than 50 years, five of eight were older than 80 years. We observed a male predominance. All our patients had severe actinic damage of the scalp due to a combination of profession, outdoor sports, and androgenetic alopecia.

Diagnosis had been confirmed by medical history, microbiology/ mycology, and skin biopsy. Although the histopathology is rather unspecific it is of importance to exclude other differential diagnoses.

It is possible that EPDS is still underreported. A summary of published cases since 2010 is given in table 4 [4,6,13,16,19,20,22-49]. Most patients had a primary diagnosis of NMSC and actinic keratosis. Five of eight patients suffered from comorbidities. The identified triggers were surgery, trauma, PDT, and topical imiquimod.

PDT has also been recommended for treatment of EPDS, but the risk of exacerbation seems real. Differential diagnosis includes red scalp syndrome and rosacea [50,51].

Table 3. *Patients demographics, clinical presentation, and comorbidities.*

Pat.-#	Age (yrs)	Gender	Clinical Diagnosis	Trigger	Comorbidities	Treatment	Outcome
1	76	m	SCC, AK	surgery	hypertension	surgery, meshed graft	CR
2	91	f	SSC	surgery	hypertension	betamethasone+ fusidinic acid	PR
					venous thrombosis	bismuth gallate 10% + ZnO 50%	
3	55	f	BP	-	frontal fibrosing alopecia	betamethasone+ fusidinic acid, bismuth gallate 10% + ZnO 50%	CR
						prednisolone 60 mg/d	
4	83	m	AK	trauma	-	silver nitrate 10%	CR
5	81	m	AK	PDT	-	silver nitrate 10%	CR
6	81	m	SCC	trauma	-	betamethasone+ fusidinic acid	CR
7	80	m	SCC	surgery	diabetes, coronary heart disease	betamethasone+ fusidinic acid	CR
8	78	f	SCC	surgery	BCC, intracranial bleeding	betamethasone+ fusidinic acid	CR

Abbreviations: AK, actinic keratosis; BCC, basal cell carcinoma; BP, bullous pemphigoid; PDT, photodynamic therapy; SCC, squamous cell carcinoma.

Table 4. *EPDS case reports since 2010.*

Reference	n	Age, gender	Trigger	Treatment	Outcome
[22]	15	49-93 y, 7 m, 8 f	radiotherapy, imiquimod, minoxidil, latanoprost, PDT, ingenol mebutate,	oral methylprednisolone, oral prednisone, topical	CR
			topical oxygen, trichotillomania	clobetasol proprionate, oral zinc	
				sulfate, gentamycin-betamethasone	
[23]	9	6 m, 3 f	-	curettage + PDT 1 week later	CR
	8	6 m, 2 f	-	curettage + PDT + silicone gel - 1 session	CR
[24]	23	46-95 y, 22 m, 1 f	-	topical corticosteroid + calcineurin inhibitor	CR (3)
				topical corticosteroid + oral acitretin	CR (7)
				topical calcineurin inhibitor +/- oral	CR (0)
				acitretin	
[10]	21	73-90 y, 18m, 3f	cryotherapy, surgery, trauma, topical treatments such as diclofenac gel or 5-fluorouracil	topical corticosteroids, disinfection, partly topical antibiotics	CR
[25]	3	50 y, m	trauma	topical corticosteroids	PR
		72 y, m	-	topical momethasone fuorate 0.1%	PR
		80 y, m	-	topical fusidinic acid and corticosteroids	PR
[26]	1	81 y, m	-	topical clobetasol proprionate + 25% zinc oxide	CR
[27]	1	23 y, f	severe scalp trauma	topical clobetasol proprionate*	CR
[28]	1	84 y, f	-	powdered umbilical remnant allograft	CR
[13]	1	84 y, m	gefitinib	topical clobetasol proprionate	CR
[29]	56	mean 62.7 y,	trauma (28.6%), cryotherapy	topical corticosteroids (62.5%),	PR 50%
		27 m, 29 f	(5.4%), infection (10.7%)	topical corticosteroids + tacrolimus (8.9%),	
				oral corticosteroids (7.1%), topical tacrolimus (5.4%)	
[30]	1	23 y, f	trauma	oral prednisolone, tetracycline	PR
[31]	4	35 y, f	-	topical clobetasol proprionate + tacrolimus maintenance	CR
		50 y, f	-	topical clobetasol proprionate-calcipotriol followed by calcipotriol maintenance	CR
		52 y, m	cryotherapy	topical clobetasol proprionate + tacrolimus maintenance	CR
		65 y, m	herpes zoster	topical halobetasol diproprionate 0.025%	CR
		30 y, m	-	topical clobetasol proprionate + tacrolimus maintenance	CR
[16]	1	61 y, f	sirolimus	discontinuation of sirolimus	CR
[32]	1	84 y, m	-	methyl aminolevulinate (PDT)**	CR
[33]	1	83 y, m	imiquimod, surgery	methyl aminolevulinate (PDT)	PR
[34]	2	74 y, m	cryotherapy, PDT	topical clobetasone proprionate	PR
		82 y, m	cryotherapy		
[35]	3	81 y, m	-	topical clobetasol	CR
		74 y, m	trauma	topical clobetasol	CR
		85 y, f	ingenol mebutate	topical clobetasol	PR
[36]	8	62-93 y, 7 m, 1 f	-	topical clobetasol	CR
[37]	33	22 m, 8 f	trauma (19), surgery (4), herpes zoster (1), autoimmune disorders (3)	topical clobetasol	PR (27)
[38]	4	68-95 y, 4 m	trauma	topical betamethasone 0,05% + fusidic acid 2.0%, hyaluronic acid dressing	CR

[39]	5	5 m	-	curettage + PDT, silicone gel	CR
[40]	11	49-84 y, 8 m, 3 f	PDT (n=2), trauma (1),	topical tacrolimus (n=1)	CR
			surgery (1)	topical corticosteroid (n=1)	CR
				topical steroid + tacrolimus (n=1)	CR
				PDT (n=4)	no CR
				surgery (n=3)	no CR
[6]	8	94 y, f	imiquimod	topical clobetasone proprionate	no data
		89 y, f	surgery	topical clobetasone proprionate	
		86 y, m	surgery	topical clobetasone proprionate	
		82 y, f	surgery	topical flucinonide	
		82 y, f	surgery	topical clobetasone proprionate + tacrolimus	
		79 y, m	surgery	intralesional kenalog, topical	
				betamethasone diproprionate,	
				topical dapsone	
		70 y, f	surgery	topical clobetasone proprionate	
		87 y, f	surgery	topical clobetasone proprionate	
[41]	1	78 y, m	-	oral acitretin 50m/d + tacrolimus	CR
[19]	2	74 y, m	cryotherapy, ingenol mebutate	16 mg methylprednisolone/d + topical clobetasol proprionate	CR
		85 y, m	PDT, ingenol mebutate	16 mg methylprednisolone/d + topical clobetasol proprionate	CR
[42]	1	89 y, m	-	10 mg prednisone/d orally, topical desoximethasone 0,25%	PR
[20]	1	61 y, f	topical latanoprost 0.1%	16 mg methylprednisolone/d + 200 mg zinc sulfate/d + topical clobetasol proprionate	CR
[43]	2	59 y, m	-	3% boric acid	PR
		87 y, f	surgery	3% boric acid followed by topical	PR
				momethasone fuorate	
[44]	1	76 y, m	-	surgery with meshed graft transplant	CR
[45]	1	77 y, f	topical minoxidil	topical clobetasol proprionate	PR
[46]	1	68 y, f	trauma	oral 40 mg prednisone/d, topical tacrolimus for maintenance	CR
[47]	4	50 y, m	-	5% dapsone gel	CR
		51 y, m	surgery	5% dapsone gel	CR
		83 y, f	topical imiquimod	5% dapsone gel	CR
		90 y, f	trauma	5% dapsone gel	CR
[48]	1	80 y, m	-	topical corticosteroids, tacrolimus for maintenance	CR
[18]	1	84 y, m	topical imiquimod	oral prednisone 0.75 mg/kg	CR
[49]	1	35 y, m	hair transplantation	topical clobetasol propionate	CR

Treatment options are dependent on size and severity of EPDS. For milder and limited cases, topical zinc oxide can be used [23]. We used topical silver nitrate paste 10% in two cases with complete remission. Another option for topical treatment is bismuth gallate 10% in zinc oxide 50%.

Topical and – for severe cases – oral corticosteroids are the mainstay of treatment. Second line treatments are topical tacrolimus (for maintenance) and photodynamic therapy (PDT), although in rare cases PDT was associated with the development of EPDS. Third-line treatment options include oral cyclosporine A, indomethacin, doxycycline, dapsone, and zinc sulfate, topical dapsone, calcipotriol, acitretin, and isotretinoin [52-54].

In our hands the fixed combination of betamethasone and fusidic acid ointment was successful in most cases. Oral corticosteroids were necessary in only a single patient.

Broad-spectrum tetracycline lymecycline had been successful in case reports [55]. Placebo-controlled trials are missing. For all treatments available, grade of evidence is low. Investigations on relapse rates are widely missing.

Surgical treatment is rarely necessary, but it may be performed due to clinical suspicion of NMSC [3,34].

Conclusion.

In conclusion, EPDS is an important differential diagnosis to NMSC, autoimmune bullous disorders, and soft tissue infections in elderly patients. The disease is associated to chronic actinic damage. EPDS seems to be underreported. Possible complications are scarring alopecia, secondary NMSC,

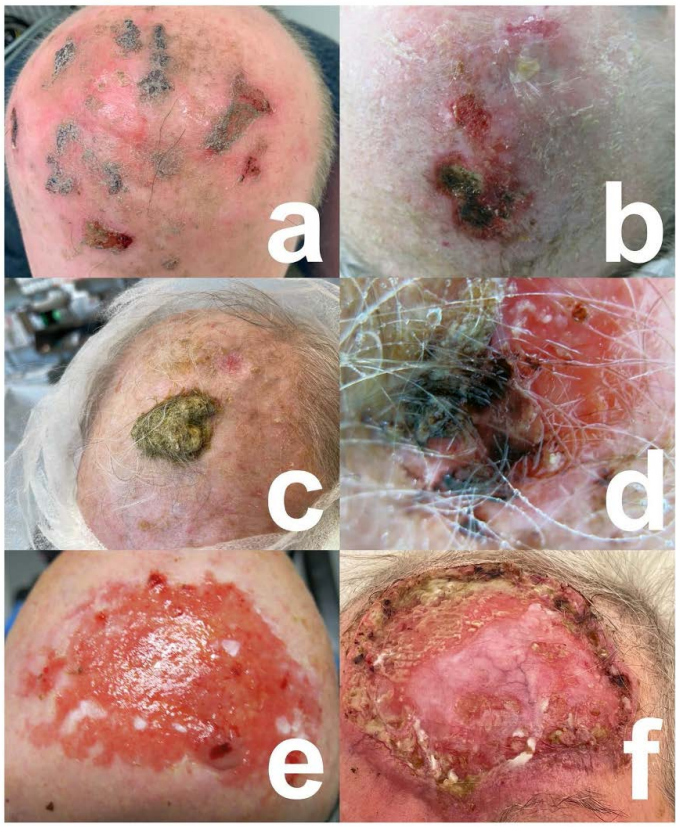

Figure 1. *Erosive pustular dermatitis of the scalp (EPDS). The pictures demonstrate the variable clinical presentation of the disease. (a) Superficial erosions and crusts simulating field cancerization. (b) Erosions and erythema suggestive of NMSC. (c) Bulky crust suggesting SCC. (d) Crusts and erosions with bleeding. (e) Large erosion suggesting bullous pemphigoid or superficial pustular pyoderma gangrenosum. (f) EPDS on the borders of a skin transplant after R0 resection of a large BCC suggesting pyoderma gangrenosum or Wegener's disease.*

and reactivation of herpes zoster. Anti-inflammatory and anti-microbial treatment is helpful. Limitations of our study are its retrospective nature and the number of patients.

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Conflict of interest.

Author have no conflicts of interest to declare.

REFERENCES

1. Pye RJ, Peachey RD, Burton JL. Erosive pustular dermatosis of the scalp. Br J Dermatol. 1979;100:559-66.
2. Yeh R, Polcz M, Wong D. Erosive pustular dermatosis of the scalp - an Australian perspective: Insights to aid clinical practice. Australas J Dermatol. 2019;60:e272-278.
3. Michelerio A, Vassallo C, Fiandrino G, et al. Erosive pustular dermatosis of the scalp: a clinicopathologic study of fifty cases. Dermatopathology (Basel). 2021;8:450-462.
4. Starace M, Alessandrini A, Baraldi C, et al. Erosive pustular dermatosis of the scalp: challenges and solutions. Clin Cosmet Investig Dermatol. 2019;12:691-698.
5. Vojvodic A, Tirant M, Nardo VD, et al. Immunocompromised districts of skin: a case series and a literature review. Open Access Maced J Med Sci. 2019;7:2969-2975.
6. Thuraisingam T, Mirmirani P. Erosive pustular dermatosis: A manifestation of immunosenescence. A report of 8 cases. Skin Appendage Disord. 2018;4:180-186.
7. Marsh RL, Spohn GP, Kaffenberger JA. Erosive pustular dermatosis of the scalp. Dermatol Online J. 2020;26:13030.
8. Moustafa F, Starace M, Ravaioli G, et al. Recurrence of herpes zoster infection in the setting of topical immunosuppression for erosive pustular dermatosis of the scalp. Int J Trichology. 2020;12:29-31.
9. Negbenebor NA, Shayegan LH, Cohen LM, et al. Nonmelanoma skin cancer in the setting of erosive pustular dermatosis of the scalp: A case series and comment on management implications. Dermatol Ther. 2022;35:e15584.
10. Reschke R, Grunewald S, Paasch U, et al. Erosive pustular dermatosis of the scalp: clinicopathological correlation leading to a definition of diagnostic criteria. Wounds. 2021;33:143-146.
11. Vaccaro M, DI Bartolomeo L, Guarneri F, et al. Erosive pustular dermatosis of the scalp as local complication of trichotillomania. J Cosmet Dermatol. 2022;21:4082-4083.
12. Goto K, Nomura T, Kogame T, et al. Improvement of erosive pustular dermatosis of the scalp following discontinuation of chemotherapy with afatinib. Eur J Dermatol. 2018;28:258-259.
13. Nazzaro G, Giacalone S, Bortoluzzi P. Erosive pustular dermatosis of the scalp induced by gefitinib: case and review of the literature. Erosive pustular dermatosis of the scalp induced by gefitinib: case and review of the literature. Dermatol Online J. 2021;27:13030.
14. Maglie R, Antiga E. Nivolumab-induced erosive pustular dermatosis of the scalp. Int J Dermatol. 2020;59:e399-e400.
15. Okuno S, Hashimoto T, Matsuo S, et al. Erosive pustular dermatosis of the scalp-like eruption from panitumumab. Australas J Dermatol. 2022;63:271-272.
16. Khanna U, Semsarzadeh N, Glaser K, et al. Erosive pustular dermatosis of the scalp associated with sirolimus. J Eur Acad Dermatol Venereol. 2020;34:e15-e16.
17. Madray VM, Kent SM, Davis LS. Aminolevulinic acid photodynamic therapy-induced erosive pustular dermatosis of the scalp. Dermatol Surg. 2021;47:1140-1142.
18. Corradin MT, Forcione M, Giulioni E, et al. Erosive pustular dermatosis of the scalp induced by imiquimod. Case Rep Dermatol Med. 2012;2012:828749.
19. Vaccaro M, Borgia F, Gasco L, et al. Erosive pustular dermatosis of the scalp following topical ingenol mebutate for actinic keratoses. Dermatol Ther. 2017;30:e12521.
20. Vaccaro M, Barbuzza O, Borgia F, et al. Erosive pustular dermatosis of the scalp following topical latanoprost for androgenetic alopecia. Dermatol Ther. 2015;28:65-67.
21. Vaccaro M, Di Bartolomeo L, Campitiello A, et al. Erosive pustular dermatosis of the scalp following topical oxygen therapy. J Cosmet Dermatol. 2022;21:403-404.
22. Di Bartolomeo L, Ceravolo I, Borgia F, et al. Treatment of erosive pustular dermatosis of the scalp: our experience and review of unconventional topical drugs. Eur Rev Med Pharmacol Sci. 2023;27:1023-1026.

23. Misitzis A, Bhargava S, Cunha PR, et al. Aminolevulinic acid-photodynamic therapy for erosive pustular dermatosis of the scalp: comparison of two treatment protocols and participant satisfaction. Skinmed. 2022;20:107-112.
24. Siskou S, Lallas A, Theodoropoulos K, et al. Diagnostic and management challenges of erosive pustular dermatosis of the scalp: a retrospective study in Greek population. J Eur Acad Dermatol Venereol. 2021;35:e776-e779.
25. Aithal SS, Shilpa K, Revathi TN. Erosive pustular dermatosis of the scalp: Report of three cases. Int J Trichol. 2022;14:178-180.
26. Di Altobrando A, Tabanelli M. Topical zinc oxide: breaking the vicious cycle of erosive pustular dermatosis of the scalp. Int J Dermatol. 2022;61:e216-e217.
27. Molle MF, Burroni AG, Herzum A, et al. Erosive pustular dermatosis of the scalp and multiple sclerosis: just a coincidence? Dermatol Reports. 2022;14:9445.
28. Buttars B, Rashid Z, Al-Rubaie V, et al. Umbilical remnant allograft application in the treatment of erosive pustular dermatosis of the scalp. JAAD Case Rep. 2022;23:70-72.
29. Nazzaro G, Giacalone S, Bortoluzzi P, et al. Erosive pustular dermatosis of the scalp induced by gefitinib: case and review of the literature. Dermatol Online J. 2021;27:13030.
30. Wolff H, Flaig MJ. Posttraumatische erosive pustulöse Dermatose am Kapillitium bei einer jungen Frau. Hautarzt. 2020;71:27-29.
31. Solanki AD, Nagrani NS, Patel DV, et al. Case reports on erosive pustular dermatosis of scalp: a cross sectional study at a tertiary care centre. Int J Res Dermatol. 2020;6:260-263.
32. Arteaga-Henriquez M, Gonzalez-Hernandez S, Garcia-Peris E. Conventional versus daylight photodynamic therapy in the treatment of erosive pustular dermatosis of the scalp. Dermatol Ther. 2020;33:e13220.
33. Vovobyev A, Zillikens D, Kahle B. Erosive pustulöse Dermatose der Kopfhaut. Akt Dermatol. 2020;46:50-52.
34. Giuffrida R, Borgia F, Cannavò SP. Two cases of erosive pustular dermatosis of the scalp occurring after topical 3.75% imiquimod for actinic keratoses. Dermatol Ther. 2019;32:e12770.
35. di Meo N, Corneli P, Retrosi C, et al. Erosive pustular dermatosis of the scalp: Therapy is the diagnosis. Dermatol Ther. 2019;32:e13128.
36. Piccolo V, Russo T, Bianco S, et al. Erosive pustular dermatosis of the scalp: Why do we miss it? Dermatology. 2019;235:390-395.
37. Tomasini C, Michelerio A. Erosive pustular dermatosis of the scalp: A neutrophilic folliculitis within the spectrum of neutrophilic dermatoses: A clinicopathologic study of 30 cases. J Am Acad Dermatol. 2019;81:527-533.
38. Sechi A, Piraccini BM, Alessandrini A, et al. Post-traumatic erosive dermatosis of the scalp: A hypergranulated variant. Australas J Dermatol. 2019;60:e322-e326.
39. Cunha PR, Tsoukas MM, Kroumpouzos G. Erosive pustular dermatosis of the scalp treated with aminolevulinic acid photodynamic therapy and postprocedure silicone gel. Dermatol Surg. 2019;45:740-743.
40. Wilk M, Zelger BG, Hauser U, et al. Erosive pustular dermatosis of the scalp: reappraisal of an underrecognized entity. J Dtsch Dermatol Ges. 2018;16:15-19.
41. Uysal İ, Ünal T, Bozdoğan Ö, et al. Chronic recalcitrant dermatosis: erosive pustular dermatosis of the scalp treated with acitretin and topical tacrolimus. Turkish J Geriatrics. 2017;20:249-253.
42. Chen WH, Chiang C-P. Erosive pustular dermatosis of the scalp in an elderly patient. Dermatologica Sinica. 2016;34:106-107.
43. Levakov O, Gajic B. Erosive pustular dermatosis of the scalp - Is it really a rare condition? Vojnosanit Pregl. 2014;71:307-310.
44. Semkova K, Tchernev G, Wollina U. Erosive pustular dermatosis (chronic atrophic dermatosis of the scalp and extremities). Clin Cosmet Investig Dermatol. 2013;6:177-182.
45. Guarneri C, Cannavò SP. Erosive pustular dermatosis of the scalp from topical minoxidil 5% solution. Int J Dermatol. 2013;52:507-509.
46. Zahdi MR, Seidel GB, Soares VC, et al. Erosive pustular dermatosis of the scalp successfully treated with oral prednisone and topical tacrolimus. An Bras Dermatol. 2013;88:796-768.
47. Broussard KC, Berger TG, Rosenblum M, et al. Erosive pustular dermatosis of the scalp: a review with a focus on dapsone therapy. J Am Acad Dermatol. 2012;66:680-686.
48. Vano-Galvan S, Antonio MC, Pedro J. Erosive pustular dermatosis of the scalp. J Pak Med Assoc. 2012;62:501-502.
49. Shahmoradi Z, Abtahi-Naeini B, Pourazizi M. Erosive pustular dermatosis of the scalp following hair transplantation. Adv Biomed Res. 2014;3:176.
50. Wollina U. Three orphans one should know: red scalp, red ear, and red scrotum syndrome. J Eur Acad Dermatol Venereol. 2016;30:e169-e170.
51. Wollina U, Bitel A, Vojvodic A, et al. Rosacea flare - up after photodynamic therapy (PDT) for field cancerization and a review on adverse events with PDT in general. Open Access Maced J Med Sci. 2019;7:2998-3001.
52. Junejo MH, Kentley J, Rajpopat M, et al. Therapeutic options for erosive pustular dermatosis of the scalp: a systematic review. Br J Dermatol. 2021;184:25-33.
53. Karanfilian KM, Wassef C. Erosive pustular dermatosis of the scalp: causes and treatments. Int J Dermatol. 2021;60:25-32.
54. Sasaki R, Asano Y, Fujimura T. A pediatric case of corticosteroid-resistant erosive pustular dermatosis of scalp-like alopecia treated successfully with oral indomethacin, doxycycline, and topical tacrolimus. J Dermatol. 2022;49:e299-e300.
55. Maglie R, Quintarelli L, Caproni M, et al. Impressive response of erosive pustular dermatosis of the scalp to lymecycline monotherapy. J Dtsch Dermatol Ges. 2019;17:1177-1178.