

CORRESPONDENCE

A case of anterior cerebral artery infarction stemming from arterial dissection was observed in a pregnant COVID-19 patient

The global COVID-19 pandemic has raised significant concerns regarding increased vulnerability to strokes. Recent studies suggest that the inflammatory response triggered by COVID-19 may exacerbate endothelial dysfunction or rupture atherosclerotic plaques, thereby increasing the risk of vascular complications such as arterial dissection.^{1,2} Isolated infarctions within the anterior cerebral artery (ACA) territory are infrequent, and the underlying etiology remains unclear.^{3,4} Here, we present a case of a pregnant patient who experienced left hemiparesis due to ACA infarction precipitated by arterial dissection during a COVID-19 infection. A 34-year-old pregnant patient at 18 weeks of gestation (para 2) presented to the emergency room with left limb weakness and speech difficulties. Her medical history included diabetes mellitus, hypertension, and previous pre-eclampsia. Four days prior, she had been hospitalized with confirmed COVID-19, presenting with low-grade fever and headache. At the time of admission, her body temperature was recorded at 37.1°C, and her blood pressure was measured at 170/100 mmHg. Neurological examination revealed left-sided hemiplegia (Medical Research Council grade 3/1) and dysarthria. Laboratory tests indicated leukocytosis ($14.22 \times 10^3/\text{mm}^3$) and elevated C-reactive protein (6.90 mg/dL), while coagulation studies yielded normal results. Cardiac evaluation, including two-dimensional echocardiography and Holter monitoring, showed normal findings. MRI DWI findings included acute infarcts located in the right ACA territory (Figure 1A), along with subtle subarachnoid hemorrhage (SAH) in the right frontal lobe (Figure 1B). Initial MR angiography demonstrated stenosis or occlusion of the right distal ACA (A2 segment) (Figure 1C). Follow-up DWI images performed seven days after the initial MRI revealed slight progression of cerebral infarction [Figure 1D], while the SAH in the right frontal lobe showed slight improvement (Figure 1E). A follow-up MRA revealed notable bulging of the ACA (Figure 1F). MR plaque imaging conducted ten days after admission confirmed right ACA dissection with a double lumen sign (Figure 1G). The patient was started on intravenous antihypertensive medication and subsequently transitioned to oral antihypertensives to ensure strict blood pressure management (systolic blood pressure < 140 mmHg). Following intensive physical therapy, her left-side hemiparesis improved to MRC grade 4/3 within one month. Remarkably, three months post-admission, she safely underwent a cesarean section, with follow-up imaging demonstrating improved ACA stenosis (Figure 1H).

Intracranial cervical artery dissection during pregnancy is often associated with traditional risk factors (i.e., trauma, exercise, and hypertension), and the risk of dissection doubles in pregnant women.^{5,6} COVID-19 infection may exacerbate underlying atherosclerosis, leading to the accumulation of modified lipids and inflammatory immune cells within the arterial intima.⁷ The luminal extension of the intimal lesion can result in stenosis or occlusion, while unstable plaques may rupture, causing arterial thrombosis.^{1,2} This unstable plaque may have contributed to the ACA infarction and dissection, particularly given the high blood pressure during the COVID-19 infection. In this case, the high blood pressure during the patient's COVID-19 infection likely contributed to arterial dissection and the resulting ACA infarction. Rigorous blood pressure management combined with systemic infection control measures during pregnancy is essential, particularly for those with underlying vascular risk factors.

Chan Hyun Lee MD, Chang Hun Kim MD, Nack-Cheon Choi MD PhD, Soo-Kyoung Kim MD PhD

Department of Neurology, Institute of Health Science, Gyeongsang National University Hospital, Gyeongsang National University School of Medicine, Jinju, Korea

Address correspondence to: Soo-Kyoung Kim, M.D., PhD., Department of Neurology, Gyeongsang National University Hospital and College of Medicine, 79 Gangnam-ro, Jinju (52727), Korea. Tel: +82-55-750-8077, E-mail: skkim.stroke@gmail.com

Date of Submission: 7 October 2024; Date of Acceptance: 25 March 2025

<https://doi.org/10.54029/2025nts>

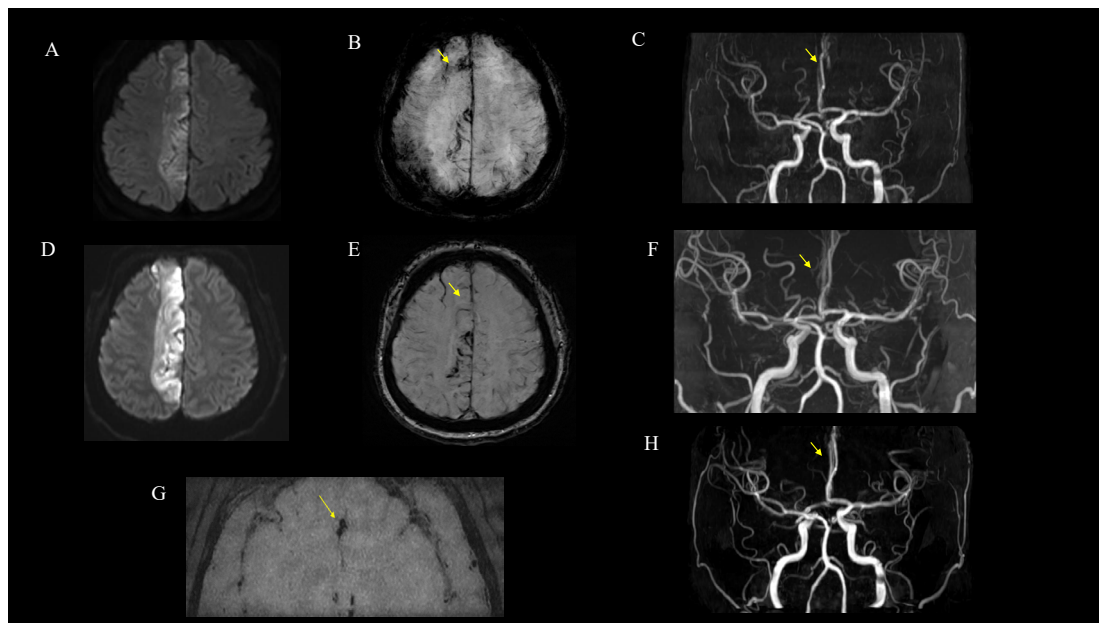


Figure 1 Serial brain imaging of anterior cerebral artery (ACA) infarction associated with arterial dissection in a pregnant patient with COVID-19.

A. Diffusion-weighted imaging (DWI) performed on admission revealed acute infarcts in the right ACA territory. **B.** Initial SWI image showing subtle subarachnoid hemorrhage (SAH) in the right frontal area (arrow). **C.** Initial MR angiography demonstrating stenosis or occlusion of the right distal ACA (A2 segment) (arrow). **D.** Follow-up DWI performed 7 days later revealed increased extent of right ACA infarction. **E.** Follow-up SWI performed 7 days later showed slightly improved SAH in the right frontal area (arrow). **F.** Follow-up Brain MR angiography performed 7 days later showed bulging of the right A2 segment (arrow). **G.** Follow-up MR plaque image 10 days after admission showed intimal flap in the ACA with double lumen sign (arrow). **H.** Follow-up MRA imaging obtained 3 months later showed improved ACA stenosis (arrow).

ACA, anterior cerebral artery; DWI, diffusion-weighted imaging; SWI, susceptibility-weighted image; SAH, subarachnoid hemorrhage.

REFERENCES

1. Martínez-Salazar B, Holwerda M, Stüdle C, *et al.* COVID-19 and the Vasculature: Current Aspects and Long-Term Consequences. *Front Cell Dev Biol* 2022;10:824851. doi: 10.3389/fcell.2022.824851.
2. Acharya Y, Alameer A, Calpin G, Alkhatab M, Sultan S. A comprehensive review of vascular complications in COVID-19. *J Thromb Thrombolysis* 2022;53(3):586-93. doi: 10.1007/s11239-021-02593-2.
3. Abraham B, Mathew SD, Sridharan K. A systematic review of arterial dissections in COVID-19 patients. *Curr Cardiol Rev* 2023;19(1):e280622206435. doi: 10.2174/1573403X18666220628093303.
4. Mohammed I, Aaland M, Khan N, Crossley I. A young pregnant woman with spontaneous carotid artery dissection-unknown mechanisms. *BMJ Case Rep* 2014;2014:bcr2013202541. doi: 10.1136/bcr-2013-202541.
5. Beyer SE, Dicks AB, Shainker SA, *et al.* Pregnancy-associated arterial dissections: a nationwide cohort study [published correction appears in *Eur Heart J* 2021;42(29):2863]. *Eur Heart J* 2020;41(44):4234-42. doi:10.1093/eurheartj/ehaa497
6. Salehi Omran S, Parikh NS, Poisson S, *et al.* Association between pregnancy and cervical artery dissection. *Ann Neurol* 2020;88(3):596-602. doi:10.1002/ana.25813
7. Briller JE, Aggarwal NR, Davis MB, *et al.* Cardiovascular disease in women committee. Cardiovascular complications of pregnancy-associated COVID-19 infections. *JACC Adv* 2022;1(3):100057. doi: 10.1016/j.jacadv.2022.100057.