

## CASE REPORT

# Worsening Cervical Epidural Hematoma After Tissue Plasminogen Activator Administration for Stroke Like Symptoms

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**Study design.** Case report.

**Objective.** To report an extremely rare case of stroke-mimicking, cervical spontaneous epidural hematoma (SEH) treated with tissue plasminogen activator (tPA) for hemiparesis followed by emergency cervical decompression.

**Summary of Background Data.** Although hemiparesis caused by cervical SEH is a relatively uncommon symptom compared with tetraparesis, such cases were often misdiagnosed as cerebral infarction and worsened by antithrombotic therapy.

**Methods.** A case report and literature review are presented.

**Results.** A 71-year-old male presented with sudden neck pain followed by left-sided hemiparesis, and was believed to have had a stroke. He was administered tPA as intracranial computed tomography showed no signs of hemorrhage. However, his neurological condition continued to decline, and MRI of the cervical spine revealed a large spontaneous epidural hematoma. He subsequently underwent evacuation of the epidural hematoma and C3-6 laminoplasty, and his clinical status improved after the surgery.

**Conclusion.** To our knowledge, only three cases of cervical SEH with hemiparesis erroneously treated with tPA resulting in neurological decline because of the enlargement of an existing hematoma, including the current case, have been reported in the English literature. It is important for physicians, especially those who administer tPA treatment, to include cervical SEH in

the differential diagnosis of stroke in patients presenting with sudden back pain followed by the onset of neurological deficits including hemiparesis.

**Key words:** cervical epidural hematoma, stroke mimic, tissue plasminogen activator.

**Level of Evidence:** 5

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Hemiparesis caused by cervical spontaneous epidural hematoma (SEH) is a relatively uncommon symptom in comparison with tetraparesis in cervical SEH. In patients presenting with hemiparesis, it may be difficult to distinguish cerebral infarction from cervical SEH, especially at the acute stage.<sup>1–11</sup> We present an extremely rare case of stroke-mimicking cervical SEH with hemiparesis worsened after tissue plasminogen activator (tPA) therapy for hemiparesis followed by emergency cervical decompression.

## CASE REPORT

A 71-year-old male presented to the emergency department with left-sided incomplete hemiparesis [manual muscle test (right/left): deltoid 5/4, elbow flexors 5/3, wrist extensors 5/3, elbow extensors 5/3, finger flexors 5/2, finger abductors 5/2, and lower extremities 5/2] after the sudden onset of neck pain and was thought to have had a stroke. The results of preoperative laboratory blood tests were all within the normal limits. The patient was not taking any antiplatelet or anticoagulant medications. As brain computed tomography (CT) showed no signs of hemorrhage (Figure 1), tPA was administered 2 hours after symptom onset. However, the patient's neurological condition worsened 1 hour after the administration of tPA, resulting in incomplete tetraplegia [manual muscle test (right/left): deltoid 5/4, elbow flexors 5/3, wrist extensors 5/3, elbow extensors 5/3, finger flexors 3/2, finger abductors 3/2, and lower extremities 3/2]. Twenty-four hours after onset cervical magnetic resonance

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**Figure 1.** Preoperative intracranial CT scan reveals no hemorrhage.

imaging (MRI) revealed a left posterolateral SEH at C4-C6 (Figure 2A, B), and the patient underwent evacuation of the epidural hematoma and C4–6 laminoplasty. The amount of intraoperative blood loss was 62 mL, and no complications of hemorrhage were observed postoperatively.

The patient's clinical status in both extremities improved 1 day after the surgery, although he was found to have a neurogenic bladder. MRI performed 5 days after onset showed no hematomas (Figure 3). On the final follow-up examination performed 1 year after the surgery, the neurological deficits had resolved without a bladder disorder requiring intermittent catheterization.

The patient and his family were informed that the data for this case would be submitted for publication, and provided their consent.

## DISCUSSION

### Cervical SEH Presenting With Hemiparesis

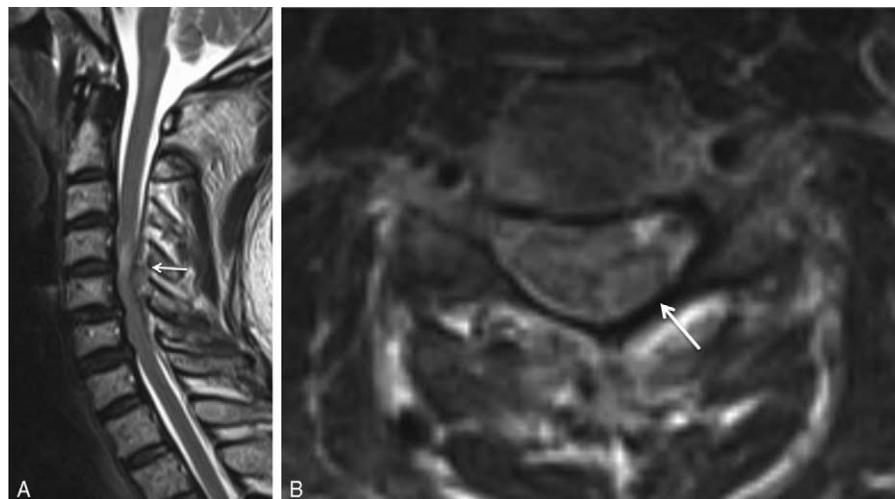
Cervical SEH may compress only the ipsilateral asymmetric spinal cord, and occasionally presents with Brown-Séquard syndrome<sup>7,8,12</sup> or hemiparesis<sup>1–6,9–11</sup> mimicking acute stroke. A review of 613 SEH case studies published by Kreppel *et al*<sup>12</sup> found only 17 patients exhibiting Brown-Séquard syndrome. Matsumoto *et al*<sup>5</sup> reviewed 13 patients with a reported instance of hemiparesis caused by SEH. Moreover, hemiparesis was recently reported in 6 of 35 patients with SEH, as described by Liao *et al*,<sup>13</sup> and in two of four patients, as described by Lonjon *et al*.<sup>14</sup> Collectively, hemiparesis may not be uncommon in cases of cervical SEH.

### Diagnostic Procedure for Distinguishing of Cervical SEH With Hemiparesis From Cerebral Infarction

Many reports have suggested that the onset of neck or back pain followed by hemiparesis is an important sign when diagnosing cervical SEH with hemiparesis.<sup>1–5,6–14</sup> Moreover, Lhermitte's sign,<sup>5</sup> the absence of facial weakness or cranial signs,<sup>4,5,10</sup> Horner's syndrome,<sup>5,12,15</sup> and the development of Brown-Séquard syndrome<sup>7,8,12</sup> during the clinical course have been reported as symptoms that may be used to differentiate cervical SEH from stroke. Therefore, physicians should consider that these symptoms may also indicate the possibility of cervical SEH. The most reliable diagnostic tool in such cases is considered to be MRI and plain CT also yields acceptable results, although the possibility of misdiagnosis with this modality still remains.<sup>10,12</sup>

### Worsening Cervical SEH Erroneously Treated With Antiplatelet Therapy, Anticoagulant and tPA

It is well known that antiplatelet, thrombolysis, and/or anticoagulant therapy has been shown to be a risk factors for SEH,<sup>1,2,4,6,11,12,15,16</sup> including tPA. Several patients with cervical SEH presenting with hemiparesis are misdiagnosed



**Figure 2.** (A) Preoperative sagittal T2-weighted MRI. MRI revealed an extradural mass (arrow) from C4 to C6 that compressed the spinal cord with intramedullary high intensity at C4/5. (B) Preoperative axial T2-weighted MRI. MRI showed the hematoma (arrow), compressing the cord posteriorly with mostly left sided involvement.



**Figure 3.** Postoperative sagittal T2-weighted MRI. MRI showed that the hematoma disappeared at 1 week after surgery.

with cerebral infarction at acute stage and erroneously treated with these agents.<sup>1,2,4,6,11,15,16</sup> Although tPA treatment in particular is a first-line therapy for acute ischemic stroke,<sup>17</sup> the development of spinal epidural hematomas after tPA treatment for acute myocardial infarction<sup>18–20</sup> and pulmonary embolism<sup>21</sup> has been reported. Therefore, the administration of tPA to patients with SEH is risky and may result in the progression of the hematoma. Hence, treatment with tPA therapy can be characterized as a “double-edged sword” that is remarkably effective, but still carries a possible risk of causing and/or worsening SEH.

To our knowledge, only three cases of cervical SEH erroneously treated with tPA, including the current case, have been reported in the English literature.<sup>5,11</sup> Fortunately, none of the cases involved excessive bleeding during the operation and displayed no signs of postoperative hemorrhage, but patients should be carefully monitored for bleeding and hematoma formation during and after surgery.<sup>5,11</sup>

To properly administer tPA treatment for acute cerebral ischemia, a correct diagnosis must be made within 3 hours of symptom onset.<sup>17</sup> However, obtaining a diagnosis within

this time frame is not easy as a wide variety of conditions mimic stroke, including seizures, migraines, spinal masses, and hematomas.<sup>11</sup> Another possible explanation is that, although MRI is generally considered to be the most reliable diagnostic tool for detecting ischemic lesions, this method can take a long time to perform and MRI devices may not be available in certain situations.<sup>17</sup> These pitfalls may be important in emergent stroke cases in which possible treatment with tPA is considered. In addition to the head, in cases of possible spinal involvement or patients with neck pain, the spine should also be scanned before tPA administration.

## CONCLUSION

It is important for physicians, especially those who administer tPA treatment, to include cervical SEH in the differential diagnosis of stroke in patients with the sudden onset of neck pain followed by neurological deficits including hemiparesis.

### ➤ Key Points

- We presented an extremely rare case of cervical SEH treated with tPA for hemiparesis followed by emergency posterior cervical decompression.
- Although cervical SEH is typically characterized by the sudden onset of neck pain followed by tetraparesis, it can occasionally present with signs of hemiparesis mimicking those of stroke.
- The possibility of cervical spinal lesions should be considered in the differential diagnosis of patients with the acute onset of hemiparesis associated with neck pain.
- Physicians must be aware of the potential for the cervical SEH in patients presenting with hemiparesis as the administration of tPA may worsen cervical SEH.

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