Cardiology in the Young

cambridge.org/cty

Severe headache in a middle-aged woman after device closure of a ventricular septal defect

Jungbin Lee[1] and Jinyoung Song[1]

Department of Pediatrics, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, South Korea

Brief Report

Cite this article: Lee J and Song J (2023) Severe headache in a middle-aged woman after device closure of a ventricular septal defect. *Cardiology in the Young* **33**: 1023–1024. doi: 10.1017/S1047951122003444

Received: 27 August 2022
Accepted: 17 October 2022
First published online: 9 November 2022

Keywords:
Ventricular septal defect; device closure; headache; reversible cerebral vasoconstriction syndrome

Author for correspondence:
J. Song, MD, PhD, Department of Pediatrics, Samsung Medical Center, Heart Vascular Stroke Institute, Grown-up Congenital Heart Clinic, Sungkyunkwan University School of Medicine, 81 Irwon-ro, Gangnam-gu, Seoul 06351, South Korea. Tel.: +82-2-3410-3539; Fax: +82-2-3410-0043.
E-mail: amyjys@naver.com

Abstract

Reversible cerebral vasoconstriction syndrome presents with thunderclap headache and represents a group of conditions that show reversible multifocal narrowing of cerebral arteries. Some patients who undergo device closure of an atrial septal defect complain of headache, which are posited as a migraine. Here we report a case of severe headache due not to migraine but reversible cerebral vasoconstriction syndrome after device closure of a ventricular septal defect.

Approximately 15% of patients complain of headache after device closure of an atrial septal defect, and most of them are believed to be migraine attacks and improved spontaneously.[1] Reversible cerebral vasoconstriction syndrome presents with thunderclap headache and represents a group of conditions that show reversible multifocal narrowing of cerebral arteries.[2] We present a case of a 48-year-old women who presented with severe headache after device closure of a ventricular septal defect. For this patient, we diagnosed reversible cerebral vasoconstriction syndrome that improved on follow-up angiography.

Case description

A 48-year-old woman came to our hospital for device closure of a ventricular septal defect. She had no specific medical history other than intermittent dizziness and palpitation. Chest X-ray showed no cardiomegaly, but echocardiography revealed a restrictive perimembranous ventricular septal defect and left atrial enlargement. We performed transcatheter ventricular septal defect closure using a Cocoon ventricular septal defect aneurysmal-type occluder 12–8 mm (Fig 1).[3] The next day, a junctional rhythm change was detected. After methylprednisolone pulse therapy for 3 days, sinus conversion was confirmed. She was discharged with oral prednisolone and aspirin.

On the fifth day after device closure, a severe tightening headache of the whole head was reported. The headache worsened when she laid down and was relieved when she stood. Due to a constant headache even with clopidogrel, she visited the emergency department on the seventh day after device closure.

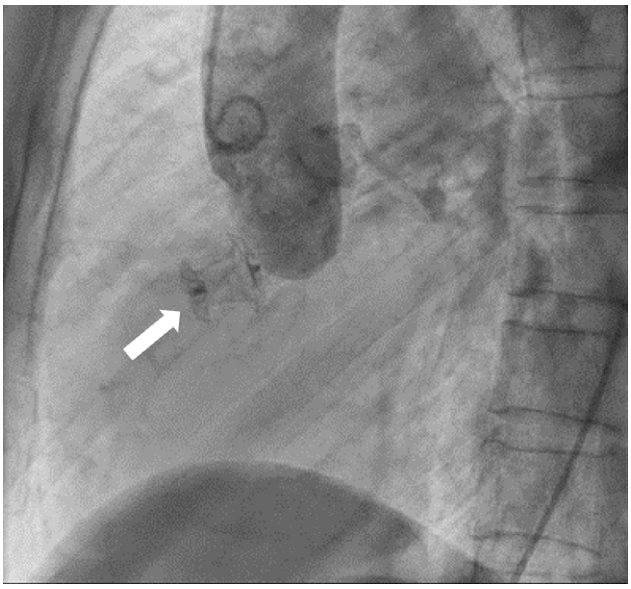

Figure 1. Transcatheter VSD closure using a cocoon VSD aneurysmal-type occluder 12–8 mm (white arrow).

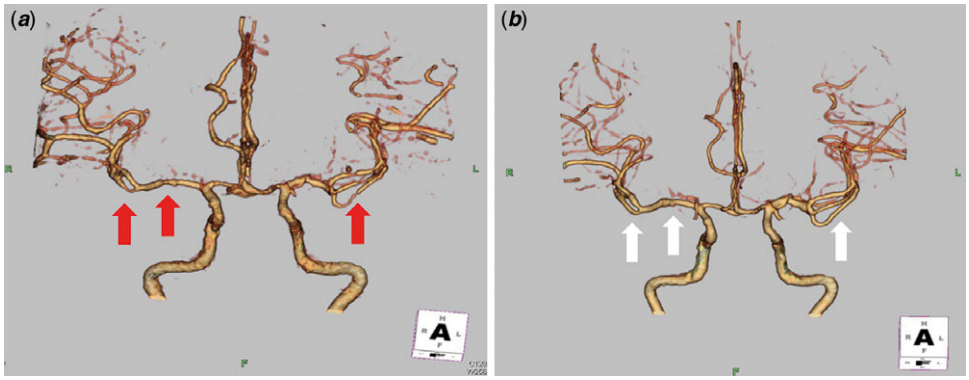

Figure 2. (***a***) CT angiography showed multifocal stenosis in multiple intracranial arteries (red arrows) and (***b***) follow-up CT angiography one month later showed great improvement (white arrows).

Her vital signs were stable, and there were no abnormal findings on neurologic examination. No evidence of intracranial haemorrhage nor infarction was found on CT. Cerebrospinal tapping was performed and showed normal pressure but 10,000/μL red blood cell on three-bottle test. We suspected a chronic subarachnoid haemorrhage. CT angiography and transfemoral cerebral angiography were carried out and showed multi-segmental stenosis on internal carotid artery, anterior carotid artery, and posterior carotid artery but no aneurysm or structural abnormality (Fig 2a). Finally, we confirmed chronic subarachnoid haemorrhage due to reversible cerebral vasoconstriction syndrome. After administration of nimodipine, her headache resolved, and multisegmental stenosis was much improved on follow-up CT angiography and brain MRI one month after diagnosis (Fig 2b). We got the informed consent for publication of this case from the patient.

Discussion

After intra-cardiac device closure, headache supposed to be a migraine is well known and reported to be improved with clopidogrel.[4] However, the pathophysiology of such pain remains unclear.[5] Since it tends to improve spontaneously within 6–12 months in most patients, the headache often resolves without sufficient evaluation.[5] To my knowledge, this is the first report of reversible cerebral vasoconstriction syndrome after ventricular septal defect device closure through sufficient evaluation for headache.

Since the headache reported by the patient was different from a migraine, a thorough evaluation was conducted. The headache mimicked a tightening of the entire head and worsened when she laid down. She even woke up with a severe headache. In contrast, migraine mainly shows a unilateral location, a pulsating pattern, and is accompanied by an aura in about 30% of cases.[5]

Reversible cerebral vasoconstriction syndrome is characterised by thunderclap headache and shows relatively good prognosis. Although it is most common in middle-aged women, the cause or pathophysiology is not clear.[6] Risk factors of reversible cerebral vasoconstriction syndrome are associated with medicine like cannabis, vasoconstrictive drugs, or steroid.[2]

As indicated by its name, reversible cerebral vasoconstriction syndrome improves without treatment, although calcium channel blockers such as nimodipine might help. No association between intracardiac device and reversible cerebral vasoconstriction syndrome has been reported. In this case, the reasons for reversible cerebral vasoconstriction syndrome were not clear but might include the device itself or association with methylprednisolone. As in atrial septal defect device closure, the pathophysiology of headache after device closure can be attributed to a microembolism, nickel allergy, or steroid treatment but might not be related to any.[7] Further study is needed on this event.

Conclusion

We treated reversible cerebral vasoconstriction syndrome after device closure of ventricular septal defect that was resolved without any consequences.

Acknowledgements. None.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Conflicts of interest. None.

References

1. Rodes-Cabau J, Horlick E, Ibrahim R, et al. Effect of clopidogrel and aspirin vs aspirin alone on migraine headaches after transcatheter atrial septal defect closure: the CANOA randomized clinical trial. JAMA 2015; 314: 2147–2154.
2. Sorensen DM. Reversible cerebral vasoconstriction syndrome. JAMA Neurol 2016; 73: 232–233.
3. Morray BH. Ventricular septal defect closure devices, techniques, and outcomes. Interv Cardiol Clin 2019; 8: 1–10.
4. Wilmshurst PT, Nightingale S, Walsh KP, Morrison WL. Clopidogrel reduces migraine with aura after transcatheter closure of persistent foramen ovale and atrial septal defects. Heart 2005; 91: 1173–1175.
5. Spencer BT, Qureshi Y, Sommer RJ. A retrospective review of clopidogrel as primary therapy for migraineurs with right to left shunt lesions. Cephalalgia 2014; 34: 933–937.
6. Wintzer-Wehekind J, Horlick E, Ibrahim R, et al. Effect of clopidogrel and aspirin vs aspirin alone on migraine headaches after transcatheter atrial septal defect closure: one-year results of the CANOA randomized clinical trial. JAMA Cardiol 2021; 6: 209–213.
7. Headache Classification Subcommittee of the International Headache Society. The international classification of headache disorders: 2nd edition. Cephalalgia 2004; 24 Suppl 1: 9–160.

https://doi.org/10.1017/S1047951122003444 Published online by Cambridge University Press