Warfarin-associated Extensive Spontaneous Spinal Epidural Hematoma Mimicking Stroke

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ABSTRACT
Clinicians usually suspect acute stroke when patients with atrial fibrillation (AF) present with neurologic symptoms. I report such a patient on warfarin therapy complaining of acute-onset right hemiplegia, which was diagnosed as extensive spinal epidural hematoma rather than stroke. International normalized ratio (INR) was within therapeutic range, with no recent dosage change. Brain MRI revealed no acute stroke. Further neurologic examination demonstrated reduced pain and temperature sensations below T2 level. Subsequently, cervical MRI was performed and revealed a massive spinal epidural hematoma in the posterior and right posterolateral regions of the spinal canal from C1 to T2. The patient underwent emergency right cervical decompressive laminectomy 24 hours after symptom onset. After 2 weeks of rehabilitation, the patient made a near-complete recovery of motor and sensory function. Spinal epidural hematoma should be the first differential diagnosis considered during acute stroke work-up in patients on warfarin medication.

Key Words: ■ spinal epidural hematoma ■ warfarin

Introduction
Oral anticoagulation (OAC) therapy is strongly recommended to prevent thromboembolic stroke in patients with atrial fibrillation (AF). However, strict control is needed to achieve optimal therapeutic level when using warfarin as the anticoagulant. Clinicians usually suspect acute stroke when patients with AF present with neurologic symptoms. I report an AF patient on warfarin therapy complaining of acute-onset right hemiplegia, which was diagnosed as extensive spinal epidural hematoma rather than stroke.

Case
A 70-year-old female patient presented to the emergency department complaining of chest discomfort and motor weakness in the right arm and leg. She had been on warfarin for 6 years after a diagnosis of paroxysmal AF. The patient reported a history of hypertension and dyslipi-
There had been no recent changes in warfarin dosage, and her international normalized ratio (INR) had been 2.0 at last measurement, within the therapeutic range. Prompt magnetic resonance imaging (MRI) of the brain was performed to evaluate acute stroke events. However, it revealed no evidence of cerebral infarction or hemorrhage. Detailed neurological examination showed decreased motor strength in right upper and lower extremities, reduced pain and temperature sensations below T2, and hyperreflexia in the lower extremities. No cognitive dysfunction or dysarthria was noted. Cranial nerve examination was normal. Taken together, these findings suggested cervical spinal cord compression.

Thereafter, cervical MRI was performed and revealed a spinal epidural hematoma (white arrow) at posterior and right posterolateral region of C1 to T2 level as low signal intensity in T1-weighted sagittal image (A) and high signal intensity in T2-weighted sagittal image (B). Spinal epidural hematoma compressed spinal cord (white arrow head) deviated to left side with compressive myelopathy at C6 to7 in T2-weighted axial image at C3 level (C) and C6 level (D).

Figure 1. Spinal epidural hematoma (white arrow) at posterior and right posterolateral region of C1 to T2 level as low signal intensity in T1-weighted sagittal image (A) and high signal intensity in T2-weighted sagittal image (B). Spinal epidural hematoma compressed spinal cord (white arrow head) deviated to left side with compressive myelopathy at C6 to7 in T2-weighted axial image at C3 level (C) and C6 level (D).
vealed a multiloculated cystic mass (11 × 1.5 × 1 cm) in the posterior and right posterolateral regions of the spinal canal from C1 to T2, with mass effect on the spinal cord and compressive myelopathy on the right side at C6–7. In addition, there was moderate left central disc herniation at C6–7. After intravenous administration of 5 mg of vitamin K, the patient underwent emergency right cervical decompressive laminectomy 24 hours after symptom onset. A massive cervical epidural hematoma extending from C1 to T1 was found and removed. The patient was hospitalized for rehabilitation for 2 weeks after the operation. Follow-up cervical MRI showed complete removal of hematoma from the spinal canal. Anticoagulation was started 2 days after operation with intravenous unfractionated heparin, which was changed to oral warfarin 5 days after operation. At hospital discharge, the motor power of the arm had been completely recovered, and lower limb strength was mostly restored with a power grade of 4/5.

**Discussion**

OAC should be considered in AF patients with high risk of thromboembolism. However, if warfarin is used for this purpose, the dose must be strictly controlled to avoid severe complications (embolic stroke if INR falls below therapeutic range and hemorrhagic stroke if it rises above). Neurologic deficit in patients on warfarin medication usually indicates acute stroke. However, this patient developed extensive spinal epidural hematoma rather than stroke. Spontaneous spinal epidural hematoma is a rare condition, that usually requires emergent surgical intervention; its occurrence in patients on warfarin with an INR within the therapeutic range has previously been reported by other authors. In the current case, laboratory tests found INR to be within the therapeutic range, and the patient did not have any trauma or underlying coagulopathic disease. The combination of hypertension and cervical disc herniation may have led to the epidural bleeding. Therefore, spinal epidural hematoma should be considered in addition to acute stroke when focal neurologic deficit is found in patients taking warfarin, and detailed neurologic examination is mandatory to differentiate spinal epidural hematoma from stroke.

Early diagnosis and emergency surgical intervention are essential in spinal epidural hematoma to enable recovery from neurologic sequelae. Surgical treatment more than 48 hours after manifestation is likely to result in permanent neurologic impairment with incomplete dysfunction of the spinal cord. Spinal epidural hematoma usually manifests as sudden, unexplained cervical or back pain. However, the patient only complained of mild chest discomfort in the current case. This shows that spinal epidural hematoma can vary in its clinical presentation, and careful examination is important in patients with neurologic symptoms, especially AF patients on warfarin medication.

Spinal epidural hematoma should be the first differential diagnosis considered in patients on warfarin medication when neurologic symptoms suggest acute stroke, even without cervical or back pain. Any delay in diagnosis and surgical intervention may result in permanent neurologic impairment.

**References**