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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.

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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 ВИНТИ 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 ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებშიდან.

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. Корректур авторам не высылаются, 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 computer-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 საყურადღებო!

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. რენტგენოგრაფიის ფოტოსურათები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების 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 ფხიხლებში 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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DISCONTINUATION OF ANTIEPILEPTIC DRUGS AFTER EMBOLIZATION OF DURAL ARTERIOVENOUS FISTULAS

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Abstract.

Background: Seizures associated with dural arteriovenous fistulas (dAVFs) are rare, and the safety of antiseizure medication (ASM) discontinuation after embolization remains uncertain.

Methods: A retrospective review of five patients with seizure-associated dAVFs treated with embolization was conducted. Clinical and angiographic outcomes were analyzed, focusing on seizure recurrence and ASM discontinuation.

Results: Three patients successfully discontinued ASMs without recurrence, while one experienced a relapse after early discontinuation. Statistical analyses showed no significant correlation between seizure-free duration and ASM discontinuation ($p=0.146$) or seizure type and ASM management ($p=0.317$).

Conclusion: ASM discontinuation may be feasible in selected post-embolization patients, but individualized decisions are essential. Larger studies are needed to establish guidelines for post-treatment seizure management.

Key words. dAVF, embolization, AEDs discontinuation, seizure control.

Introduction.

Dural arteriovenous fistulas (dAVFs) are uncommon vascular abnormalities, accounting for approximately 10-15% of all intracranial arteriovenous malformations. While dAVFs are more commonly associated with presentations such as intracranial hemorrhage, progressive neurological deficits, or venous congestion, seizures represent a rare clinical manifestation, occurring in only about 3% of cases [1,2]. Despite this low prevalence, seizures are a potentially significant and debilitating symptom.

The prognosis of seizure-associated dAVFs remains poorly understood. Data on the prevalence and characteristics of seizures in untreated dAVFs are limited, and it is unclear whether seizures result directly from the pathophysiology of the fistula such as venous hypertension or cortical irritation, or from secondary structural damage caused by complications like micro-hemorrhages or ischemia [3].

It is unknown whether the angiographic resolution of the fistula correlates with seizure freedom or if the cessation of antiseizure medications (ASMs) or antiepileptic agents is appropriate and safe in these patients [4,5].

Below, we present our experience in following up on five patients after the successful embolization of dural fistulas regarding the management of antiseizure medications (ASMs).

Materials and Methods.

A retrospective review of our dural arteriovenous fistula (dAVF) database was conducted to identify patients who

presented with seizures within three months prior to treatment between 2020 and 2024. Among 26 patients diagnosed with dAVFs at our center, five patients with seizure-associated dAVFs were identified and had complete follow-up records.

Clinical data, dAVF characteristics, and angiographic outcomes were collected. Patient clinical information included sex, age at diagnosis, seizure type and recurrence, and Cognard dAVF classification.

The goal was to obliterate the DAVF to improve patient's clinical symptoms, especially reversal of cortical venous reflux (CVR). The imaging data included angiographic images immediately after treatment and during the follow-up period. All patients underwent follow-up digital subtraction angiography (DSA) at 6 months after initial treatment to evaluate the efficacy of endovascular embolization.

Descriptive statistics were used to summarize patient demographics and clinical outcomes. The mean age of the patients and the mean seizure-free period post-embolization were evaluated. To assess the association between seizure-free duration and ASM discontinuation, an independent t-test was performed. To determine whether ASM discontinuation was significantly associated with seizure recurrence, a chi-square test was conducted. Statistical significance was set at $p < 0.05$ for all tests. All statistical analyses were performed using SciPy (Python).

Antiseizure medication (ASM) discontinuation was attempted in selected patients based on individualized risk assessments, clinical judgment, and patient preference. Factors such as seizure presentation (type and severity), the length of the post-embolization seizure-free interval, and the 6-month follow-up DSA result were all considered. These clinical factors were weighed alongside patient-related considerations—including patient preference and psychological comfort or anxiety about seizure recurrence—when deciding whether to taper and discontinue ASM for each patient.

Results.

Detailed Analysis and Insights from our Cases (Table 1).

Longer seizure-free periods seem to correlate with successful ASM discontinuation. Patients with longer seizure-free durations (18+ months) could discontinue ASMs without recurrence. Patient C, who experienced recurrence, had the shortest seizure-free period (6 months), suggesting that premature ASM discontinuation may increase the risk of seizure recurrence.

A comparison of seizure free periods between patients who discontinued ASM (mean 22 months) and those who did not (mean 15 months) was performed using an independent t-test. The difference was not statistically significant ($p=0.146$) indicating no clear correlation between ASM discontinuation and seizure-free period (Figure 1 and 2).

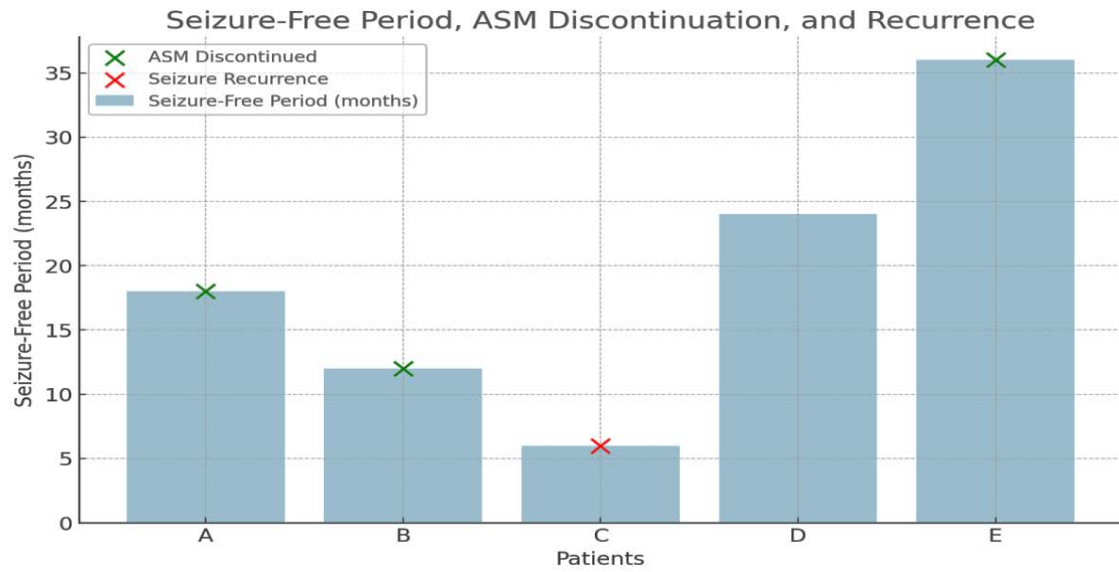


Figure 1. Seizure-Free Period vs. ASM discontinuation.

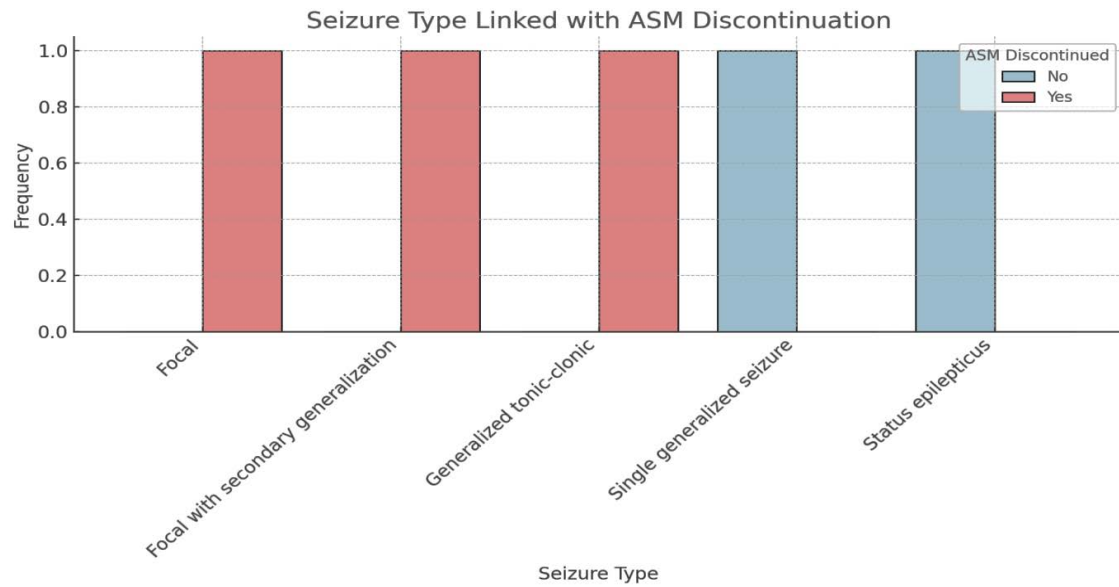


Figure 2. Seizure type linked to ASM discontinuation.

Table 1. Data of the patients during follow up.

Patient	Age (years)	Gender	Seizure Type	Cognard Type	Treatment	Seizure-Free Period (months)	ASM Discontinued	Recurrence
A	58	Male	Generalized tonic-clonic	IIa	Complete embolization of transverse sinus dAVF	18	Yes	No
B	65	Female	Focal	IIa+b	Complete embolization of sigmoid sinus dAVF	12	Yes	No
C	45	Male	Single generalized seizure	IIa	Embolization of superior sagittal sinus dAVF	6	Yes	Yes
D	50	Female	Status epilepticus	IIb	Embolization of torcular dAVF	24	No	No
E	39	Male	Focal with secondary generalization	IV	Embolization of cortical venous reflux dAVF	36	Yes	No

Recurrence Risk and Patient-Specific Factors.

Impact of Initial Seizure Presentation:

The single patient with recurrence after ASM discontinuation (Patient C) had a history of a generalized seizure before treatment. This could suggest that generalized seizures prior to embolization might pose a higher risk for post-discontinuation recurrence. Patients presenting with focal seizures (Patients B and E) successfully discontinued ASMs without recurrence, suggesting that the seizure type may play a role in predicting post-treatment ASM requirements. However, due to the limited sample size, this finding requires further validation. Patient D, despite being seizure-free, resumed ASMs due to anxiety, highlighting the psychological aspects influencing treatment adherence and ASM management.

A chi-square test was conducted to assess the association between seizure type and ASM discontinuation. The result showed no statistically significant relationship ($p=0.317$) indicating that seizure type did not significantly influence ASM decisions in this cohort. A Fisher's exact test was conducted to assess the association between seizure type and ASM discontinuation. This analysis showed no statistically significant relationship between the type of seizure presentation (generalized vs. focal) and the decision or ability to discontinue ASMs ($p = 0.40$). In other words, within this small cohort, seizure type by itself did not significantly influence ASM management outcomes.

Gender and Outcomes:

Due to the small cohort, no clear pattern emerges based on gender, but three males and two females exhibited similar seizure-free outcomes post-embolization with mean age 51.4 years (SD:10.43) and the mean seizure-free period post-embolization was 19.2 months (SD = 12.36).

Discussion.

Seizures associated with dural arteriovenous fistulas (dAVFs) are uncommon and often result from venous hypertension or cortical irritation caused by retrograde venous drainage and congestion. Successful embolization or surgical disconnection of the dAVF often resolves these underlying pathophysiological mechanisms [6,7]. However, limited attention has been given in the literature to the prognosis of seizures linked to dAVFs or the appropriateness of discontinuing antiseizure medications (ASMs) after treatment. Experimental studies suggest that intracranial venous hypertension and blood-brain barrier disruption may lead to cortical epileptogenicity by allowing serum proteins and other components to enter brain parenchyma. This process creates a cycle of sustained epileptogenicity that cannot be effectively controlled by ASMs alone [4,5].

In our analysis, we examined the relationship between seizure-free period and ASM discontinuation using an independent t-test, as well as the association between seizure type and ASM discontinuation through a chi-square test.

The t-test comparing seizure-free duration between patients who discontinued ASM and those who did not revealed no statistically significant difference ($p = 0.146$). While patients who discontinued ASM tended to have longer seizure-free periods, the small sample size limits the statistical power of this

observation. This suggests that seizure-free duration alone may not be a definitive predictor of ASM discontinuation success, and individualized decision-making remains essential.

Similarly, the chi-square test assessing the relationship between seizure type and ASM discontinuation showed no statistically significant association ($p = 0.317$). The Fisher's exact test assessing the relationship between seizure type and ASM discontinuation showed no statistically significant association ($p = 0.40$). Although focal seizures were more frequently associated with successful ASM discontinuation, this finding did not reach statistical significance. The results suggest that seizure type alone may not be a determining factor in post-embolization ASM management.

Studies, such as those by Lee et al. and Pop et al., highlight the importance of addressing the underlying vascular abnormalities to control seizures. In Lee's study, three cases of dAVF-related status epilepticus were successfully treated with endovascular intervention and ASMs, with two patients achieving seizure freedom within a short follow-up period [8].

Pop et al. reported a patient presenting with a generalized seizure and rapidly progressive neurological deficits due to a Cognard type IV dAVF. After successful endovascular treatment, seizure control was achieved, and ASMs were discontinued without recurrence. These studies emphasize the role of timely intervention in resolving venous congestion and preventing long-term epileptogenicity [9,10].

Limitations of the study.

1. Small Sample Size: This study included only five patients, which limits the statistical power and generalizability of the findings. A larger cohort would be necessary to draw conclusions that are more definitive.

2. Single-Center Design: All patients were treated at a single neurovascular center, which may introduce selection bias and limit the applicability of results to broader patient populations. A multi-center study would provide data that are more generalizable.

3. Lack of Control Group: This study did not include a control group of patients with dAVFs who did not undergo embolization, making it difficult to directly assess the role of embolization in seizure control.

4. Limited Statistical Power: Due to the small sample size, statistical significance was not achieved in comparisons of seizure-free period and seizure type with ASM discontinuation. Larger studies are needed to validate these associations.

Despite these limitations, this study provides important preliminary insights into ASM management following dAVF embolization. Future research with larger sample sizes, multi-center collaboration, and standardized follow-up protocols will be necessary to develop evidence-based guidelines for post-treatment ASM management in dAVF patients.

Conclusion.

Our study supports the growing evidence that seizures associated with dAVFs should be treated aggressively with endovascular or surgical interventions to alleviate venous congestion and control seizures. Further research with larger cohorts and longer follow-up is required to develop evidence-based protocols for ASM management in these patients.

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