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Conservative treatment of corpus callosum hemorrhage in severe traumatic brain injury: a case report

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ABSTRACT

Background: Hemorrhage in the corpus callosum (CC) potentially has a poor prognosis. Surgical treatment can lead to high morbidity and mortality. Patients with CC hemorrhage may improve clinically and radiologically with conservative treatment.

Case: A child with multiple traumas including severe traumatic brain injury presented to our emergency room with a decrease of consciousness, aphasia, and seizure. On admission, her Glasgow Coma Scale score was E2V1M5 (8/15). The brain CT Scan showed hemorrhage in the body of the corpus callosum. We treated the patient conservatively in close observation in the intensive care unit. The patient showed significant improvement on day 4 and day 11 both clinically and radiologically. The patient was discharged from the hospital on day 20 in a stable neurological condition.

Conclusion: Rather than surgery, a conservative treatment can be a better option for a patient with corpus callosum hemorrhage.

Keywords: corpus callosum hemorrhage, traumatic brain injury
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INTRODUCTION

Hemorrhage in the corpus callosum (CC) is rare, especially the one due to traumatic brain injury (TBI).[1,2] CC injury potentially has a poor prognosis.[3] The manifestation of hemorrhage in the CC is varied. Many of the symptoms are also due to the involvement of the surrounding structures.[1] Despite its poor prognosis, patients with CC hemorrhage may improve clinically and radiologically with conservative treatment.

CASE REPORT

A 7-year-old girl was referred to the emergency room in our hospital with a decrease of consciousness after traffic accidents 6 hours before. She also presented with nausea and generalized seizure which had resolved with intravenous anticonvulsant drugs. She sustained multiple traumas including severe TBI, left renal injury grade IV, liver injury grade I, sacral wing fracture, and femoral head impaction fracture. Her Glasgow Coma Scale (GCS) score on admission was E2V1M5 (8/15), aphasic, with anisochoric pupils 3 mm/4 mm. A computed tomography (CT) scan of the brain showed hemorrhage in the body of CC with 4.4 cm x 2.8 cm x 1.4 cm in size (Figure 1).

We treated the patient conservatively in close observation in the intensive care unit (ICU). On day 4 of treatment, her GCS score was improved to E3V1M5 (9/15). We ordered a CT scan to evaluate the hemorrhage (Figure 2). The hemorrhage

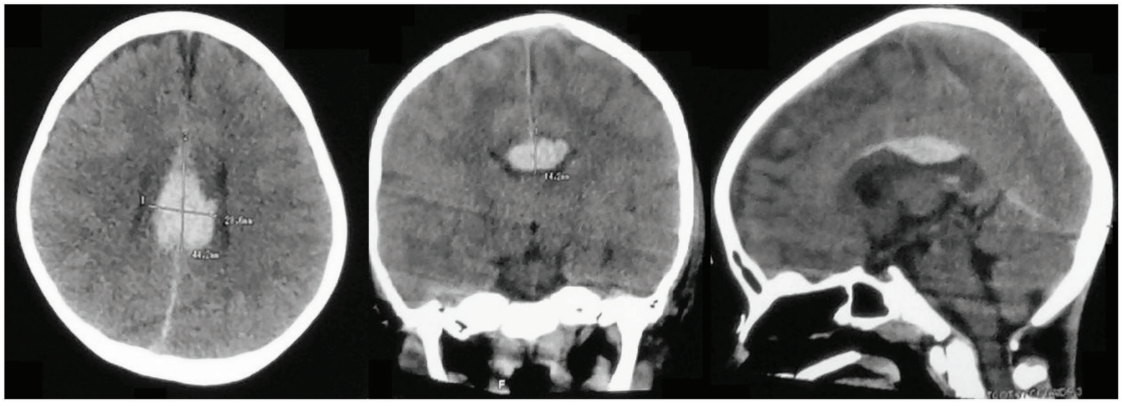

Figure 1 Brain CT Scan on admission showing a high signal indicating acute hemorrhage 4.4cmx-2.8cmx1.4cm involving the body of corpus callosum in axial, coronal, and sagittal view. There was also subdural hemorrhage in the interhemispheric fissure and cerebellar tentorium

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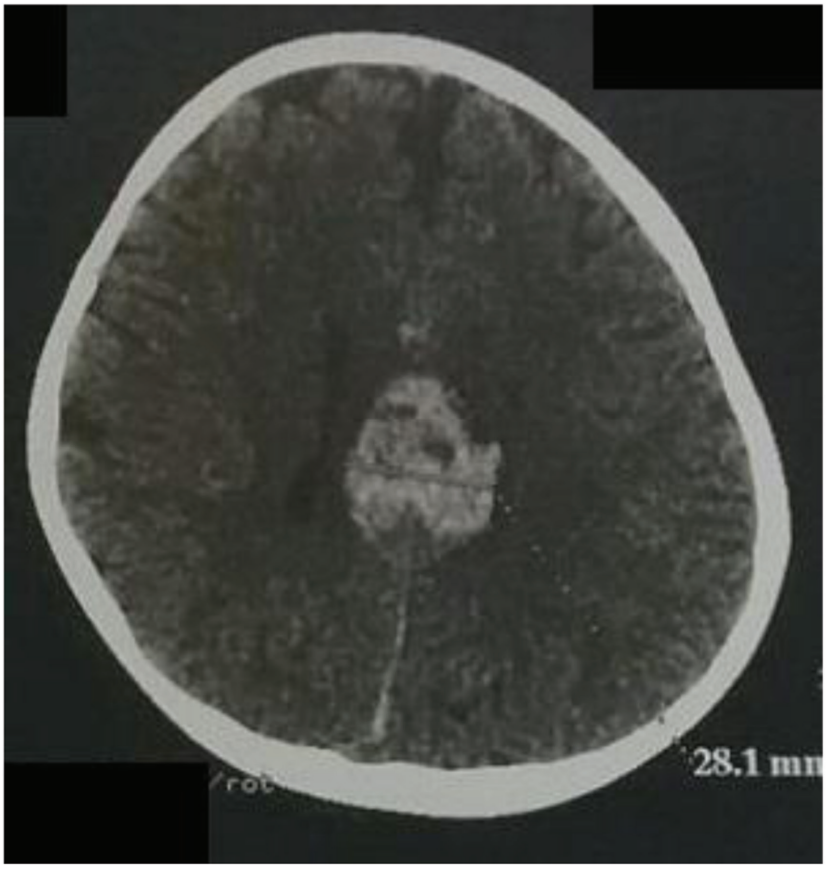

Figure 2 Axial view of brain CT Scan showing the volume of the hemorrhage was decreasing (1,1 cm x 2,6 cm x 2,81 cm in size) on day 4 of conservative treatment

decreased to 1.1 cm x 2.6 cm x 2.81 cm. On day 11, her GCS score made another improvement to E4V2M5 (11/15) and we moved her out of the ICU to the ward. The patient was discharged from the hospital on day 20 in a stable neurological condition.

DISCUSSION

CC serves several important roles in motor control: transfer of information to the opposite side of hemisphere to guide unilateral movement, transfer of information to inhibit contralateral movement during a unilateral motor activity, and transfer of information for bilateral movement coordination.[3] The anatomy of interhemispheric connections in the CC suggests that the supplementary motor cortex and much of the primary motor (precentral) cortex send interhemispheric connections. The anatomy allows the communication of information, as well as integrative and reciprocal inhibitory influences.[4,5] CC also associated with a global cognitive function.[3] Injury to the CC could lead to dysfunction of these brain areas.[5]

Hemorrhage confined to the CC alone is rare. It could happen because of hemorrhagic infarction after angiography in subarachnoid hemorrhage (SAH) patient, spontaneous hemorrhagic stroke due to oral anticoagulant therapy in patient with acquired von Willebrand syndrome supported with Left Ventricular Assist Devices, after anterior communicating or pericallosal artery aneurysm rupture, after anterior cerebral artery rupture presenting as remote intraparenchymal hemorrhage due to vasospasm, after arteriovenous malformation (AVF) or arteriovenous fistula (AVF) rupture, due to hypertension, amyloid angiopathy, moyamoya syndrome, Marchiafava-Bignami disease, cavernomas, and intratumoral or encephalitic hemorrhage.[2,4-8] CC hemorrhage may manifest as disturbance in consciousness, intense holo cranial headache, generalized seizures, encephalopathy, vomiting, acute cervical pain, hemiparesis, callosal disconnection syndrome/alien hand syndrome, emotional disturbance, global aphasia/mutism, akinetic, impaired visual recognition, persistent vegetative state, alexia, agraphia, tactile anomia, neglect syndrome, memory loss, apraxia, somatosensory deficit, and gait disturbance.[1,2,4-7,9]

Hemorrhage of the CC caused by TBI is exceedingly rare.[2] It might be associated with small hemorrhagic foci causing a compressive effect and perifocal edema of the CC bundles. This pathology makes satisfactory clinical outcome during and after the spontaneous absorption of the hemorrhage resulting in near full recovery at the follow-up. Traumatic CC hemorrhage might be accompanied by subdural hemorrhage (SDH) in the interhemispheric fissure and intraventricular hemorrhage (IVH).[2]

Injury to the midline structures is mostly caused by rotational/torsion or shearing forces produced at the junction of the CC with the septum pellucidum and fornix.[2,3] It made a disruption of axons at the time of trauma and associated with more extensive brain damage.[2,4] More specifically, injury in the CC is thought to be caused by traumatic laceration of the free edge of the falx. The number of lesions in the CC is correlated with the intensity of the traumatic forces.[3]

Injury of the CC in TBI patients is considered to be a prognostic factor of poor outcome in TBI patients.[3] Some variables that were associated with CC injury in TBI include old age, severe TBI, a multifocal involvement of the CC, traffic accident as the mechanism of injury, the presence of IVH, and a sign of diffuse axonal injury (DAI)/traumatic aneurysm rupture/vascular injury.[2,3] CC injury, old age, male, low GCS score on admission, and the presence of IVH were factors associated with disability in the future.[3]

In our case, the patient presented with a decrease of consciousness, aphasia, and generalized seizure after injury due to the compressive effect, perifocal

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edema, and associated cortical lesions surrounding the CC bundles. The hemorrhage was located in the body of CC which had thick fibers that were affected by the rapid brain displaced during the impact. On day 4, as the perifocal edema starting to resolved and spontaneous absorption of the hemorrhage happened, the size of the hemorrhage radiologically also decreased, and her GCS score improved as well. She made a significant improvement on day 11. Some factors related to good prognosis of our patient were young age, the unifocal involvement of the CC (body of the CC), no presence of IVH, and no sign of DAI/traumatic aneurysm rupture/vascular injury.

Surgical of CC hemorrhage contributes to high morbidity and mortality due to the damage of a vast number of callosal fibers and the adjacent brain tissue during interhemispheric transcallosal approach and hemorrhage evacuation. Thus, decision of not evacuating the lesion may lead to a favorable outcome in neurologically stable and clinically and radiologically improving patient.[2]

Improvement of consciousness level usually can be observed starting from the second week of treatment. Regular follow-up can be done in 1 month, 3 months, and 6 months after admission. Sometimes, patients can make a significant recovery in 6 months follow up.[2,5]

We treated this patient conservatively because she showed an improvement both clinically and radiologically starting from day 4 of treatment. Based on the literature, patient with CC hemorrhage showing an improvement at least from the second week of treatment will gradually make another improvement in 3 months and 6 months.[2,5]

CONCLUSION

We report a case of corpus callosum hemorrhage in severe traumatic brain injury presenting with a decrease of consciousness, seizure, and aphasia. Conservative treatment made a significant improvement both clinically and radiologically as early as day 4 of treatment. Rather than surgery, conservative treatment can be a better option for a patient with corpus callosum hemorrhage.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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REFERENCES

1. Kulkarni GB, Pendarkar H, Mirza MA, Mustare V. Corpus callosal hemorrhage due to deep cerebral venous thrombosis. *Neurology India* 2014; 62(5): 563-5. doi: http://dx.doi.org/10.4103/0028-3886.144497.
2. Elsayed A, Elgamal E, Elsayed AA, Wasserberg J, Kuncz A. Non-surgical treatment of massive traumatic corpus callosum hematoma after blunt head injury: a case report. *Neurologia I Neurochirurgia Polska* 2016; 30: 1-4. doi: http://dx.doi.org/10.1016/j.pjnns.2016.04.005.
3. Matsukawa H, Shinoda M, Fujii M, Takahashi O, Murakata A, Yamamoto D, Sumiyoshi S, Ishikawa R. Intraventricular hemorrhage on computed tomography and corpus callosum injury on magnetic resonance imaging in patients with isolated blunt traumatic brain injury. *J Neurosurg* 2012; 117: 334-9. doi: http://dx.doi.org/10.3171/2012.5.JNS112318.
4. Huang Y, Jia J. Corpus callosum hematoma secondary to cerebral malformation presenting as alien hand syndrome. *Neurocase* 2013; 19(4): 377-81. doi: http://dx.doi.org/10.1080/13554794.2012.690420.
5. Kim IH, Lee S, Lee CY, Lee DG. Intracranial hemorrhage in the corpus callosum presenting as callosal disconnection syndrome: FDG-PET and tractography: a case report. *Ann Rehabil Med* 2014; 38(6): 871-5. doi: http://dx.doi.org/10.5535/arm.2014.38.6.871.
6. Sorimachi T, Yajima N, Sasaki O, Koike T, Fujii Y. Hematoma in the splenium of the corpus callosum in the subacute stage of subarachnoid hemorrhage. *Neurol Med Chir* 2010; 50: 209-12. doi: http://dx.doi.org/10.2176/nmc.50.209.
7. Lemaire A, Cuttone F, Desgue J, Ivascau C, Buklas D, Massetti M. Corpus callosum hemorrhage during left ventricular-assist device support. *Asian Cardiovascular & Thoracic Annals* 2012; 21(5): 605-7. doi: http://dx.doi.org/10.1177/0218492312460773.
8. Abud TG, Nguyen AD, Abud LG, Houdart E. Anterior cerebral artery aneurysm rupture presenting as hemorrhage in the splenium of the corpus callosum. *Radiol Bras* 2016; 49(4): 268-9. doi: http://dx.doi.org/10.1590/0100-3984.2015.0130.
9. Perez-Bovet J, Marnov A, Blasco JLS, Martin JJA. Delated haemorrhage in the splenium of the corpus callosum after aneurysm rupture. *British Journal of Neurosurgery* 2013; Early Online: 1-3. doi: http://dx.doi.org/10.3109/02688697.2013.799121.