International Journal of Advances in Medicine
Gunawan SE et al. Int J Adv Med. 2022 Jul;9(7):848-851
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: https://dx.doi.org/10.18203/2349-3933.ijam20221715

Case Report

Primary intra-ventricular hemorrhage in 33-year-old man: a case report

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Received: 22 May 2022
Accepted: 13 June 2022

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ABSTRACT

The aim of the study was to provide insight into cases of primary intra-ventricular hemorrhage caused by arterial venous malformations. A 33-year-old man visited the emergency room and admitted that he had a chief complaint of headache for the last 7 days. Neurological clinical examination only found nuchal rigidity. The CT scan of the head showed intra-ventricular hemorrhage and the CTA results showed an AVM with a left occipital nidus with arterialization of the posterior cerebral artery. One day before the DSA was performed, the patient had a seizure and based on a repeat CT scan, the bleeding spread to the parenchyma. The patient refused decompression and decided to go home after his condition stabilized and his complaints improved with anti-edema treatment. A repeat DSA action was planned but the patient had financial problems. Primary intra-ventricular hemorrhage occurs when the nidus arterial venous malformation is adjacent to the ventricle although this is only 7% of all cases of primary intra-ventricular hemorrhage. In the case of primary intra-ventricular hemorrhage, complications need to be wary of when hydrocephalus appears. In addition, digital subtraction angiography should be performed prior to endovascular surgery as the main modality of therapy. Arterial venous malformation can be one of the causes. Digital angiography and Endovascular measures should be performed in this patient to prevent further complications. However, the refusal of the patient and family until the time of this case report was made is a separate obstacle in the diagnostic and therapeutic process.

Keywords: Intra-ventricular hemorrhage, Arterial venous malformation, Neurological

INTRODUCTION

Intra-ventricular hemorrhage is the extension of hemorrhage into the ventricular area. Intra-ventricular hemorrhage itself is divided into secondary intra-ventricular hemorrhage (where the intra-ventricular hemorrhage accompanies an intracerebral hemorrhage) and primary intra-ventricular hemorrhage (intra-ventricular hemorrhage without hemorrhage in the brain parenchyma).

Secondary intra-ventricular hemorrhage is assumed to increase mortality by 30-70% and has an incidence of up to 70% of all intra-ventricular haemorrhage.[1] Primary intra-ventricular hemorrhage occurs within the ventricle itself or a lesion very close to the ventricle, for instance, intra-ventricular trauma, aneurysms, vascular malformations, and choroid plexus tumors. Primary intra-ventricular hemorrhage accounts for 3.1% of all non-traumatic brain hemorrhages so it is a rare case and accounts for about 27% of all intra-ventricular hemorrhages.[2]

The study conducted by Dorner et al found that the majority of intra-ventricular hemorrhage was due to rupture of arteriovenous malformations, whereas the Ye et al study stated that only 7.8% of ruptured arteriovenous malformations caused primary intra-ventricular hemorrhage.[3,4] Primarily, the arteriovenous malformations are supplied by the posterior cerebral arteries. We reported

a rare case, in this case, of primary intra-ventricular hemorrhage caused by ruptured arteriovenous malformation with manifestations of headache and nuchal rigidity in the absence of visual disturbances.

CASE REPORT

A 33-year-old man came to the hospital with a headache. The complaint started seven days earlier where the headache was described as a throbbing sensation all over the head. Pain slightly improved when given medication but did not go away completely. The patient also mentioned that there was stiffness in the back of the neck area. He also denied any other complaints such as headache, vomiting, double or blurred vision, slurred speech, sore lips, and weakness in half of the body. There was no history of head trauma and previous infection. The patient was referred to West Nusa Tenggara Province hospital on the basis of suspicion of a brain infection.

The results of the clinical neurological examination found nuchal rigidity. CT scan of the head without contrast showed intra-ventricular hemorrhage in the right and left lateral ventricles as well as the III and IV ventricles. Follow-up CT angiography showed an AVM with a nidus size of 3×2.8 cm in the left occipital, arterialization: left posterior cerebral artery, superficial vein straight sinus in Figure 1.

Figure 1: CTA of the head: nidus in the left occipital measuring approximately 3×2.8 cm.

The third week after onset, the patient was scheduled for digital angiography followed by endovascular procedures. One day before the procedure, the patient had 2 seizures. According to the international league against epilepsy (ILAE) 2017, seizures are classified as general onset, motor onset tonic clonic. EEG examination was not performed. The patient received OAE treatment of phenytoin 2×200 mg. A repeat CT scan was performed and extension of the hemorrhage into the left occipital lobe was found.

Figure 2 showed decompression was planned to be carried out but the patient did not agree and decided to go home after the seizures were under control and the headache improved.

Figure 2: Extension of the hemorrhage into the left occipital lobe.

DISCUSSION

Arterial-venous malformations can cause hemorrhage confined to the ventricular system.[5] Malformations within ventricular structures such as those in the choroid plexus can cause intra-ventricular hemorrhage. It will usually immediately extend to the adjacent parenchyma and cause a large hematoma.[6] Malformations outside the ventricular structure can cause primary intra-ventricular hemorrhage due to contact of the nidus with the adjacent ventricle.[7] In this patient, the nidus size was 3×2.8 cm in the area of the left occipital lobe adjacent to the left lateral ventricle.

Common manifestations of arteriovenous malformations in the occipital lobe are headache and visual disturbances.[8] Visual disturbances in the form of visual field disturbances are quantranopia and hemianopia. Research by Kupersmith revealed that visual field disturbances are predominantly present when the calcarine artery, which is a terminal branch of the posterior cerebral artery, is a direct feeder to the malformation nidus. The study also revealed that 70 malformation patients with nidus in the occipital lobe region 45% had no visual disturbances. The patient in this case report had no visual disturbances even though his main feeder was the posterior cerebral artery.

Milatov's et al study of the anatomy of the feeding artery in arteriovenous malformations found that only 10.39%

came from the posterior cerebral artery.[9] Yisen Zhan's study on imaging characteristics of arteriovenous malformations in the brain divided the blood supply from the posterior cerebral arteries to the nidus area into type I where the blood supply involves the posterior choroidal artery which is proximal to the posterior cerebral artery and type II involving the temporal and occipital branches originating distal to the posterior cerebral artery. Both of these branches have the same prevalence to supply blood to the nidus area. Blood supply involving the proximal branch of the posterior cerebral artery more often involves deep venous drainage. CT angiography in the patient in this case report revealed that the nidus was in the occipital lobe with involvement of superficial vein drainage. According to the study of Stapf et al in patients with involvement of superficial vein drainage, the possibility of further hemorrhage from this arteriovenous malformation is actually small.[10]

The intra-ventricular hemorrhage discussed earlier is associated with a high mortality rate.[11] The main complication of primary intra-ventricular hemorrhage is hydrocephalus. In this patient the Graeb scale is 5. The Graeb scale itself is a semi-quantitative scale that measures the severity of intra-ventricular hemorrhage and the patient's output seen from the CT scan results, a score of 5 means a poor outcome. This patient did not perform surgery at the beginning of the incident. In intra-ventricular hemorrhage causing obstructive hydrocephalus, EVD is recommended to rule out blood clots. The approach of this case is endovascular therapy as the main modality which aims to save weak structures and reduce the risk of rebleeding which is performed immediately after diagnostic angiography. Based on a systematic review from Leacy et al recommended for pre-treatment assessment of cerebral AVM. Embolization action before resection is very useful to reduce preoperative blood loss and other complications that can cause death.[12]

In this case, the patient was also scheduled to undergo embolization which was preceded by diagnostic angiography. However, one day before the procedure, there was a sudden general onset of motor tonic clonic seizures. According to reports, this incident has happened twice. EEG examination was not performed but the patient was started on anti-epileptic therapy. A repeat CT scan was performed and found widespread intra-ventricular hemorrhage and bleeding in the occipital lobe parenchyma. The patient was advised to consult a neurosurgeon and scheduled for decompression. The challenge in the cases we have described is patient and family consent for the procedure. The patient decided to refuse medical treatment and decided to forcibly go home.

CONCLUSION

Primary intra-ventricular hemorrhage is an uncommon occurrence with a prevalence of 3.1 percent of all nontraumatic brain hemorrhages of which only 7% of cases are due to arteriovenous malformations. Hydrocephalus is a complication that must be watched out for which the Graeb scale should be assessed from the start to see the patient's outcome. To support digital angiography, it was continued with the recommended endovascular procedure for this case of primary intra-ventricular hemorrhage. Repeated education is very necessary and becomes a weakness in this case report because the patient and family decided to forcibly go home before the procedure was carried out.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Hinson HE, Hanley DF, Ziai WC. Management of intra-ventricular hemorrhage. Curr Neurol Neurosci Rep. 2010;10(2):73-82.
2. Valdez Sandoval P, Hernández Rosales P, Quiñones Hernández DG, Chavana Naranjo EA, García Navarro V. Intra-ventricular hemorrhage and posthemorrhagic hydrocephalus in preterm infants: diagnosis, classification, and treatment options. Childs Nerv Syst. 2019;35(6):917-27.
3. Dorner RA, Burton VJ, Allen MC, Robinson S, Soares BP. Preterm neuroimaging and neurodevelopmental outcome: a focus on intra-ventricular hemorrhage, post-hemorrhagic hydrocephalus, and associated brain injury. J Perinatol. 2018;38(11):1431-43.
4. Ye Z, Ai X, Fang F, Hu X, Faramand A, You C. The use of neutrophil to lymphocyte ratio as a predictor for clinical outcomes in spontaneous intracerebral hemorrhage. Oncotarget. 2017;8(52):90380.
5. Hong T, Yan Y, Li J, Radovanovic I, Ma X, Shao YW, et al. High prevalence of KRAS/BRAF somatic mutations in brain and spinal cord arteriovenous malformations. Brain. 2019;142(1):23-34.
6. Subat YW, Dasenbrock HH, Gross BA, Patel NJ, Frerichs KU, Du R et al. Periprocedural intracranial hemorrhage after embolization of cerebral arteriovenous malformations: a meta-analysis. J Neurosurg. 2019;133(5):1417-27.
7. Barnaure I, Liberato AC, Gonzalez RG, Romero JM. Isolated intra-ventricular haemorrhage in adults. Br J Radiol. 2017;90(1069):20160779.
8. Trifan G, Arshi B, Testai FD. Intra-ventricular hemorrhage severity as a predictor of outcome in intracerebral hemorrhage. Front Neurol. 2019;10:217.
9. Milatović B, Saponjski J, Huseinagić H, Moranjkić M, Medenica SM, Marinković I et al. Anatomy of the feeding arteries of the cerebral arteriovenous malformations. Folia Morphol. 2018;77(4):656-69.
10. Stapf C, Mast H, Sciacca RR, Choi JH, Khaw AV, Connolly ES, et al. Predictors of hemorrhage in patients with untreated brain arteriovenous malformation. Neurology. 2006;66(9):1350-5.

11. Suzuki K, Kimura K, Takeuchi M, Morimoto M, Kanazawa R, Kamiya Y et al. The randomized study of endovascular therapy with versus without intravenous tissue plasminogen activator in acute stroke with ICA and M1 occlusion (SKIP study). Int J Stroke. 2019;14(7):752-5.
12. De Leacy R, Ansari SA, Schirmer CM, Cooke DL, Prestigiacomo CJ, Bulsara KR et al. Endovascular treatment in the multimodality management of brain arteriovenous malformations: report of the Society of Neuro Interventional Surgery Standards and Guidelines Committee. J Neuro Interventional Surg. 2022;0:1-10.

Cite this article as: Gunawan SE, Putri SA. Primary intraventricular hemorrhage in 33-year-old man: a case report. Int J Adv Med 2022;9:848-51.