CASE REPORT

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Unmasking cerebral infarction: hemianopia and heavy menstrual bleeding in a patient with adenomyosis and vascular abnormalities

Qing Wan¹⁺, Chao Wang²⁺, Weiyue Zhang¹, Weijia Zhong², Haoran Wang², Hee King SU², Mei Hwa Joanne HNG², Fan Yang³ and Xiaoguang Li^{1*}

Abstract

Background Adenomyosis, typically associated with heavy menstrual bleeding and pelvic pain, is rarely linked to neurological complications. This case presents a rare instance of ischemic stroke in a young patient with adenomyosis and vascular abnormalities, underscoring the role of anemia, hypercoagulability, and vascular factors as potential contributors to cerebral infarction.

Case presentation We describe a 41-year-old female with a history of adenomyosis who presented with rightsided hemianopia and dizziness following severe menstrual bleeding. Imaging revealed multiple acute cerebral infarctions and diffuse narrowing of the left internal carotid artery, suggesting an underlying vascular pathology. Thrombelastography revealed a hypercoagulable state, raising questions about the contributions of systemic and vascular factors in the context of adenomyosis.

Conclusion This case highlights the need for a multidisciplinary approach in young patients with atypical risk factors. The findings underscore the importance of considering gynecological, vascular, and coagulation abnormalities in the evaluation of cerebrovascular events, offering new insights into diagnostic and therapeutic strategies.

Keywords Adenomyosis, Cerebral infarction, Heavy menstrual bleeding, Carotid artery stenosis

Case presentation

A 41-year-old female presented to the emergency department (ED) complaining of fatigue, dizziness, and blurred vision, particularly in her right visual field. The symptoms had persisted for three days following an episode of heavy menstrual bleeding. The patient reported that she had

[†]Qing Wan and Chao Wang are co-first authors of the article.

*Correspondence:

xiaoguang.li@ufh.com.cn

¹Emergency Department, Shanghai United Family Hospital, 699 Pingtang Road, Changning District, Shanghai 200335, China

²Emergency Department, Beijing United Family Hospital, Beijing, China
³Neurosurgery Department, Beijing United Family Hospital, Beijing, China

changed her menstrual pads five to seven times a day due to heavy bleeding, which was unusual for her. Along with the heavy bleeding, she also experienced abdominal pain, nausea, mild headache, and right-sided visual disturbance. Despite these symptoms, she denied experiencing any limb weakness, hearing loss, or altered mental status.

This patient has a history of adenomyosis and dysmenorrhea for the past year. Three months ago, she was diagnosed with anemia, presenting with a hemoglobin (Hb) level of 89 g/L, a mean corpuscular volume (MCV) of 73.7 fL, serum iron of 3.52 μ mol/L (reference range: 7.8–32.2 μ mol/L), iron transferrin saturation of 5.3% (reference range: 20–55%), total iron-binding capacity of 70.1 μ mol/L (reference range:54–77 μ mol/L), soluble



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Xiaoguang Li

transferrin receptor(sTFR) of 8.55 mg/L(reference range: 1.9-4.4 mg/L) and an unsaturated iron-binding capacity (UIBC) of 66.4 µmol/L (reference range: 25-50.1 μ mol/L). Subsequently, she began taking an oral iron supplement once daily. The patient has a history of two induced abortions 7 years ago. Her family history is notable for hypertension. She denies any personal history of stroke, myocardial infarction, hypertension, diabetes, or migraines. Her baseline blood pressure is approximately 110-120/60-80 mmHg. The patient is a white-collar worker experiencing significant occupational stress. She reports no history of smoking or alcohol consumption. While she occasionally experiences insomnia, she denies other notable sleep disturbances. She does not engage in regular physical activity and has a BMI of 22.2, indicating she is not obese. Additionally, she denies the use of oral contraceptives or any history of substance abuse.

Upon arrival at the ED, the patient's vital signs revealed elevated blood pressure (170/92 mmHg), though her other vital signs were stable. A physical examination showed right-sided hemianopia and positive Romberg's test, which indicated impaired balance. Neurological examination was otherwise unremarkable, with no focal deficits in motor or sensory function.

Laboratory tests showed hemoglobin (Hb) levels of 118 g/L, while her white blood cell count, platelet count, and other basic metabolic panel results were within normal limits. A D-dimer test was in normal range (488 ng/mL). Her coagulation profile, including prothrombin time (PT) 11.8s, activated partial thromboplastin time (APTT) 29.3s and international normalized ratio (INR) 1.06, was normal. Her EKG showed a normal sinus rhythm.

Given her neurological symptoms and risk factors, an urgent brain MRI was performed, revealing multiple patchy and punctate diffusion-weighted imaging (DWI) hyperintensities in the left occipital, parietal, and frontotemporal lobes (Fig. 1, C). These findings were consistent with acute cerebral infarction. No midline shift, intracranial hemorrhage, or other significant abnormalities were observed.

A head and neck computed tomography angiography (CTA) showed narrowing of the left internal carotid artery, and carotid artery dissection could not be ruled out (Fig. 1, A & B). Given the patient's history of heavy menstrual bleeding, anemia, and acute neurological symptoms, a multidisciplinary consultation was sought. A neurosurgeon and a neurologist were both consulted and confirmed the diagnosis of acute cerebral infarction. A transthoracic echocardiogram was performed, which showed no evidence of cardiac thrombi, valve abnormalities, or patent foramen ovale (PFO).

The patient was admitted to the general ward for further treatment. In carefully weighing the risks between her heavy menstrual bleeding and the acute cerebral infarction, she was started on dual antiplatelet therapy with aspirin (100 mg daily) and clopidogrel (75 mg daily), as well as a high-dose statin (atorvastatin 40 mg daily) to reduce the risk of further thromboembolic events. Further laboratory tests were conducted in the general ward and thrombelastography (TEG) findings revealed clotting factor hypercoagulability (see Table 1). Autoimmune screening, including antineutrophil cytoplasmic antibody (ANCA), anti-double-stranded DNA antibody (AntidsDNA), antinuclear antibody (ANA), and anti-extractable nuclear antigen (Anti-ENA), yielded negative results.

During her hospital stay, cerebral angiography revealed occlusion in the intracranial segment of the left internal carotid artery, with diffuse narrowing throughout the extracranial segment (Fig. 1, D). These vascular abnormalities likely contributed to reduced cerebral perfusion and the subsequent infarction. Despite these findings, the neurosurgical team advised continuing medical management rather than surgical intervention, as the patient's condition stabilized with conservative treatment.

Over the next few days, the patient's symptoms gradually improved. Her vision slowly returned, and her dizziness lessened. Blood pressure control was initiated with a low-dose beta-blocker to prevent further hypertensive episodes. The patient was discharged after six days in stable condition with instructions for follow-up care with both the neurology and gynecology departments.

Discussion

Our case hightlights the multifactorial nature of ischemic stroke in a young patient with atypical risk factors. While adenomyosis and associated heavy menstrual bleeding likely contributed to anemia and a potential pro-inflammatory state [1], the presence of vascular abnormalities offers additional insights into the underlying mechanisms. Notably, thrombelastography revealed clotting factor hypercoagulability, raising the possibility of antiphospholipid syndrome (APS) [2]. Although the patient did not meet the diagnostic criteria for APS based on clinical and laboratory standards, the hypercoagulability observed prompts consideration of its association with adenomyosis or other underlying conditions.

Adenomyosis is a condition characterized by the presence of endometrial tissue within the myometrium, which leads to painful and menorrhagia. The relationship between adenomyosis and a hypercoagulable state remains an area of active investigation. Chronic inflammation and coagulation dysregulation associated with adenomyosis may predispose patients to thromboembolic events [3]. However, other contributing factors, such as unidentified vascular pathologies or systemic conditions, warrant further exploration. The vascular abnormalities observed in this case, including occlusion and diffuse narrowing of the left internal carotid artery,



Fig. 1 A & B: Head and neck CT angiography images showing the left internal carotid artery (LICA) along its course through the neck. The green arrow in both images highlights an area of diffuse narrowing, which may have contributed to reduced cerebral perfusion and subsequent ischemic events. **C**: Brain MRI using diffusion-weighted imaging (DWI) shows multiple hyperintense areas in the left occipital, parietal, and frontotemporal lobes, consistent with acute cerebral infarction. **D**: Cerebral angiography image indicating occlusion in the intracranial segment of the left internal carotid artery, with diffuse narrowing in the extracranial segment (green arrow)

highlight the need for comprehensive evaluation, as these findings may indicate a predisposing structural or functional vascular condition independent of adenomyosis.

Vascular imaging findings suggest the possibility of fibromuscular dysplasia (FMD), a non-atherosclerotic and non-inflammatory arterial disease that can lead to arterial stenosis and dissection. The narrowing and occlusion of the left internal carotid artery are consistent with FMD [4], which could have exacerbated cerebral perfusion compromise and increased stroke risk. Additionally, the potential contribution of vasculitis also should be considered. Although autoimmune screening, including ANA and ANCA, was negative, vasculitis-associated arterial inflammation can present with subtle clinical and laboratory findings, potentially explaining the observed vascular abnormalities [5]. These possibilities enhance the importance of thorough vascular evaluation in patients with ischemic stroke and atypical risk factors.

Table 1 Laboratory tests

Further Investigations	At	Normal
	presentation	range
Cholesterol	6.38	<5.17 mmol/L
LDL-C (Low density lipoprotein cholesterol)	4.35	<3.35 mmol/L
Triglycerides	2.77	< 1.69 mmol/L
Homocysteine	13.4	0.00–15 umol/L
ESR	30	4–25 mm/hr
Lupus anticoagulant ndRVVT-R	1.37	0.80-1.2
Anti-Cardiolipin IgM Ab	3.9	< 20 cu
Anti-Cardiolipin IgG Ab	< 2	< 20 cu
Anti-Cardiolipin IgA Ab	< 2	< 20 cu
Anti-PhosphatidylserineU/ml, IgG	4	0–30 U/ml
Anti-PhosphatidylserineU/ml, IgM	43.4	0–30 U/ml
Anti-beta2 Glycoprotein I IgM	4.8	< 20 cu
Anti-beta2 Glycoprotein I IgG	6.4	< 20 cu
Anti-beta2 Glycoprotein I IgA	4	< 20 cu
CA 125	429.2	0-35 kU/L
CA19-9	235.2	0–27 kU/L
Thrombelastography(TEG)		
R, Reaction Time	4.8	5.0–10.0 min
K, Clot firmness	1.2	1.0–3.0 min
Alpha Angle	71.6	53.0–72.0 degree
MA, Maximum amplitude	69.7	50.0–70.0 mm

This case illustrates the clinical utility of thrombelastography in assessing hypercoagulability in complex presentations. The hypercoagulable state observed offers critical guidance for anticoagulation strategies and underscores the need for further research into the interplay between adenomyosis, hypercoagulability, and cerebrovascular events. Whether the hypercoagulability in this case is directly related to adenomyosis or represents another underlying pathology remains uncertain and merits continued consideration.

We present this case as a reminder for emergency physician to maintain a high level of vigilance for cerebral infarction in young patients with non-specific symptoms, such as fatigue, particularly when accompanied by neurological deficits like visual disturbances or balance impairment. Even in the absence of traditional cerebrovascular risk factors, timely investigation, including vascular imaging and coagulation studies, is essential. By broadening diagnostic considerations to include APS, FMD, vasculitis, and other vascular or systemic conditions, clinicians can adopt a more comprehensive and effective approach to managing ischemic stroke in young individuals. Our case not only highlights the complexities of stroke pathogenesis but also provides valuable insights that may guide improved diagnostic and therapeutic strategies.

Conclusion

The case provides a unique perspective on the intersection of gynecological and vascular factors contributing to ischemic stroke in a young patient. The combination of anemia, potential pro-inflammatory effects of adenomyosis, and vascular findings such as carotid artery narrowing suggests a multifactorial etiology. This underscores the need for a broader diagnostic approach in young patients with atypical risk factors. By integrating gynecological and vascular considerations, this case broadens the understanding of stroke mechanisms and informs more personalized management strategies.

Acknowledgements

The authors would like to thank all the Emergency doctors, fellows, nurses and technicians for their hard working and helping saving patients' life.

Author contributions

Qing Wan and Chao Wang wrote the main manuscript text. Weiyue Zhang and Weijia Zhong contributed to the figures. Hee King SU and Mei Hwa Joanne HNG provided medical support. Haoran Wang and Fan Yang contributed to the multidisciplinary consultations. Xiaoguang Li critically revised the manuscript for important intellectual content and supervised the entire project. All authors contributed to manuscript revision and approved the submitted version.

Funding

No funding was received for this study.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethical approval

Not applicable.

Consent for publication Not applicable.

Competing interests

The authors declare no competing interests.

Consent to participate

Not applicable.

Received: 17 October 2024 / Accepted: 1 December 2024 Published online: 14 January 2025

References

- Moawad G, Fruscalzo A, Youssef Y, Kheil M, Tawil T, Nehme J, et al. Adenomyosis: an updated review on diagnosis and classification. J Clin Med. 2023;12(14):4828. https://doi.org/10.3390/jcm12144828. PMID: 37510943; PMCID: PMC10381628.
- Barbhaiya M, Zuily S, Naden R, et al. 2023 ACR/EULAR antiphospholipid syndrome classification criteria. Ann Rheum Dis. 2023;82(10):82. https://doi.or g/10.1136/ard-2023-223456.
- Yan Y, Zhang X, Zhong D, Wang A, Wu S, Wu B. Adenomyosis-associated ischemic stroke: pathophysiology, detection and management. Brain Sci. 2022;12(10):1410. https://doi.org/10.3390/brainsci12101410. PMID: 36291343; PMCID: PMC9599589.
- Olin JW, Sealove BA. Diagnosis, management, and future developments of fibromuscular dysplasia. J Vasc Surg. 2011;53(3):826–836. https://doi.org/10.1 016/j.jvs.2010.10.031. PMID: 21276699.

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