



Case Report

Recurrent Stroke Like Episodes in a Young Woman with Multiple Dural Arteriovenous Fistulas

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Abstract

Background: Intracranial dural arteriovenous fistulas (dAVFs) may cause progressive headaches, neurological deficits, and serious complications related to abnormal venous drainage. **Objectives:** To describe the clinical progression, angiographic findings, treatment response, and complications in a young woman with multiple intracranial dAVFs. **Methods:** A descriptive case review integrated serial clinical assessments, computed tomography, digital subtraction angiography, magnetic resonance imaging, and endovascular treatment records. **Results:** A 23 year old woman presented with progressive pulsatile occipital headache, left sided weakness, and visual disturbances. Computed tomography revealed hyperdensity and surrounding edema. Angiography identified multiple dAVFs involving the left transverse and superior sagittal sinuses, supplied by bilateral middle meningeal and occipital arteries. Staged embolization temporarily improved symptoms and reduced shunt flow. Recurrent seizures required additional embolization. Three months after discharge, seizures and impaired consciousness recurred. Magnetic resonance imaging demonstrated superior sagittal sinus thrombosis and intraventricular hemorrhage. Further intervention was delayed, followed by neurological deterioration. **Conclusions:** Multiple intracranial dAVFs may demonstrate complex clinical progression despite initial treatment response. Sustained angiographic surveillance, timely reassessment, and multidisciplinary management are essential considerations for detecting persistent vascular abnormalities and potentially serious complications.

Keywords: Dural arteriovenous fistula; Cerebral venous thrombosis; Embolization; Intraventricular hemorrhage; Stroke mimic.

Introduction

Intracranial dural arteriovenous fistulas (dAVFs) are abnormal connections between meningeal arteries and dural venous sinuses or cortical veins. Their presentation ranges from headache and tinnitus to hemorrhage or progressive neurological deficits, depending on venous drainage and outflow restriction^{1,2}. A young adult with recurrent focal symptoms therefore requires assessment of the underlying vascular mechanism.

The diagnostic challenge is that venous congestion, hemorrhage, and seizures can resemble arterial stroke. Computed

tomography (CT) identifies acute abnormalities, while digital subtraction angiography (DSA) defines arterial feeders, shunt sites, and dynamic venous drainage³. Clinical severity alone cannot substitute for the drainage information used in the Borden and Cognard classifications^{4,5}.

Recurrent deterioration after treatment raises concern about persistent shunting or changes in venous outflow. In patients with hemorrhagic dAVFs and cortical venous drainage, a multicenter cohort demonstrated greater rebleeding risk during the first two weeks than later in follow up⁶. This evidence supports timely specialist assessment, but it

does not determine the mechanism or individual risk in every patient.

This report describes a 23 year old woman with multiple intracranial dAVFs, recurrent stroke like manifestations, temporary improvement after staged embolization, and later superior sagittal sinus thrombosis with intraventricular hemorrhage. Its objective is to present the clinical chronology and imaging findings and explain their implications for reassessment after treatment.

The case emphasizes recognition of a vascular shunt disorder in an unusually young patient and the distinction between symptomatic improvement and confirmed angiographic closure. A chronological presentation follows CARE reporting principles, which prioritize clinical findings, diagnostic assessment, intervention, follow up, and consent^{7,8}.

Materials and Methods

Study Design

A descriptive single patient case report was prepared from the clinical course at Raden Mattaher General Hospital, Jambi, Indonesia. The account concerns diagnosis, staged endovascular treatment, and subsequent neurological deterioration. The design documents the individual course and does not estimate population risk or comparative treatment efficacy.

Sample

The report concerns one woman aged 23 years with multiple intracranial dAVFs. She had progressive headache, focal motor and visual complaints, a history of intracerebral hemorrhage, and later recurrent seizures.

Data Collection Technique

Clinical information comprised the presenting symptoms, changes in limb weakness and communication, seizure descriptions, level of consciousness, and the reported course after embolization. Diagnostic sources included initial noncontrast head CT, DSA, and

subsequent brain magnetic resonance imaging (MRI). Relative intervals are used to organize the clinical sequence without adding calendar dates.

Data Analysis Technique

The clinical observations and imaging findings were organized chronologically and interpreted descriptively. No inferential statistical tests were performed. Reported reduction in shunt flow was distinguished from complete angiographic obliteration, and recurrent symptoms were distinguished from angiographically proven recanalization. Literature was used to contextualize the case rather than assign unmeasured findings to the patient.

Ethical Consideration

The clinical narrative omits the patient name, date of birth, and medical record number. Image margins are cropped for the displayed clinical views. Confidentiality and consent for publication of the clinical account and images are separate reporting requirements under CARE^{7,8}.

Result

The patient was a 23 year old woman with a one year history of progressively worsening pulsatile headache, predominantly in the occipital region. She described heaviness and reduced mobility of the left upper and lower limbs, blurred vision, and narrowing of the peripheral visual field in both eyes. The visual complaints affected walking, with frequent collisions with objects. Her history included a previous intracerebral hemorrhage.

Initial noncontrast CT showed hyperdense areas with surrounding low attenuation described as vasogenic edema. The finding prompted investigation for an underlying arteriovenous shunt. DSA established multiple intracranial dAVFs and showed involvement of the left transverse sinus with a filling defect. Figure 1 presents the initial CT images, and Figure 2 presents the diagnostic angiographic

views. Table 1 summarizes the relative clinical timeline.

Two months after the initial assessment, she returned with headache, blurred vision, right sided weakness, and slurred speech. Staged endovascular embolization was undertaken, followed by temporary attenuation of the neurological symptoms. The procedural

description identified a parasagittal dAVF involving the superior sagittal sinus, with feeders from the middle meningeal and occipital arteries on both sides. Post treatment angiography was described as showing reduced shunt flow. The post embolization cranial views are presented in Figure 3.

Table 1. Clinical timeline of the reported course

Relative interval	Clinical findings	Assessment or intervention	Reported course
Initial presentation after one year of symptoms	Progressive occipital headache, left sided weakness, blurred vision and peripheral field narrowing	Initial CT; diagnostic DSA	Multiple dAVFs and left transverse sinus filling defect identified
Two months after initial presentation	Recurrent headache and visual symptoms; right sided weakness and slurred speech	Initial staged endovascular embolization	Temporary clinical improvement; reduction in shunt flow reported
During the following three months	Focal seizures progressing to generalized convulsions; right sided weakness and impaired communication	Further endovascular embolization	No immediate meaningful improvement; later stabilization and discharge
Three months after discharge	Recurrent seizures and decreased consciousness	Brain MRI; additional embolization planned	Superior sagittal sinus thrombosis and intraventricular hemorrhage reported
Subsequent interval	Increasing impairment of consciousness, headache, repeated vomiting and bilateral limb weakness	Further treatment delayed because of financial constraints	Clinical deterioration continued

Source: clinical case narrative. Intervals are relative to the preceding clinical event as described; they do not establish exact procedure dates or the total number of sessions.

During the following three months, seizures began as focal events affecting one side of the body and progressed to generalized convulsions with rigidity and tonic clonic movements lasting approximately five minutes. Headache, right sided weakness, and difficulty communicating also recurred. Further embolization was performed. There was no immediate meaningful clinical improvement, but her neurological condition subsequently stabilized sufficiently for discharge with continued therapy and follow up.

Three months after discharge, the patient returned with seizures and decreased consciousness. MRI was reported to demonstrate multiple dAVFs, superior sagittal sinus thrombosis, and intraventricular hemorrhage. Additional embolization was planned but delayed because of financial constraints. During this interval, she developed worsening consciousness, persistent headache, repeated vomiting of up to ten episodes daily, and bilateral limb weakness.

This single case describes temporal changes in symptoms, intervention, and imaging. The temporary improvement after embolization and subsequent deterioration represent the observed course. They do not establish a comparative treatment effect, a definite cause of every recurrence, or proof of complete closure followed by recanalization.

Figures 1 to 3 complement the clinical timeline: Figure 1 shows the initial CT appearances, Figure 2 the diagnostic angiographic views, and Figure 3 the post embolization cranial views. Dynamic shunt reduction is reported from the procedural account and is not quantified from the static images.

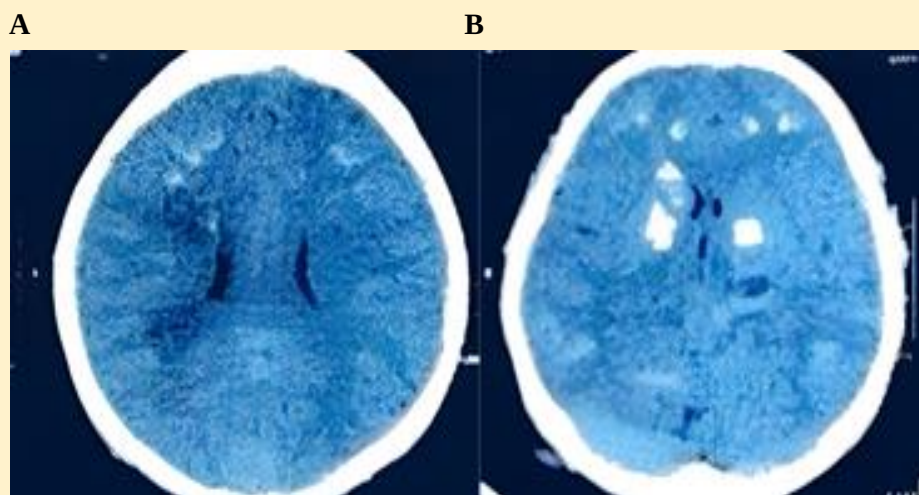


Figure 1. Initial noncontrast axial head CT. A and B identify the left and right displayed slices, respectively. Hyperdense foci and surrounding low attenuation are shown, corresponding to the hyperdense and edematous appearances described at initial assessment. Display position does not assign patient laterality.

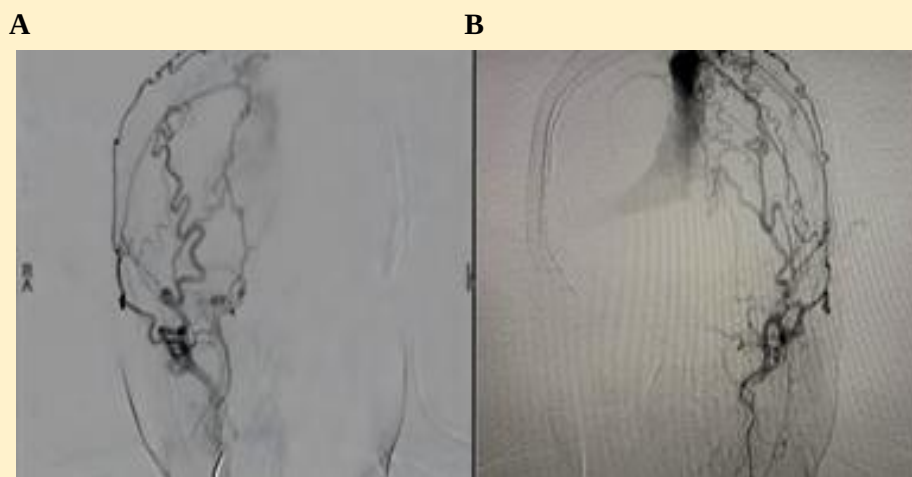


Figure 2. Diagnostic digital subtraction angiographic views. A and B identify the left and right displayed panels. The examination identified multiple intracranial dAVFs and a filling defect involving the left transverse sinus. The two panels depict the intracranial vascular appearances during diagnostic assessment.

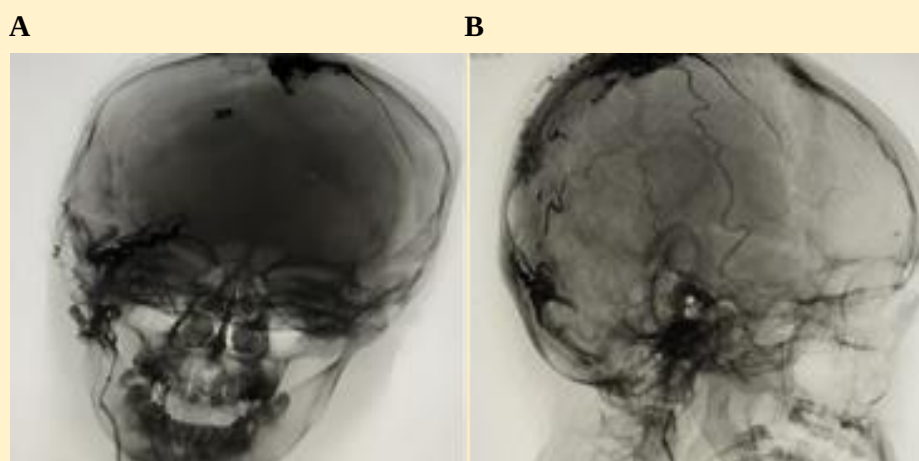


Figure 3. Post embolization cranial views. A shows the frontal view and B the lateral view, with radiopaque treatment material visible in the cranial region. The procedural account describes a parasagittal superior sagittal sinus dAVF supplied by bilateral middle meningeal and occipital arteries and a reduction in shunt flow. These static views show material distribution and do not establish complete fistula closure.

Multiple intracranial dAVFs were identified in a young woman with progressive headache and recurrent focal neurological symptoms. Temporary improvement followed staged embolization. Subsequent seizures, superior sagittal sinus thrombosis, intraventricular hemorrhage, and neurological deterioration characterized the later course.

Discussion

Interpretation of Key Findings. The combination of progressive headache, alternating focal weakness, visual complaints, and seizures is compatible with a clinically aggressive intracranial shunt disorder. Angiographic diagnosis and subsequent venous sinus thrombosis give the case a vascular basis beyond symptom description. Corbelli and colleagues documented heterogeneous headache presentations in dAVF⁹, and the International Classification of Headache Disorders recognizes headache attributed to a dural fistula¹⁰. In this patient, venous hypertension is a plausible explanation for the symptom complex, while the direction of the causal relationship between thrombosis and fistula progression remains uncertain.

Comparison with Previous Studies. ACTION CVT evaluated the association of dAVFs with cerebral venous thrombosis¹¹. Kuiper and colleagues also described temporal and anatomical relationships between these conditions¹², while Wan and colleagues found more visual disturbance, focal deficits, and seizures in patients with coexisting thrombosis¹³. The later sinus thrombosis and hemorrhage in this patient fit the clinical spectrum described in that literature. They do not establish whether thrombosis preceded fistula formation, followed abnormal venous flow, or contributed to deterioration through more than one pathway.

Recurrent seizures warrant consideration of an active vascular process. Dunbabin and colleagues reported recurrent focal status epilepticus associated with dAVF¹⁴, and a systematic review of 120 patients found cortical venous reflux in most reported cases of dAVF related seizures¹⁵. The present patient had focal seizures progressing to generalized convulsions, but a five minute convulsion and subsequent reduced consciousness do not by themselves establish electrographic status epilepticus. An HTJ report by Handayani and

Aulina describes electroencephalographic findings in post stroke seizures¹⁶, supporting the value of documenting seizure phenotype and electroencephalographic (EEG) findings alongside vascular imaging.

Treatment series show that endovascular approaches vary with fistula location, venous accessibility, and the intended occlusion endpoint. Maus and colleagues described transarterial and transvenous strategies¹⁷, and Hendriks and colleagues examined multimodal approaches in fistulas with an isolated sinus¹⁸. In this case, the directly reported procedural result was reduction in shunt flow. That finding is different from confirmed complete closure. The CONDOR analysis documented recurrence after apparent cure¹⁹, Chandra and colleagues evaluated long term outcomes after Onyx embolization²⁰, and Adamczyk and colleagues reported recurrence after initially successful treatment²¹. These publications support continued angiographic surveillance after treatment.

Clinical and Public Health Implications. A progressive stroke like presentation in a young adult should retain venous shunt disease in the differential diagnosis. HTJ literature provides complementary neurological context: Husnawati and colleagues discuss medication monitoring in an older patient with ischemic stroke and vascular comorbidity²²; Agustiawan and colleagues examine admission glucose and neurological severity²³; and Halim and Widjaya study age and MRI white matter hyperintensity²⁴. These articles address different mechanisms and populations, so their risk patterns cannot classify this woman's dAVFs. Their relevance is the need to relate neurological symptoms to measured clinical variables and a specific imaging diagnosis.

Continuing assessment should also address recovery domains beyond motor symptoms. Minarti and colleagues investigated brain derived neurotrophic factor (BDNF) and

depression after ischemic stroke²⁵, while Handayani, Bintang, and Kaelan examined vascular comorbidity and outcomes in ischemic stroke with hypersomnia²⁶. These studies support consideration of mood, alertness, and systemic comorbidity during follow up. In this case, financial constraints delayed planned further treatment, identifying an access barrier that should be considered in discharge coordination and referral planning.

Advantages and Limitations of the Research. The case links serial symptoms with CT, angiography, subsequent MRI findings, and the clinical course after embolization. Its contribution is the chronology of recurrent neurological manifestations in a young adult with multiple dAVFs. A single patient cannot establish treatment effectiveness or causal direction. Clinical aggressiveness should also be distinguished from an assigned angiographic grade, which depends on the drainage characteristics defined by Borden and Cognard^{4,5}. The observations support reassessment of the shunt and venous outflow.

Recommendations for Future Research. Prospective clinical registries should document lesion specific arterial supply, drainage direction, venous ectasia, sinus patency, and angiographic grade. Procedural records should distinguish residual shunting, complete occlusion, and later recurrence, with dates, treatment agents, complications, and functional outcomes. Such documentation would allow comparisons of staged strategies and follow up pathways across centers, including the effects of barriers to continued care^{8,19}.

Conclusion

Multiple dAVFs should be considered in young adults with progressive or recurrent stroke like manifestations. DSA is central to defining shunt anatomy and venous drainage. In this patient, temporary clinical improvement after embolization was followed by recurrent

seizures, venous sinus thrombosis, and hemorrhage, emphasizing the importance of reassessment and durable angiographic control.

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Conflict of Interest Statement

The author(s) declare no commercial, financial, or personal conflicts of interest related to this research. All authors approved the final manuscript and consented to its publication in *Healthy Tadulako Journal*.

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