

Spontaneous cervical epidural haematoma mimicking stroke: a case report and literature review

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Abstract

Spontaneous spinal epidural haematoma (SSEH) is a rare disease that requires emergency decompression or haematoma evacuation to prevent permanent neurological deficits. Hemiparesis is an extremely rare presentation of SSEH, commonly misdiagnosed as stroke. With the help of case studies and references, this paper comprehensively discusses the effective methods to distinguish SSEH from stroke and provides theoretical support and ideas for rapid and accurate identification of SSEH.

Herein, we report on the case of a 51-year-old man with SSEH who presented with acute hemiparesis and posterior neck pain. Cervical computed tomography (CT) revealed cervical degeneration. A carotid CT angiogram revealed a high-density mass in the C2-C5 right posterolateral epidural region. Cervical spine magnetic resonance imaging showed SSEH. The patient was conservatively treated and discharged following a full recovery.

Rapid identification of SSEH continues to present a great challenge for neurologists. A soft tissue CT scan can be used to quickly and accurately identify SSEH; however, in the absence of cranial signs, Brown-Sequard syndrome, Lhermitte's sign and Horner syndrome should be used to differentiate SSEH from stroke.

Key words: spontaneous spinal epidural haematoma, stroke, CT, Lhermitte's sign.

Introduction

The incidence of spontaneous spinal epidural haematoma (SSEH) is approximately 0.1 per 100,000 people [8]. SSEH is a neurological emergency that leads to spinal cord compression and requires emergency decompression and haematoma evacuation. Prognosis depends mostly on compression time and haematoma size. SSEH commonly presents as tetraparesis, paraparesis or Brown-Sequard syndrome. Hemiparesis is an extremely rare presentation of SSEH that is commonly mistaken for stroke [1,2,4-6, 8-15]. Timely and accurate diagnosis remains challenging for neurologists. In this paper, we report a case of spontaneous cervical epidural haematoma

in a patient who presented with neck pain and hemiparesis. A carotid computed tomography angiogram (CTA) revealed a mass of slightly high density posterolateral to the spinal cord, compatible with an epidural haematoma. The patient was treated without decompressive surgery, and his neurological symptoms were completely resolved.

Case report

A 51-year-old right-handed man, a farmer by profession, presented with right hemiparesis that started in the early morning, followed by right-sided posterior neck pain. There were no visual impairments, non-fluent speech, impairment of mental abilities or difficulty swallowing. The patient complained of neck pain and

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right hemiparesis. An initial neurologic examination revealed that the motor strength of his right extremities was grade 4/5 with no facial weakness. A sensory examination revealed hypoesthesia in the lower right extremities. According to the physician's diagnosis, the patient's deep tendon reflexes were exaggerated on the right side. His mental status and speech were normal. He reported a medical history of hypertension, treated with 5 mg amlodipine every day. Based on his medical history and clinical symptoms, the physician working at the emergency department ordered brain computed tomography (CT) to rule out intracranial haemorrhage. However, brain CT showed no signs of bleeding. After CT examination, the patient's muscle

strength was grade 5/5 in the right limbs. A cerebrovascular accident was strongly suspected. As the patient's family members did not consent to intravenous thrombolytic therapy, he was treated with aspirin. However, he continued to complain of persistent right-sided posterior neck pain. The physician suspected that the spinal canal was compressed. Subsequently, a cervical CT scan was performed, revealing cervical degeneration (Fig. 1A). Due to the initial pain syndrome, artery dissection (and subsequent stroke) was suspected. A carotid CTA showed no arterial dissection; however, lesions that were approximately 0.4 cm by 0.7 cm by 3.5 cm in size with a high-density mass were detected in the C2-C5 right posterolateral epidural region (Fig. 1B).



Fig. 1. The computed tomography (CT) scan and magnetic resonance imaging (MRI) scan of the cervical spine. **A)** Cervical CT scan revealed cervical degeneration; **B)** CT scan of the carotid artery showed a high-density mass in the right posterolateral epidural region; **C)** Adjusted CT window width that showed a high-density mass in the C 2/3; **D)** Five days after the initial presentation, MRI of the cervical spine showed epidural haematoma; the haematoma was completely resolved.

Table 1. Reported cases of spontaneous spinal epidural haematoma (SSEH) that were misdiagnosed as stroke

| Author | Age/ Sex | Symptom | Cranial nerve palsy | Special signs | Treatment offered for misdiagnosis | Diagnosing tool | Treatment | Outcome | Location |
|------------------|-------------|---|---------------------------|----------------------------|--|--------------------|-----------------------|---------------------------|----------|
| Patel R [8] | 51/M | Right hemiparesis neck pain | – | Reduced sensation level T1 | t-PA | MR | Decompressive surgery | Complete recovery | C3-C5 |
| Shima H [11] | 84/F | Right hemiparesis neck pain | – | – | – | CT/MR | Conservative | Complete recovery | C2-C3 |
| Huang DW [2] | 54/F | Neck pain right hemiparesis | – | – | t-PA | MR | Decompressive surgery | Disability | C3 |
| Liu C [5] | 65/M | Left hemiparesis back pain | – | – | Antiplatelet therapy | MR | Decompressive surgery | Complete recovery | T10-T12 |
| Emamhadi M [1] | 77/F | Left hemiparesis neck pain | – | – | Anticoagulant therapy | CT/MR | Decompressive surgery | Complete recovery | C3-T1 |
| Pavličević G [9] | 72/F | Right hemiparesis neck pain | – | – | – | CT/MR | Decompressive surgery | Good recovery | C2-C6 |
| Morimoto T [6] | 71/M | Left hemiparesis neck pain | – | – | t-PA | MR | Decompressive surgery | Good recovery | C4-C6 |
| Tsukita K [14] | 64/F | Right hemiparesis neck pain | – | – | Aspirin | MR | Conservative | Complete recovery | C2-C6 |
| Son S [12] | 63/M | Left hemiparesis neck and left shoulder pain | Mild dysarthria | Brown-Sequard syndrome | t-PA | MR | Decompressive surgery | Disability | C4-T2 |
| Yurter A [15] | 69/F | Left-sided hemiparesis | – | – | t-PA | MR | Decompressive surgery | Good recovery | C1-C7 |
| Li C [4] | 71/F | Right hemiparesis Neck pain | – | – | Aspirin Clopidogrel | MR | Decompressive surgery | Dead due to complications | C2-C6 |
| Shah JA [10] | 33/F | Left hemiparesis neck pain | – | – | – | CT/MR | Decompressive surgery | Complete recovery | C4-C7 |
| Teles P [13] | 63/F | Right hemiparesis neck and back pain | – | – | tPA | MR | Decompressive surgery | Disability | C3-C6 |

M – male, F – female, t-PA – tissue plasminogen activator

We reviewed the cervical CT and adjusted the CT window width, which showed a high-density mass in the C2-C5 region (Fig. 1C). The patient displayed complete recovery of muscle strength. Because of this favourable clinical evolution, no decompression was performed. Five days after the initial presentation, cervical spine magnetic resonance imaging (MRI) showed an epidural lesion compatible with haematoma (Fig. 1D). The haematoma was completely resolved, and the patient was discharged on 10 May. The patient was in good health during the three-month follow-up period and experienced no neurological deficits.

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Discussion

Jackson first described SSEH in 1869. The current annual incidence rate is thought to be approximately

0.1 per 100,000 people [8]. The cause of SSEH is an idiopathic and vascular malformation, and antiplatelet agents have been suggested as its secondary aetiology [8]. SSEH usually presents as Brown-Sequard syndrome, paraparesis or tetraparesis, with cervical or back pain. Hemiparesis is a very rare presentation of SSEH that is commonly misdiagnosed as acute ischemic (cerebral) stroke (AIS) [1,2,4-6,8-15]. In patients whose symptoms were mistaken for AIS, treatment with heparin, rt-PA, aspirin and warfarin worsened their condition [1,2,4-6,8,12-15]. The patient's characteristics are shown in Table I.

For neurologists and physicians, it is always challenging to distinguish SSEH from AIS. In their case series, Naeem *et al.* [7] found that CT is a valuable tool for diagnosing spinal epidural haematoma. The CT presentation of a spinal epidural haematoma depends on the age of the haematoma. In acute spinal epidural haematoma, the lesion presents with high density relative to the spinal cord. CT may be an optimal diagnostic method for acute brain ischemia that requires less preparation than MRI. In the current case, cervical CT was performed on admission to rule out SSEH, and a cervical CTA revealed it. We assume that the Hounsfield unit (HU) setting of the bone window is much higher than that of the soft tissue window. The HU setting of haematomas is generally between 50 and 90 HU, which is similar to the soft tissue window, and the degree of recognition of soft tissue and haematoma under the bone window is decreased. Diagnosis of SSEH can therefore be easily missed. In soft tissue, a CT image increases the differentiation between tissue and haematomas. When the thoracic and lumbar regions are affected by air artifacts, the risk of misdiagnosis is higher. In 13 patients with SSEH mimicking stroke, most involved segments were located at the cervical vertebra. Consequently, CT may be chosen to exclude cervical spinal haematoma. Therefore, it is considered that cervical CT of soft tissue is an effective method for the rapid differentiation of SSEH and AIS.

A comprehensive examination confirmed the diagnostic impression based on the patient's history, especially neurology. SSEH should be highly suspected, especially with persistent neck pain and hemiparesis or weakness in limbs, with no non-fluent speech or facial weakness. Neck pain radiates to the corresponding dermatome due to compression of the nerve roots by haematoma; however, pain may sometimes be vague. In most misdiag-

nosed cases, neurologists and physicians focus on hemiparesis and ignore neck pain, cranial signs, Brown-Sequard syndrome, Horner syndrome and Lhermitte's sign, which can be used to differentiate SSEH from stroke [8]. A reverse Lhermitte's sign on neck extension (rather than neck flexion) is usually caused by pathology extrinsic to the cervical spinal cord causing cord compression. The pain and radiating electric shock may be aggravation [3]. A reverse Lhermitte's sign may be used as a valuable clue to extrinsic mass compression of the cervical spinal cord. A detailed examination is essential to avoid misdiagnosis.

Conclusions

The rapid identification of SSEH continues to present a significant challenge for neurologists. The correct choice of appropriate imaging examination, along with detailed examination, is essential in avoiding misdiagnosis.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Disclosure

The authors report no conflict of interest.

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