Spontaneous Cervical Epidural Hematoma Mimicking Acute Ischemic Stroke

Byoung Wook Hwang, MD , Dong Kun Lee, MD, Min A Lee, MD, Chang Ju Lee, MD, Seong Hwan Ahn, MD

Department of Neurology, Chosun University Hospital, Chosun University College of Medicine, Gwangju, Korea

In acute reperfusion therapy, the onset to needle time is correlated with the prognosis. Rapid diagnosis is essential to reduce the in-hospital delay. Meanwhile, intravenous thrombolysis requires strict indications and careful decisions to prevent hemorrhagic complications. If patients present with symptoms that mimic stroke, it may not be easy to reveal the underlying critical illness with only restricted assessment in the emergency room. Spontaneous cervical epidural hematoma usually presents with quadriplegia, but it may present with hemiplegia following neck pain, and no cranial abnormalities can easily be misdiagnosed as stroke. We report two cases of spontaneous cervical spinal epidural hematoma, which may be a harmful stroke mimicking intravenous thrombolysis.

J Neurosonol Neuroimag 2021;13(1):22-25

Key Words: Hematoma, epidural, spinal; Hemiplegia; Stroke mimic

Received: May 10, 2021

Revised: June 8, 2021

Accepted: June 25, 2021

Correspondence:

Seong Hwan Ahn, MD

Department of Neurology,
Chosun University Hospital,
Chosun University College of
Medicine, 365 Pilmun-daero,
Dong-gu, Gwangju 61453, Korea
Tel: +82-62-220-3182
Fax: +82-62-232-7587
E-mail: shahn@chosun.ac.kr

Rapid diagnosis and reperfusion therapy have a significant impact on a stroke patient's prognosis.¹ Patients with stroke symptoms who visit the emergency room are treated with intravenous tissue plasminogen activator (tPA) and stroke treatment after ruling out diseases that mimic stroke. However, it is not easy to consider all diseases with stroke symptoms during a given period, and inappropriate intravenous tPA can lead to deterioration of the patient's diseased condition.

Between May 2015 and December 2016, 846 patients who arrived at our emergency room with stroke symptoms, including hemiplegia, underwent multimodal brain computed tomography (CT) to consider reperfusion therapy. We report two patients diagnosed with spontaneous cervical epidural hematoma and presenting with acute stroke-mimicking symptoms, along with a review of the literature.

The Institutional Review Board waived the need for informed consent (IRB No. CHOSUN 2021-04-014).

CASE 1

A 69-year-old woman fell asleep at around 9:30 p.m.

the previous day, and came to our emergency room at 2:19 a.m. due to neck pain and right-sided hemiplegia that occurred at around 00:00 a.m. She was diagnosed with diabetes 20 years ago. There was no history of trauma before or after the symptoms began to manifest. Upon admission, her blood pressure was recorded as 192/100 mmHg. Neurological examination revealed right-sided hemiplegia (Medical Research Council grade 2/3), and there was no other neurological deficit. She had a National Institute of Health Stroke Scale (NIHSS) score of 5. According to the stroke system, multimodal CT was performed, wherein it was found that there was no intracranial hemorrhage, and degenerative change and stenosis of C3-C5 were detected in the aortic arch to vertex view (Fig. 1A). However, a high-density lesion on the axial view of the CT scan was identified in the right posterior epidural space at the C3-C5 level (Fig. 1B). High signal intensity was detected at the same level on spine magnetic resonance imaging (MRI) (Fig. 1C, D). The patient was finally diagnosed with spontaneous cervical epidural hematoma. Emergency decompression surgery was performed. On the 4th day after surgery, the patient was able to walk again.

CASE 2

An 85-year-old male fell asleep at around 7:00 p.m. the previous day, and was admitted to our emergency room at 12:50 a.m. due to right-sided hemiplegia when he woke up. He had a history of stroke 9 years prior, for which he took an antiplatelet agent. There was no trauma history. Recorded vital signs were within the normal range. He had neck pain that was exacerbated by movement and was relieved by rest. Neurological examination revealed right hemiplegia (Medical Research Grade 1/1), and there was no other neurologic deficit. The patient had a NIHSS score of 6. According to the stroke system, multimodal CT was performed; based on this, there was no intracranial hemorrhage, and degenerative change and stenosis of C5-C6 were detected in the aortic arch to vertex view (Fig. 2A). However, a high-density lesion on the axial view of CT was identified in the right posterior epidural space at the C3-C6

level (Fig. 2B). High signal intensity was detected at the same level on spine MRI (Fig. 2C, D). The patient was finally diagnosed with spontaneous cervical epidural hematoma. Emergency decompression surgery was performed. After surgery, the patient was able to walk again.

DISCUSSION

Our cases showed that spontaneous cervical epidural hematoma must be differentiated from stroke before intravenous tPA. Our patients presented with neck pain followed by hemiplegia without cranial nerve manifestations. Multimodal brain CT, including the aortic arch to vertex view, showed the reason why neck pain was provoked.

Spontaneous cervical epidural hematoma is a rare disease that has been reported to be around 1 in every

FIG. 1. Multimodal brain computed tomography (CT) and cervical magnetic resonance image findings of case 1. (A) Aortic arch to vertex view of brain CT shows degenerative change and stenosis from C3 to C5. (B) Axial view of brain CT shows the high-density mass (arrow). (C) Sagittal view and (D) axial view of T2-weighted image shows hematoma compressing the spinal cord from C3 to C5 (arrow).

FIG. 2. Multimodal brain computed tomography (CT) and cervical magnetic resonance image findings of case 2. (A) Aortic arch to vertex view of brain CT shows degenerative change and stenosis from C5 to C6. (B) Axial view of brain CT shows the high-density mass (arrow). (C) Sagittal view and (D) axial view of T2-weighted image shows hematoma compressing the spinal cord from C3 to C6 (arrow).

1 million people.² Generally, the patient experiences paraplegia and tetraplegia accompanied by neck pain without cranial nerve abnormality.³ However, there are numerous descriptions of hemiparesis as an initial manifestation of spontaneous cervical epidural hematoma. In such cases, the patient is often misdiagnosed with ischemic stroke. Among the cases of spontaneous cervical epidural hematoma that have been reported so far in the PubMed database (<https://pubmed.ncbi.nlm.nih.gov/>), eight were suspected with having stroke and were treated with intravenous tPA. Four of these cases had deterioration of neurological symptoms after tPA use (Table 1). All of the reported cases initially had symptoms of hemiplegia, which could be due to cerebral infarction. However, the deterioration of neurological symptoms after administration of intravenous tPA included quadriplegia, Brown-Sequard syndrome, dysuria, and Horner's syndrome, which are suspected to be manifestations of spinal cord disease rather than cerebral infarction. Emergency decompression surgery was performed as treatment, and most of the postoperative neurological symptoms showed improvement.

However, some symptoms reportedly persisted.

In reperfusion therapy, the time from onset to needle time is correlated with the prognosis of patients with stroke symptoms. For this reason, non-contrast brain CT is widely used for initial imaging examinations to exclude hemorrhage before initiating tPA treatment. However, the appropriate administration of tPA is also correlated with patient prognosis. Because inappropriate tPA can worsen hematoma, physicians should be aware of the potential for spontaneous cervical epidural hematoma within the time window for tPA treatment. In this regard, multimodal brain CT that includes non-contrast brain CT, CT angiography, and CT perfusion has the advantage of being a rapid and effective screening tool for acute ischemic stroke.⁴ Furthermore, the aortic arch to vertex view and angiographic-enhancing imaging performed in this case are useful for diagnosing cervical diseases, such as spontaneous cervical epidural hematoma, while evaluating acute stroke.

Spontaneous cervical epidural hematoma with hemiparesis can be mistaken for an acute ischemic stroke, and treatment with intravenous tPA has a severe risk of

TABLE 1. The cases of spontaneous cervical epidural hematoma that was misdiagnosed for stroke treated with intravenous tissue plasminogen activator

Study	Age/sex (from onset)	Symptoms	Clinical Course after thrombolysis	Prognosis
Teles et al. ² (2020)	63/M (3.0 H)	Right hemiplegia (G2/Go) Neck pain Shoulder pain	Worsening weakness and newly developed sensory symptom	Improved G3/G1 after surgery
Patel et al. ³ (2018)	51/M (ND)	Right hemiplegia (G2/G3), neck pain, hyperreflexia, ankle clonus, Babinski's sign(+)	Worsening, upper G1/lower G2, B-S syndrome, urinary retention, Horner's syndrome(+)	Improved to G4/G5
Morimoto et al. ⁵ (2016)	71/M (2.0 H)	Left hemiplegia (G3/G2) Neck pain	Worsening, tetraplegia (right G4+/G4, left G3/G2), urinary retention	Resolved after 1 year with surgery
Huang et al. ⁶ (2020)	54/M (2.0 H)	Right Hemiplegia (G2/G2), facial numbness, neck pain	Worsening, right hemiplegia, newly developed left hemiplegia (G2/G2)	Improved to Right side G3/G3 and Left side G4/G4 after surgery
Rahangdale et al. ⁷ (2020)	67/M (ND)	Hemiparesis, Hemianesthesia	Not described	Improved after Cryoprecipitate treatment
Son et al. ⁸ (2012)	63/M (2.5 H)	Left upper G4 weakness, Flaccid paraplegia, hemisensory decreased, neck pain Areflexia	No Change	Improved paraplegia (right lower G4/left lower G3) after surgery
Kim et al. ⁹ (2018)	73/M (<3.0 H)	Hemiparesis (G2/G4), neck pain	No Change	Improved (G4/G4) after surgery
	65/F (<3.0 H)	Hemiparesis (G4/G4), neck pain	No Change	Improve (G4/G4) after surgery

B-S syndrome; Brown-Sequard syndrome, ND; not described.

aggravating the neurological symptoms, delaying surgery, and worsening the surgical outcome. If the patient presented with hemiparesis and neck pain and no cranial nerve abnormalities were observed, spontaneous cervical epidural hematoma must be considered before administering intravenous tPA.

Conflicts of Interest

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

REFERENCES

1. Saver JL, Fonarow GC, Smith EE, Reeves MJ, Grau-Sepulveda MV, Pan W, et al. Time to treatment with intravenous tissue plasminogen activator and outcome from acute ischemic stroke. *JAMA*. 2013;309:2480-2488.
2. Teles P, Correia JP, Pappamikail L, Lourenço A, Romero C, Lopes F, et al. A spontaneous cervical epidural hematoma mimicking a stroke - A case report. *Surg Neurol Int*. 2020;11:157.
3. Patel R, Kumar A, Nishizawa K, Kumar N. Hemiparesis in spontaneous spinal epidural haematoma: a potential stroke imitator. *BMJ Case Rep*. 2018;2018:bcr2017222686.
4. Vo KD, Yoo AJ, Gupta A, Qiao Y, Vagal AS, Hirsch JA, et al. Multimodal Diagnostic Imaging for Hyperacute Stroke. *AJNR Am J Neuroradiol*. 2015;36:2206-2213.
5. Morimoto T, Yoshihara T, Yakushiji Y, Eriguchi M, Hara H, Sonohata M, et al. Worsening Cervical Epidural Hematoma After Tissue Plasminogen Activator Administration for Stroke Like Symptoms. *Spine (Phila Pa 1976)*. 2016;41:E437-E440.
6. Huang DW, Sun JM, Chen YH, Huang KC. Acute hemiparesis. A rare presentation of spontaneous spinal epidural hematoma mimicking acute stroke. *Neurosciences (Riyadh)*. 2020;25:316-319.
7. Rahangdale R, Coburn J, Streib C. Spontaneous cervical epidural hematoma mimicking acute ischemic stroke. *Neurology*. 2020;95:496-497.
8. Son S, Kang DH, Choi DS, Kim SK, Lim BH, Choi NC. A case of spontaneous spinal epidural hematoma mimicking a stroke. *Neurologist*. 2012;18:41-43.
9. Kim MC, Kim SW. Improper Use of Thrombolytic Agents in Acute Hemiparesis Following Misdiagnosis of Acute Ischemic Stroke. *Korean J Neurotrauma*. 2018;14:20-23.