Basilar Artery Thrombosis in the Postpartum Period During COVID – 19 Pandemic: A Lethal But Avoidable Complication

Manbir Kaur[1], Ankur Sharma[2], Sanjiv Sharma[3], Sarbesh Tiwari[4]

Abstract

Purpose: To highlight the factors leading to the delayed diagnosis of basilar artery occlusion and poor outcome in the postpartum period during the prevailing Corona Virus Disease-2019 (COVID-19) pandemic.

Case report: We here report a case of a 34-year female who presented with a headache localized to the occipital region after cesarean section under spinal anesthesia. Her headache severity increased over time, and she developed a generalized seizure episode and became unconscious. Subsequently, basilar artery thrombosis was diagnosed. Despite all efforts, she succumbed to death. We believe that we might have saved the patient's life if we could have made the diagnosis beforehand.

Conclusion: We recommend that unless shown otherwise, postpartum headache and neck discomfort, even in individuals with no known risk factors, should have a low index of suspicion, early diagnosis using non-invasive radiological study such MRI to rule out this uncommon but deadly illness quickly.

Keywords: Basilar artery thrombosis, basilar artery occlusion, pregnancy, postpartum, cesarean section, COVID-19.

Acta Neurol Taiwan 2022;31:167-170

INTRODUCTION

Basilar artery thrombosis or occlusion (BAO) causing brainstem infarct is the most feared of all the ischemic infarcts. BAO was first described in 1828 by Scottish physician John Abercrombie [(1)]. It may lead to brainstem ischemia resulting in the deterioration of the level of consciousness and death [(2,3)]. We are describing a case report to share our recent experience with a postpartum patient with basilar artery thrombosis in our critical care unit. We discuss the relevant learning points on the management of headache in the postpartum period to promptly diagnose this rare but life-threatening disease. This rare complication assumes more significance in an already hypercoagulable state of the postpartum patient in the coronavirus disease 2019 (COVID-19) pandemic, as several recent reports show COVID-19 infection to cause hypercoagulability [(4)].

From the Department of Anesthesia and Critical care[1], Trauma & Emergency (Anesthesiology)[2], Neurology[3], Radiology[4], All India Institute of Medical Sciences (AIIMS), Jodhpur 342005, Rajasthan, India.

Received December 24, 2021. Revised January 9, 2022.
Accepted January 18, 2022.

Correspondence to: Dr. Ankur Sharma, Associate Professor, Department of Trauma & Emergency (Anesthesiology), All India Institute of Medical Sciences (AIIMS), Jodhpur 342005, Rajasthan, India
E-mail: ankuranaesthesia@gmail.com

CASE REPORT

A 34-year-old-female, weighing 70 kg, gravida two para two (G2P2), presented to our emergency department in an unconscious state with high-grade fever. She had undergone a cesarean section (under spinal anesthesia) 12 days back at another hospital. After one day of cesarean section, she developed a headache that was localized to the occipital region. Headache primarily occurred during sitting and standing and was relieved on lying down, suggestive of post-dural puncture headache (PDPH). She was managed with intravenous fluids and hydration. However, her headache severity increased over time; she developed a generalized seizure episode and became unconscious. Magnetic resonance imaging (MRI) brain done outside showed patchy infarcts in the cerebellum and pons, probably due to basilar artery thrombosis. The infarct characteristics were not in favor of cerebral venous sinus thrombosis. She was given recombinant tissue plasminogen activator (rt-PA), alteplase (60 mg intravenously) and referred to our hospital. At the time of presentation in the emergency area, she was unconscious. Glasgow coma scale (GCS)- E2V1M3, pupils 2 mm bilaterally sluggishly reacting to light, quadriplegia was present; her vitals were – heart rate-91/min, blood pressure - 130/80 mmHg, respiratory rate-30/min, oxygen saturation - 100% on oxygen (2L/min), temperature – 102.5°C. Her antenatal course was uneventful, with no history of pre-eclampsia/ eclampsia, hypothyroidism, or gestational diabetes. There was no history of trauma. Because of low GCS, the patient was intubated with a 7 mm endotracheal tube. Since she came from a red zone of COVID-19 (Red zone is defined in our country as the city/ town where there is a high concentration of COVID-19 cases in the community) and had a high-grade fever, she was suspected a case of COVID -19 and shifted to CCCU (COVID-19 Critical Care Unit, an ICU facility dedicated solely for COVID-19 patients at our center). However, the report for the COVID-19 test came out to be negative after one day, and she was shifted to our routine critical care unit.

All other routine blood investigations, including coagulation profile, were within a normal range. All relevant cultures were sent, and serum procalcitonin was 0.08 ng/ml (not suggestive of bacterial infection/ sepsis). Plain computed tomography (CT) brain at admission showed patchy infarcts in bilateral superior cerebellar artery territory (right > left), right anterior inferior cerebellar artery territory, bilateral posterior inferior cerebellar artery with involvement of the pons and midbrain (basilar perforator territory) (figure 1a). There was no mass effect or hydrocephalus. CT angiography (figure 1b) showed eccentric non-flow-limiting thrombus at the mid-basilar trunk (partial resolution of thrombosis due to alteplase administered at a previous hospital). A focal narrowing was noted at the V2 segment of the left vertebral artery, possibly secondary to dissection (figure 1c). MRI brain was done, which confirmed the infarcts at the bilateral cerebellar hemisphere and pons (figure 1d) with evidence of hemorrhagic transformation (figure 1e) involving the pons (possibly secondary to intravenous thrombolysis). She was started on injection heparin at 500 units/hour with regular monitoring of activated

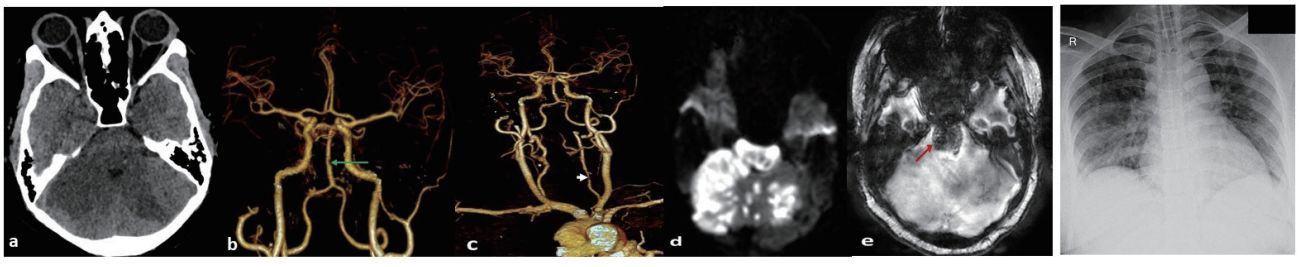

Figure 1. The axial non-contrast CT scan (a) & diffusion-weighted image (d) shows acute infarct at bilateral cerebellar hemisphere (right > left) and pons. The volume-rendered CT angiogram image (b) reveals focal narrowing with an irregular plaque at the mid-basilar level (green arrow). The volume-rendered CT angiogram image of the neck vessels (c) shows focal narrowing at the V2 segment of the left vertebral artery. The susceptibility-weighted image (e) shows hemorrhagic transformation at the pons (red arrow).

partial thromboplastin time (APTT) levels. Since the patient presented to us late (more than 6 hours), had poor neurological status and already well-established infarct, mechanical thrombectomy would not be beneficial. Chest on auscultation showed diffuse bilateral crepitations, arterial blood gas (ABG) was normal. Her chest x-ray was unremarkable. Electrocardiogram (ECG) was normal. Her repeat blood investigations were normal, except APTT – 62.5 sec (due to heparin). Later in the clinical course, repeated episodes of nasal bleeding occurred managed by nasal packing. Her repeat coagulation profile showed a platelet count of 24000/μl, APPT- 67 sec, INR – 1.74. Heparin was stopped temporarily (given suspected heparin-induced thrombocytopenia). However, the patient's neurological response deteriorated to E1VTM1, repeat CT showing an increase in infarct size with significant mass effect and hydrocephalus. External ventricular drain (EVD) insertion was planned for hydrocephalus but could not be done due to coagulopathy. Unfortunately, her BP started falling, which did not respond to fluids. Inotropes were started; however, her condition deteriorated progressively. Despite all efforts, she succumbed to death.

DISCUSSION

Basilar artery thrombosis resulting in posterior circulation stroke is a rare and challenging condition for clinicians to diagnose and manage [5].

Several factors present in our case were responsible for promoting the thrombosis of the basilar artery. First and foremost is the presence of vertebral artery (VA) dissection. VA dissection is a known risk factor for upstream thrombotic/ embolic phenomena like BAO [6,7]. There have been earlier reports of spontaneous peripartum VA dissection with accompanying hypertensive disease of pregnancy as a significant risk factor for its occurrence [7,8]. It is to be noted that the VA dissection, in many instances, presents only with headache and neck pain [9]. In fact, in some cases, it has been seen that the headache precedes the development of neurological signs by a few days, thus indicating that the headache and neck pain should not be taken lightly in the postpartum patient [9]. Headache in cervical arterial dissection is severe, throbbing, and pulsating. It is associated with neck pain and not postural. It may be unilateral, bilateral, or diffuse. However, Czempik et al. recently described BAO in a pregnant patient with no identifiable risk factors, including VA dissection [10]. Second, pregnancy, as a hypercoagulable condition, is associated with an increased risk of ischemic stroke [11]. The risk is higher in the third trimester and the immediate postpartum period (as seen in our patient) [11]. The third risk factor that favors the development of ischemic stroke is the cesarean section (C/S), mentioned in the literature as an independent risk factor for ischemic stroke [12]. Fourth, recent studies emphasize that COVID infection increases the incidence of thrombotic events [4]. Though our patient's COVID-19 report came to be negative, however, this test has a false negative rate of 38% [13]. Unfortunately, we could not repeat the test as the patient expired before we could do the test again.

In our case, the patient presented with a headache one day after the C/S, which was postural. Since post-dural puncture headache (PDPH) is common in patients after spinal anesthesia, she was managed according to PDPH treatment [14]. However, the patient's headache did not resolve and increased in severity with each passing day. Later on, she developed seizures and became unconscious when a CT head was done. We want to stress two critical issues via this report, delaying the accurate diagnosis in our case. Since the headache was postural and occurred after spinal anesthesia given for cesarean section, the most probable diagnosis to think would be PDPH. Also, PDPH is more common than other rare diagnoses, such as vertebral artery dissection. However, as noted earlier, the headache present in our patient was probably due to vertebral artery dissection rather than PDPH. Retrospectively thinking, we believe that a low degree of suspicion and a radiological investigation had been done earlier when the patient had developed a headache, could have made the diagnosis beforehand, and might have saved the patient's life.

The other cause of delay in managing our case was the COVID pandemic. There is no doubt that in addition to healthcare workers, patients with other medical conditions are also suffering in these challenging days [15]. Since the patient had a fever on presentation at our center and was a resident of the red zone area, the screening criteria used at our center for COVID-19 placed her as a COVID-19 suspect. She was kept in CCCU for COVID-19 testing before being accurately managed. Thus, valuable

time was lost during which a digital subtraction angiogram and timely endovascular intervention could have been done. Though a case is described in the literature where BAO was successfully managed even after 24 hours of symptom onset, it was not achieved in our case [3].

CONCLUSION

We propose that seemingly innocuous postpartum headache and neck pain, even in patients with no known predisposing factors such as hypertension, should be thought of as due to cervical artery (ICA or VA) dissection until and unless proved otherwise. A low index of suspicion, early diagnosis, and timely non-invasive radiological investigation such as MRI can quickly rule out this rare but life-threatening condition. If VA dissection and the consequent BAO are diagnosed and intervened promptly, an excellent clinical outcome is possible.

Contributors: All authors contributed to the article.

Competing interests: None declared.

Patient consent: Obtained.

REFERENCES

1. Kompanje EJ, Walgaard C, de Groot YJ, Stevens M. Historical sources of basilar artery occlusion. Neurology. 2011;76:1520-1523
2. Grear KE, Bushnell CD. Stroke and pregnancy: clinical presentation, evaluation, treatment, and epidemiology. Clin Obstet Gynecol. 2013;56:350-359
3. Cincotta RB, Davis SM, Gerraty RP, Thomson KR. Thrombolytic therapy for basilar artery thrombosis in the puerperium. Am J Obstet Gynecol. 1995;173:967-969.
4. Al-Ani F, Chehade S, Lazo-Langner A. Thrombosis risk associated with COVID-19 infection. A scoping review [published online ahead of print, 2020 May 27]. Thromb Res. 2020
5. Bhaskar S, Gosal JS, Garg M, Jha DK. Letter: The Neurological Examination. Oper Neurosurg (Hagerstown). 2020;18: E262.
6. Mass SB, Cardonick E, Haas S, Gopalani S, Leuzzi RA. Bilateral vertebral artery dissection causing a cerebrovascular accident in pregnancy. A case report. J Reprod Med. 1999;44:887-890.
7. Kelly JC, Safain MG, Roguski M, Edlow AG, Malek AM. Postpartum internal carotid and vertebral arterial dissections. Obstet Gynecol. 2014;123:848-856.
8. Shanmugalingam R, Reza Pour N, Chuah SC, Vo TM, Beran R, Hennessy A, et al. Vertebral artery dissection in hypertensive disorders of pregnancy: a case series and literature review. BMC Pregnancy Childbirth. 2016;16:164.
9. Oomura M, Yamawaki T, Terai T, Shigeno K. Prolonged Headache Six Weeks Before Ischemic Symptoms Due to Vertebral Artery Dissection--A Case Report. Rinsho Shinkeigaku. 2005;45:521-523.
10. Czempik PF. Basilar artery thrombosis in a 20-year-old pregnant patient - difficulties in establishing the aetiology. Anaesthesiol Intensive Ther. 2019;51:330-332.
11. Cerneca F, Ricci G, Simeone R, Malisano M, Alberico S, Guaschino S. Coagulation and fibrinolysis changes in normal pregnancy. Increased levels of procoagulants and reduced levels of inhibitors during pregnancy induce a hypercoagulable state, combined with a reactive fibrinolysis. Eur J Obstet Gynecol Reprod Biol. 1997;73:31-36.
12. Lin SY, Hu CJ, Lin HC. Increased risk of stroke in patients who undergo cesarean section delivery: a nationwide population-based study. Am J Obstet Gynecol. 2008;198:391.e1-7.
13. Kucirka LM, Lauer SA, Laeyendecker O, Boon D, Lessler J. Variation in False-Negative Rate of Reverse Transcriptase Polymerase Chain Reaction-Based SARS-CoV-2 Tests by Time Since Exposure. Ann Intern Med. 2020; M20-1495.
14. Choi PT, Galinski SE, Takeuchi L, Lucas S, Tamayo C, Jadad AR. PDPH is a common complication of neuraxial blockade in parturients: a meta-analysis of obstetrical studies. Can J Anaesth. 2003;50:460-4699.
15. Ruparelia J, Gosal JS, Garg M, Bhaskar S, Jha DK. Challenges to Neurosurgical Residency Training during COVID-19 Pandemic: An Indian Perspective. World Neurosurg. 2020;S1878-8750: 31149-9.