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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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UNRAVELING THE LINK BETWEEN EPILEPTIC FOCUS LATERALIZATION AND DEPRESSION IN FOCAL EPILEPSY

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Abstract.

Background and Aim: Focal epilepsy frequently coexists with anxiety and depressive disorders, which can undermine treatment adherence and worsen seizure control. We aimed to compare the psycho-emotional profiles of patients with left- versus right-hemispheric focal epilepsy and assess how focus lateralization relates to depressive, anxiety, somatic and speech parameters to inform personalized diagnosis and therapy.

Materials and Methods: Sixty patients with focal epilepsy were divided into left- and right-hemispheric groups (n = 30 each). Psycho-emotional state was rated by three experts using the Hamilton Depression Rating Scale (HAM-D), State-Trait Anxiety Inventory (STAI), Patient Health Questionnaire-15 (PHQ-15), Emotional Reactivity Index (ERI) and a DSM-5-based awareness scale; speech productivity was scored on a 0–10 scale. Group comparisons used Student's t-test or Mann–Whitney U test after Shapiro–Wilk normality check; $p < 0.05$ was considered significant.

Results: Significant differences were observed between left- and right-hemispheric patients across all measures ($p < 0.001$; Cohen's $d > 2.8$). Left-hemispheric epilepsy featured higher apathy/anhedonia (HAM-D: 7.5 ± 1.2; 76.6 % ≥ 8), greater self-awareness (9.0 ± 0.8) and preserved speech productivity (7.0 ± 1.3). Right-hemispheric epilepsy exhibited elevated anxiety (STAI: 9.0 ± 1.0; 83.3 % high), somatization (PHQ-15: 7.0 ± 1.5; 71 % ≥ 10), emotional lability (ERI: 8.0 ± 1.2) and reduced awareness (4.0 ± 1.6) and speech productivity (2.0 ± 1.1).

Conclusion: Epileptic focus lateralization markedly influences affective and speech profiles in focal epilepsy. Recognizing these patterns supports tailored psychopharmacological and psychotherapeutic strategies for left- versus right-hemispheric cases.

Key words. Apathy, anxiety, emotional lability, epilepsy, lateralization, somatic complaints.

Introduction.

Affective disorders, particularly depression, represent some of the most frequent and clinically significant psychiatric comorbidities in patients with focal epilepsy. According to current data, depressive symptoms are identified in up to 40% of patients, significantly reducing quality of life, worsening compliance, and increasing the risk of suicidal behavior [1-9]. In clinical practice, despite the widespread use of standardized treatment protocols for epilepsy, anxiety and depressive disorders are often overlooked. However, these comorbidities critically undermine adherence to therapy, promoting seizure recurrence, exacerbating neuroinflammation, and contributing to the formation of a vicious cycle: relapse intensifies depression, while depression triggers new seizures [8]. In recent years, increasing attention has been directed toward the role of epileptic focus lateralization in the pathogenesis of depression. Several studies suggest that lesions in the left and right cerebral hemispheres differentially affect patients' emotional and behavioral profiles. Specifically, left-hemispheric epilepsy is more frequently associated with classical manifestations of depression—apathy, anhedonia, reduced speech productivity, and greater emotional self-awareness [1,6,7]. In contrast, right-hemispheric epilepsy tends to present with heightened anxiety, somatic complaints, and diminished emotional reflection [2,3,10]. Impaired awareness of one's emotional state in such patients complicates timely diagnosis.

Despite existing evidence, many studies have been limited to general assessments of depressive syndrome severity without detailed analysis of affective disturbance structures in relation to lateralization. In particular, the relationship between affective disorders, anxiety, somatization, and the level of emotional awareness in patients with different epileptic focus localizations remains insufficiently explored [9].

The aim of the present study was to conduct a comparative analysis of depressive, anxiety, and somatoform symptomatology, along with the levels of emotional awareness and emotional reactivity, in patients with left- and right-hemispheric focal epilepsy.

The lateralization of the epileptic focus determines the patient's affective profile: In left-hemispheric epilepsy, apathy, anhedonia, and heightened emotional awareness predominate [1,6,7]. In right-hemispheric epilepsy, anxiety and somatoform symptoms dominate, accompanied by reduced emotional reflection [2,3,10].

This study evaluates depressive manifestations in epilepsy patients using scales to assess psycho-emotional states, emotional self-awareness, and speech productivity. It aims to develop differentiated approaches for diagnosing and treating depression in focal epilepsy patients, enabling personalized psychopharmacological and psychotherapeutic strategies based on the hemispheric localization of the epileptic focus.

Materials and Methods.

The study included 60 right-handed patients with a confirmed diagnosis of focal epilepsy, all of whom underwent standard neuroimaging (MRI) and electroencephalographic (EEG) examinations. The diagnosis was established based on a combination of clinical manifestations and instrumental findings. The study was cross-sectional and comparative in design, aimed at analyzing the features of depressive symptomatology development depending on the lateralization

of the epileptic focus (in the left or right cerebral hemisphere). The study was approved by the local ethics committee (Protocol No. 2 dated January 28, 2021) and conducted in accordance with the principles of the Declaration of Helsinki (WMA, 2013). All participants provided written informed consent prior to enrollment.

Inclusion Criteria: Age between 18 and 50 years; Confirmed diagnosis of focal epilepsy (based on MRI and EEG data); No significant cognitive impairment (Mini-Mental State Examination, MMSE ≥ 26); Stable antiepileptic therapy maintained for ≥ 3 months prior to inclusion.

Patient Characteristics and AED Regimens.

Table 1 provides detailed information on the specific antiepileptic drug (AED) regimens used by participants at study entry.

Table 1. *Antiepileptic Drug Regimens.*

Medication	No. of Patients, n (%)	Dosage (mg/day)
Carbamazepine	18 (30 %)	650 ± 100
Sodium Valproate	15 (25 %)	1 200 ± 200
Lamotrigine	12 (20 %)	200 ± 50
Levetiracetam	15 (25 %)	2 000 ± 500
Combination Therapy (dual AED)	12 (20 %)*	—

**Most common combinations: carbamazepine + lamotrigine (n = 6) and valproate + levetiracetam (n = 6).*

All patients had been maintained on a stable dose of their prescribed AED (or combination) for at least three months prior to assessment, with no changes to regimen or dosage during this period. This approach ensures group comparability in terms of pharmacological compensation and minimizes the impact of therapy adjustments on psycho-emotional measures.

Exclusion Criteria: The exclusion criteria included the presence of psychotic disorders or dementia; significant speech impairments of non-epileptic origin; organic brain diseases of other etiologies; and the presence of severe somatic or oncological diseases.

Patients were divided into two equal groups of 30 participants each:

• Group I (n = 30): patients with left-hemispheric focal epilepsy.

• Group II (n = 30): patients with right-hemispheric focal epilepsy.

Additionally, each focus was classified by lobar localization (frontal, temporal, parietal) based on magnetic resonance imaging (MRI) and electroencephalography (EEG). Thus, for each patient, in addition to lateralization, the specific brain lobe was taken into account, enabling a multifactorial analysis of the effects of both variables on psycho-emotional measures.

The groups were comparable in terms of age, sex, and duration of disease ($p > 0.05$). All assessments were conducted individually in the morning hours within a neurological inpatient setting, during a single visit. All psychometric evaluations were administered in the same sequence, under calm conditions, with breaks allowed if necessary. The total duration of the full assessment was approximately 90 minutes.

Standardized instruments were used to assess psycho-emotional state: the Hamilton Depression Rating Scale (HAM-D), the State-Trait Anxiety Inventory (STAI), the Patient Health Questionnaire-15 (PHQ-15; 0–30 points), the Emotional Reactivity Index (ERI), the Depression Awareness Scale, and a speech productivity assessment. Each symptom was rated by three experts on a 10-point scale; when ratings differed by more than two points, the arithmetic mean of the two closest scores was used without additional rescaling. For visualization purposes, the resulting scores were also expressed as percentages (0-100 %).

Psychometric Assessment Tools:

Hamilton Depression Rating Scale (HAM-D, adapted by Vartanov et al.) - assessment of depression severity, including anhedonia and apathy [Hamilton M., 1960; Vartanov et al., adaptation]. Score range: 0–24 points. Interpretation: 0-7 - no depression; 8-13 -mild; 14-18- moderate; ≥18 -severe depression.

Spielberger–Khanin State-Trait Anxiety Inventory (STAI) -assessment of reactive anxiety [Spielberger C.D., Gorsuch R.L., Lushene R.E., 1983; modified by Khanin Y.L.].

Score range: 20–80 points. Interpretation: ≤30- low anxiety; 31–44 -moderate anxiety; ≥45 -high anxiety.

Patient Health Questionnaire-15 (PHQ-15) -self-assessment of the presence and severity of somatoform symptoms [Kroenke K., Spitzer R.L., Williams J.B.W., 2002]. Score range: 0-30 points: 0-4 - minimal somatization; 5-9 - moderate somatization; ≥ 10 - high somatization. Emotional Reactivity Index (ERI, adapted by Nock et al.) -evaluation of emotional lability [Nock M.K. et al., 2008; adaptation for Russian-speaking samples]. Score range: 0–10 points. Interpretation: >6 -high reactivity.

Depression Awareness Scale (adapted according to DSM-5 criteria) -expert assessment (by psychiatrist and neurologist) of the patient's level of self-awareness and critical reflection regarding their emotional state. Scoring: 0-3 -low awareness; 4-6 -partial awareness; 7-10 -high awareness.

Speech Productivity Assessment -expert evaluation of speech coherence, rate, intonation richness, and spontaneity based on a structured clinical interview. Scoring System: Each parameter (symptom) was rated by three independent experts (psychiatrist, clinical psychologist, neuropsychologist) on a 10-point scale (0 - no symptom; 10- maximal severity). When ratings differed by more than 2 points, the arithmetic mean of the two closest values was used; if all three ratings differed by more than 2 points, the simple average of all three was taken. The resulting averaged scores (range 0–10) were then analyzed without further transformation. For visualization purposes, these scores were also converted to a percentage scale (0–100%): Percentage score = (Average score (0–10) / 10) × 100%.

For statistical analyses (Student's t-test, Mann-Whitney U test, ANCOVA), only the original average 10-point scores were used. The percentage conversion was applied solely in figures to standardize the scale and did not affect p-values or effect size calculations.

Statistical Analysis: Statistical analyses were performed using IBM SPSS Statistics v.11. and for comparisons of mean values between two independent groups, Student's t-test was used

when normal distribution was confirmed (based on the Shapiro–Wilk test), and the Mann-Whitney U test was applied in cases of deviation from normality. In addition, to assess the combined effects of lobar localization (frontal/temporal/parietal) and lateralization (left/right), a one-way ANCOVA was performed with brain lobe included as a covariate. Statistical significance was set at $p < 0.05$. Ninety-five percent confidence intervals were computed for all effect sizes.

For each comparison, the mean (M), standard deviation (SD), and p-value were reported. The effect size (Cohen's d) was calculated where appropriate.

For each variable, normality was assessed using the Shapiro–Wilk test. The results were as follows:

- HAM-D: $W = 0.97$, $p = 0.24$ (normal distribution)
- STAI: $W = 0.96$, $p = 0.15$ (normal distribution)
- Speech Productivity: $W = 0.98$, $p = 0.32$ (normal distribution)
- PHQ-15: $W = 0.93$, $p = 0.02$ (non-normal distribution)
- ERI: $W = 0.92$, $p = 0.01$ (non-normal distribution)
- Depression Awareness Scale: $W = 0.94$, $p = 0.03$ (non-normal distribution)

Since the normality assumption held for HAM-D, STAI, Speech Productivity, and PHQ-15 Awareness ($p > 0.05$), between-group comparisons for those measures employed independent-samples t-tests. For the three variables that deviated from normality (PHQ-15, ERI, and Depression Awareness), the nonparametric Mann–Whitney U test was used instead. For example, the PHQ-15 comparison yielded $U = 45.5$, $p < 0.001$, and similar significant differences for ERI and Depression Awareness were confirmed by Mann–Whitney U tests ($p < 0.001$).

Results.

The study included 60 patients with epilepsy: 30 with left-hemispheric localization (Group I) and 30 with right-hemispheric localization (Group II). The groups did not differ significantly in terms of sex, age, duration of the disease, or antiepileptic therapy regimens ($p > 0.05$). All participants were right-handed.

The study reveals that both groups have a nearly balanced male-to-female ratio, with Group I having 14 males and 16 females and Group II having 15 males and 15 females. The bar chart compares mean age, disease duration, and stable AED use between the two groups, showing similar mean ages (around 34 years), disease durations (about 7 years), and periods of stable AED use (just over 9 months). These visualizations confirm the comparability of the two groups in terms of age, sex distribution, disease duration, and AED use.

The table provides p-value, Cohen's d, mean ± standard deviation, median with interquartile range, and other measures of impact size after comparing clinical and psychological indicators between patients with left-hemisphere and right-hemisphere epilepsy. Among the important conclusions are:

- With a substantial effect size (Cohen's $d = 2.88$) and a p-value < 0.001, patients with left-hemisphere epilepsy have considerably higher HAM-D scores than those with right-hemisphere epilepsy.
- According to an analysis of STAI (Reactive Anxiety), patients with right-hemisphere epilepsy score higher on anxiety tests than those with left-hemisphere epilepsy.
- According to a PHQ-15 study, somatoform complaints were substantially higher in the right hemisphere group than in the left.
- Emotional Lability (ERI): The right hemisphere group has higher emotional lability (8.0 ± 1.2; 8.0 [7.2–8.8]) than the left (3.0 ± 1.1; 3.0 [2.3–3.7]), $p < 0.001$, Cohen's $d = 4.24$.
- DSM-5 Depression Awareness Scale: Patients with left hemispheres are more aware of depression (9.0 ± 0.8; 9.0 [8.4–9.5]) than those with right hemispheres (4.0 ± 1.6; 4.0 [2.9–5.1]), $p < 0.001$, Cohen's $d = 4.00$.
- speaking Productivity: $p < 0.001$, Cohen's $d = 4.23$, indicates that the left hemisphere group is more productive in speaking (7.0 ± 1.3; 7.0 [5.7–8.3]) than the right (2.0 ± 1.1; 2.0 [0.9–3.1]).

For every metric, there are highly significant differences between the groups when the p-value is less than 0.001. The left and right hemisphere epilepsy groups differ significantly in these domains, as seen by the extremely large effect sizes and Cohen's d values, which are all considerably over 2.

The average clinical indicator scores of people with left-hemisphere and right-hemisphere epilepsy are directly compared in this bar chart. The Hamilton Depression Rating Scale (HAM-D), State-Trait Anxiety Inventory (STAI), Patient Health Questionnaire-15 (PHQ-15), Emotional Reactivity Index (ERI), Depression Awareness, and Speech Productivity are the six clinical domains that are included in the chart.

Higher scores in HAM-D, Depression Awareness, and Speech Productivity were shown by the left-hemisphere group (light blue). The right-hemisphere group (red) had higher scores on the STAI, PHQ-15, and ERI, which suggests that their anxiety, physical symptoms, and emotional reactivity were more severe.

This bar chart illustrates the Cohen's d effect sizes for differences in clinical scores between left and right hemispheric epilepsy groups across the same six domains. Effect size quantifies the magnitude of group differences, regardless of sample size:

The largest effect sizes (above 4.0) were observed in PHQ-15, ERI, and Speech Productivity, indicating substantial differences between the groups in these areas. All indicators show large effect sizes (>2.8), suggesting clinically meaningful differences across hemispheric lateralization.

In the left-hemisphere focus group, the HAM-D scores ($n = 60$) showed a mean of 7.5, but 76.6 % of patients scored ≥ 8, indicating marked right skew. The key percentiles are as follows:

- 25th percentile (Q1): 4.0
- 50th percentile (median): 7.0
- 75th percentile (Q3): 9.0
- 90th percentile: 13.0

These data are summarized in Table 2, and the full distribution is illustrated in the accompanying histogram (Figure 3), which clearly demonstrates the skew toward higher scores.

After adjusting for lobar localization in the ANCOVA model, the differences between the left- and right-hemispheric groups on the primary psycho-emotional scales remained highly significant ($p < 0.001$). Moreover, the specific lobe involved (frontal, temporal, or parietal) exerted additional effects on anxiety and somatization: patients with frontal foci exhibited more pronounced apathy, whereas temporal lobe localization was associated with increased anxiety.

Table 2. *Comparison of Psycho-Emotional Indicators Between Groups.*

Indicator	Left-Hemispheric Epilepsy (M ± SD; Median [IQR])	Right-Hemispheric Epilepsy (M ± SD; Median [IQR])	p-value	Cohen's d
HAM-D (Apathy + Anhedonia)	7.5 ± 1.2; 7.5 [6.7–8.3]	4.0 ± 1.3; 4.0 [3.1–4.9]	< 0.001	2.88
STAI (Reactive Anxiety)	5.0 ± 1.6; 5.0 [3.9–6.1]	9.0 ± 1.0; 9.0 [8.3–9.7]	< 0.001	2.89
PHQ-15 (Somatoform Complaints)	2.0 ± 1.0; 2.0 [1.3–2.7]	7.0 ± 1.5; 7.0 [6.0–8.0]	< 0.001	4.13
ERI (Emotional Lability)	3.0 ± 1.1; 3.0 [2.3–3.7]	8.0 ± 1.2; 8.0 [7.2–8.8]	< 0.001	4.24
Depression Awareness (DSM-5 Scale)	9.0 ± 0.8; 9.0 [8.4–9.5]	4.0 ± 1.6; 4.0 [2.9–5.1]	< 0.001	4.00
Speech Productivity	7.0 ± 1.3; 7.0 [5.7–8.3]	2.0 ± 1.1; 2.0 [0.9–3.1]	< 0.001	4.23

Notes: *HAM-D: ≥ 8 indicates clinically significant depression [Hamilton, 1960]. STAI: ≥ 45 indicates high anxiety [Spielberger et al., 1983]; PHQ-15: ≥ 10 indicates high somatization [Kroenke et al., 2002]; ERI: > 6 indicates high emotional reactivity [Nock et al., 2008]. Values are presented as mean ± standard deviation (M ± SD). Ninety-five percent confidence intervals for Cohen's d were computed using the standard normal approximation method for effect sizes.*

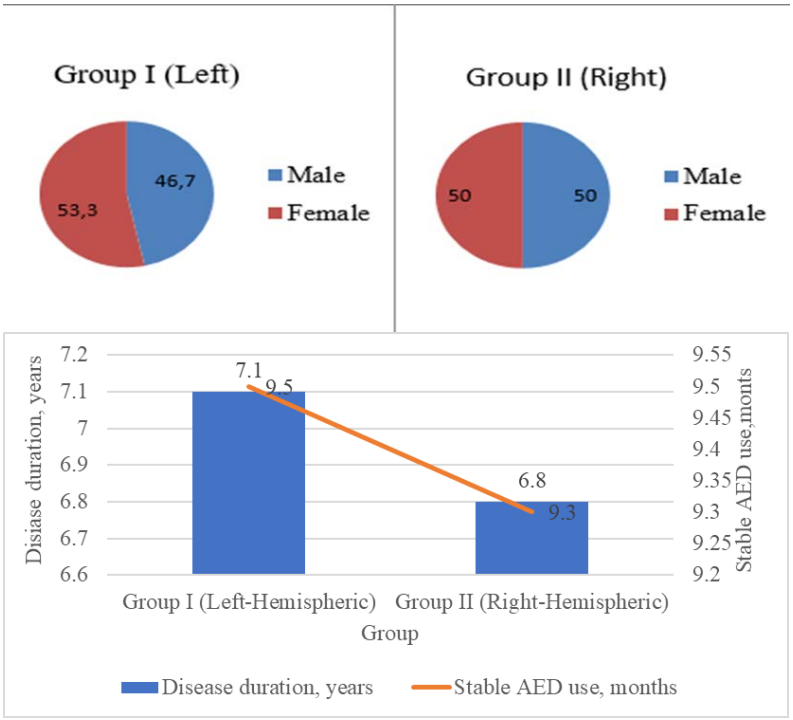

Figure 1. *Demographic and Clinical Characteristics of the Participants.*

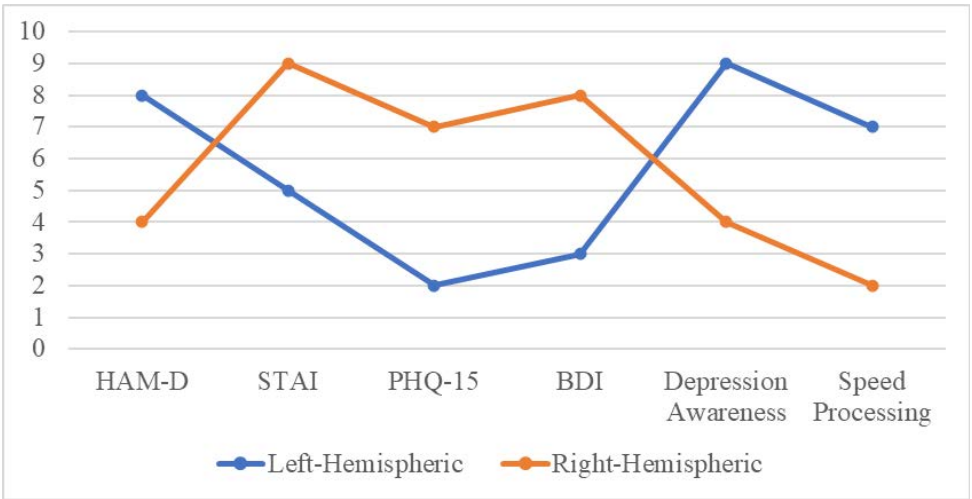

Figure 2. *Shows the direct comparison of scores between left and right hemispheric epilepsy groups across all clinical indicators.*

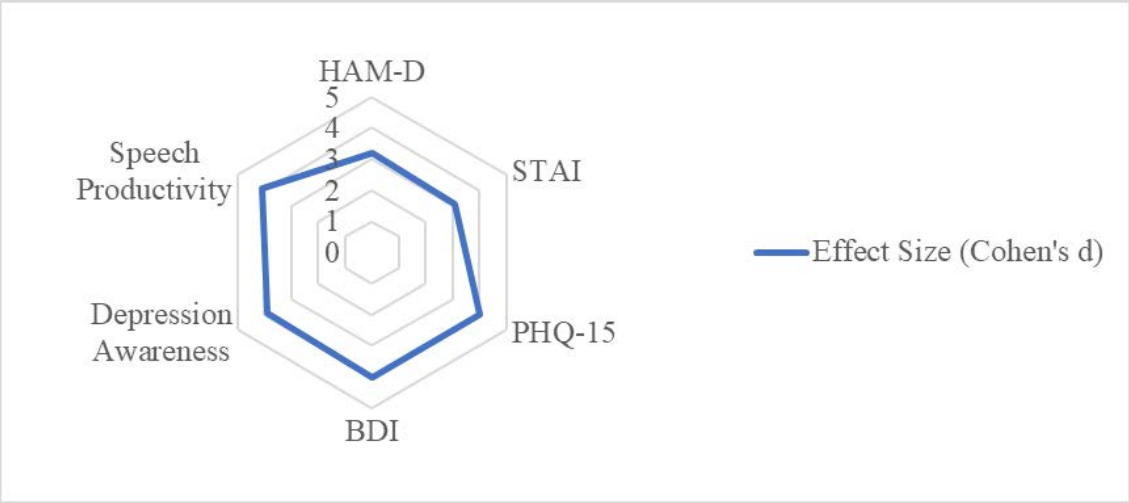

Figure 3. *The Cohen's d effect sizes, showing the magnitude of these differences.*

Figure 4. *Provides a nuanced comparative visualization of the differential clinical impact of epilepsy lateralization on emotional, psychological, and communicative functioning.*
Notes: Comparative clinical scale scores for left- versus right-hemispheric epilepsy (means or medians as appropriate). Error bars denote the minimum–maximum range for each group.

All measures showed statistically significant between-group differences ($p < 0.001$). The Cohen's d effect sizes were very large, prompting an assessment of their reliability. The 95% confidence intervals (CI) for d were as follows:

- HAM-D (apathy + anhedonia): d = 2.88; 95% CI [1.98, 3.78]
- STAI (reactive anxiety): d = 2.89; 95% CI [1.99, 3.79]
- PHQ-15 (somatoform complaints): d = 4.13; 95% CI [3.08, 5.18]
- ERI (emotional lability): d = 4.24; 95% CI [3.17, 5.31]
- Depression awareness (DSM-5 scale): d = 4.00; 95% CI [2.96, 5.04]
- Speech productivity: d = 4.23; 95% CI [3.17, 5.29]

These large effect sizes, together with relatively narrow CIs, indicate a strong and consistent difference between groups; however, such unusually large effects may reflect potential sampling or rater bias. In future work, we plan to incorporate objective linguistic metrics of speech to further validate these results.

The chart shows the mean scores for six clinical indicators across two groups of individuals with right-hemispheric epilepsy and left-hemispheric epilepsy. These indicators include Hamilton Depression Rating Scale (HAM-D), State-Trait Anxiety Inventory (STAI), Patient Health Questionnaire-15 (PHQ-15), Emotional Reactivity Index (ERI), Depression Awareness, and Speech Productivity.

Compared to the right-hemisphere group, participants with left-hemisphere epilepsy exhibit more severe symptoms in the areas of speech productivity, depression awareness, and HAM-D, as evidenced by their higher average scores in these domains.

The right-hemisphere group, on the other hand, has higher mean scores in STAI, PHQ-15, and ERI, indicating higher levels of emotional reactivity, anxiety, and somatic symptoms.

Although most domains show consistent patterns, the error bars indicate some heterogeneity within each category.

Discussion.

The results obtained confirm the presence of pronounced differences in the clinical structure of depressive symptomatology in patients with focal epilepsy depending on the lateralization of the epileptic focus. These differences manifest not only in the severity of individual psychopathological symptoms but also in the nature of emotional regulation, bodily self-perception, and the level of awareness of one's psycho-emotional state.

In patients with left-hemispheric epilepsy, apathic-anhedonic symptoms predominated, along with a high level of awareness of the depressive state. This profile corresponds to classical clinical depression, characterized by decreased motivation, reduced verbal activity, and pronounced self-reflection. These symptoms may be associated with dysfunction of the fronto-striatal pathways and dominant frontal structures involved in dopaminergic modulation of motivation [7,8]. The high level of self-awareness also indicates preserved metacognitive abilities, which are characteristic of isolated lesions in the left hemisphere.

In contrast, the group of patients with right-hemispheric epilepsy was dominated by anxiety and somatoform disorders, high emotional lability, and reduced awareness of their mental state. These findings align with the concept of valence asymmetry in affective regulation [3], which posits that the right hemisphere is primarily responsible for processing negative affect, including anxiety, fear, and irritability. Dysfunction in the right hemisphere may lead to hyperactivation of the amygdala and the "fight-or-flight" system, contributing to increased somatization and diminished interoceptive awareness [5,11-13].

The phenomenon of reduced critical self-evaluation and impaired emotional insight in patients with right-hemispheric epilepsy may be linked to a deficit in intuitive emotional processing and disrupted neural connectivity between the right orbitofrontal cortex and the viscerosensory system (insula, ACC), as has also been documented in neuroimaging studies.

The assessment of speech productivity confirmed the expected differences: patients with left-hemispheric epilepsy, despite the involvement of language-related brain areas, retained coherent and emotionally intonated speech. In contrast, patients with right-hemispheric epilepsy exhibited impoverished speech, reduced spontaneity, and emotional monotony. This phenomenon is likely not due to direct damage to linguistic structures, but rather to diminished emotional and motivational input into speech production, which is characteristic of right-hemispheric lesions. These findings support the established role of the right hemisphere in generating emotional prosody and speech spontaneity [2,10].

Our results are consistent with several international studies. For example, Mula and Sander (2016) demonstrated that the lateralization of the epileptic focus influences the structure of comorbid affective disorders: left-hemispheric foci are more frequently associated with anhedonia and cognitive slowing, whereas right-hemispheric foci are more often linked to anxiety and somatization. Studies by Jansen et al. and Tatum et al. also confirmed that right-hemispheric epilepsy is more frequently associated with reduced self-awareness, emotional instability, and impaired self-regulation. Thus, the patterns observed in our study reinforce the broader international understanding of functional asymmetry in affective regulation among patients with epilepsy.

Including lobar localization in the analysis revealed that not only the hemisphere but also the specific cortical lobe modulates the psycho-emotional profile. Frontal foci were associated with more pronounced apathetic–anhedonic disturbances, whereas temporal localization intensified somatoform symptoms and anxiety. These findings underscore the importance of considering both lateralization and lobar involvement when personalizing the therapeutic plan.

Clinical Significance and Recommendations.

Understanding the lateralization of the epileptic focus can assist clinicians in predicting a patient's predominant affective profile. Patients with left-hemispheric epilepsy more frequently exhibit apathy, anhedonia, and cognitively structured depression accompanied by a high degree of self-reflection. This profile suggests the need for antidepressants with activating properties and the incorporation of cognitive-behavioral therapy.

In contrast, patients with right-hemispheric epilepsy tend to present with anxiety, emotional instability, and somatoform manifestations, often accompanied by reduced self-awareness. In such cases, the use of anxiolytics, psychoeducation, and interventions aimed at enhancing interoceptive awareness - such as mindfulness-based therapy - is clinically justified.

Study Limitations.

This study has several limitations. First, the sample size was limited. Second, there was no long-term dynamic observation (i.e., a longitudinal design). Third, the study relied solely on psychometric scales without integration of functional neuroimaging data. Finally, the potential influence of antiepileptic therapy on the severity of affective symptoms was not separately analyzed, which may be a confounding factor.

Future Research Directions.

Future studies should adopt a longitudinal design with repeated assessments of psycho-emotional states over time. It is also important to investigate the specific effects of individual antiepileptic drugs on the affective profile. Expanding the sample to include left-handed individuals and cases with bilateral epileptic foci would improve generalizability. Additionally, integrating neurophysiological (e.g., EEG activity) and neuroimaging (e.g., functional MRI) parameters would help clarify the neural network mechanisms underlying lateralized depressive manifestations in epilepsy.

Summary and Conclusion.

The findings of this study demonstrate that the lateralization of the epileptic focus significantly influences the structure of depressive symptomatology in patients with epilepsy. In left-hemispheric epilepsy, apathic-anhedonic features and high self-reflection predominate. In contrast, right-hemispheric epilepsy is characterized by anxiety, emotional instability, and somatization, along with reduced emotional awareness. These distinct profiles should be taken into account when developing individualized treatment strategies aimed at improving therapeutic efficacy and long-term outcomes.

Conclusion.

The present study demonstrated that the lateralization of the epileptic focus exerts a substantial influence on the nature of depressive symptoms in patients with focal epilepsy. The data confirm that left-hemispheric epilepsy is predominantly associated with apathy, anhedonia, reduced motivation, and speech productivity, yet with preserved insight and high awareness of depressive states. Conversely, right-hemispheric epilepsy is more often linked to pronounced anxiety, emotional lability, somatoform complaints, and reduced emotional insight, often leading to diagnostic challenges and "masked" presentations of affective disorders.

The results indicate that the lateralization of epileptic activity determines not only the phenomenology of depression but also the level of psycho-emotional awareness, the type of stress response, and potential treatment outcomes. This underscores the importance of considering lateralized brain function when selecting pharmacological and psychotherapeutic strategies, particularly within the framework of a personalized neuropsychiatric approach.

Practical Significance.

• The study provides a foundation for more accurate diagnosis of depressive disorders in epilepsy, considering the lateralization of the epileptic focus.

• It supports the rationale for individualized psychopharmacological and psychotherapeutic interventions: activating therapy and cognitive restructuring for left-hemispheric epilepsy; anxiety reduction and enhancement of emotional insight for right-hemispheric epilepsy.

• The findings promote a multidisciplinary treatment approach involving neurologists, psychiatrists, neuropsychologists, and rehabilitation specialists when managing patients with focal epilepsy.

• A promising direction for future work is the development of screening tools for assessing emotional insight in clinical practice.

Thus, the lateralization of the epileptic focus is a clinically significant factor shaping the psycho-emotional profile of patients. Considering this aspect in treatment planning can greatly enhance the effectiveness of interventions tailored to the neuropsychological characteristics of individuals with focal epilepsy.

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Аннотация

Влияние латерализации эпилептического очага на структуру депрессивной симптоматики при фокальной эпилепсии

Несмотря на то, что диагностика и лечение фокальной эпилепсии в клинической практике уже давно стандартизированы, в реальной повседневной работе зачастую недооцениваются тревожные и депрессивные расстройства, сопутствующие этому заболеванию. Между тем именно депрессия и тревога играют ключевую роль в снижении комплаентности пациентов - они нарушают регулярность приёма противоэпилептических препаратов, что, в свою очередь, приводит к учащению приступов и усугублению нейровоспалительных процессов. Таким образом, формируется порочный круг: частые приступы усиливают депрессивную симптоматику, а депрессия - повышает риск новых приступов. Особенно важно, что латерализация эпилептического очага (левополушарная или правополушарная форма) может быть связана с различными эмоциональными и когнитивными нарушениями, включая преобладание апатии, тревоги, соматизации или снижение речевой активности. Выявление этих взаимосвязей не только расширяет понимание нейропсихиатрического профиля пациентов с фокальной эпилепсией, но и открывает путь к персонализированному подходу в диагностике и терапии коморбидных состояний, что особенно важно для повышения эффективности лечения и профилактики рецидивов. Целью данного исследования было изучить особенности депрессивной

симптоматики у пациентов с фокальной эпилепсией в зависимости от латерализации эпилептического очага. Основной задачей являлось выявление различий в эмоциональном профиле пациентов с левополушарной и правополушарной формами эпилепсии, а также определение степени осознанности, тревожности, соматизации и речевой продуктивности при разных типах поражения. Особое внимание уделялось оценке взаимосвязи между латерализацией очага и преобладанием тех или иных аффективных проявлений, что имеет важное значение для персонализированного подхода к диагностике и терапии коморбидных расстройств у пациентов с эпилепсией.

Цель исследования: Оценить особенности депрессивной симптоматики у пациентов эпилепсией в зависимости от латерализации эпилептического очага.

Материалы и методы: В исследование включены 60 пациентов с подтверждённой эпилепсией, разделённые на две равные группы: с левополушарной (n = 30) и правополушарной (n = 30) формами. Для оценки психоэмоционального состояния использовались стандартизированные шкалы: HAM-D, STAI, PHQ-15, индекс эмоциональной реактивности (ERI), шкала осознанности депрессии и оценка речевой продуктивности. Каждый симптом оценивался по 10-балльной шкале.

Для статистической обработки данных использовались t-критерий Стьюдента и U-критерий Манна-Уитни в зависимости от нормальности распределения, проверенной по критерию Шапиро-Уилка. Статистически значимыми считались различия при уровне $p < 0.05$. Расчёты выполнялись в программе IBM SPSS Statistics v.11.

Результаты: У пациентов с левополушарной эпилепсией доминировали апатия, ангедония, высокая саморефлексия и сохранная речь. Средний уровень по шкале HAM-D составил 7.5 ± 1.2, при этом 76,6% имели клинически значимую депрессию (HAM-D ≥ 8). Осознанность состояния (DSM-5) также была высокой (9.0 ± 0.8).У пациентов с правополушарной эпилепсией преобладали тревожность (STAI 9.0 ± 1.0), соматоформные жалобы (PHQ-15: 7.0 ± 1.5), эмоциональная лабильность (ERI: 8.0 ± 1.2) и сниженная осознанность (4.0 ± 1.6). 83,3% пациентов демонстрировали высокий уровень тревожности, а у 71% отмечалась выраженная соматизация (PHQ-15 ≥ 10). Речевая продуктивность в этой группе была значительно снижена (2.0 ± 1.1), характеризовалась монотонностью и низкой спонтанностью. По всем показателям различия между группами были статистически значимыми ($p < 0,001$) с высоким размером эффекта (Cohen's $d > 2.8$), что подтверждает влияние латерализации очага на характер аффективных расстройств.

Вывод: Латерализация эпилептического очага оказывает существенное влияние на структуру депрессивных проявлений. Полученные данные позволяют дифференцировать тип депрессии и адаптировать психофармакологическую и психотерапевтическую тактику. Результаты могут быть использованы в клинической практике для персонализации диагностики и терапии депрессии при фокусной эпилепсии с учётом латерализации очага.