ABSTRACT
Spontaneous spinal epidural hematoma (SCEH) is a considerbably rare clinical condition. It may lead to persistent neurological deficits or even death unless recognized and treated early in its course. It usually occurs after trauma but may also develop spontaneously. Majority of cases can be diagnosed with a detailed neurological examination and magnetic resonance imaging (MRI). Urgent surgical therapy is the preferred mode of treatment in advanced cases while a conservative approach is selected for cases with mild neurological deficit. MRI is regarded as the imaging modality of choice for the diagnosis of SCEH. We report a case of nontraumatic SCEH after oral anticoagulant (OAC) use that presented with sudden-onset paraplegia. We also reviewed the relevant literature.

Keywords: Spinal epidural hematoma, nontraumatic, oral anticoagulant, MRI, human prothrombin complex concentrate

INTRODUCTION
Spontaneous spinal epidural hematoma (SCEH) is a rare condition and it is the rarest cause of neck pain. However, it is a medical emergency since it may lead to permanent neuroogical deficit or even death if missed or left untreated. The clinical picture usually starts with pain corresponding to the level of bleeding and progresses into neurological deficits. Depending on the site of occurrence, it may cause paraparesia, quadriparesia, and sphincteric malfunction. Usually observed in cervical and thoracic regions, SCEHs are the rarest among the pathologies causing spinal cord compression. Epidural hematomas are generally located to the posterior aspect of the spinal cord owing to close relationship of the dura with the posterior longitudinal ligament at the anterior aspect of the dural sac. Epidural hematomas located in the cervical region manifest with acute or chronic symptoms, although neck pain or root pain are the most common complaints. Motor and/or sensory deficits accompany the clinical picture depending on the magnitude of spinal cord compression. SCEH follows a trauma most of the time, although spontaneous SCEHs have also rarely been described. SCEH may complicate hypertension, vascular malformations, bleeding disorders, anticoagulant therapy, tumors, pregnancy, vasculitic syndromes, surgical interventions, and epidural anesthesia. In this case, we aimed to presented a SCEH case. There was no ethical problem in this case.

Case report
A 26-year-old man presented with sudden-onset neck pain and weakness in arms and legs. He had been on oral anticoagulant therapy (warfarin sodium 5 mg for 30 days). His general status was moderately impaired and he was consicous, cooperated and oriented. On physical examination the cardiac sounds were normal, abdomen was nontender, pupils were isocoric, and cranial nerves were roughly intact. Motor examination revealed a muscle strength of 1/5 in left wrist flexion and extension and 1/5 in right wrist flexion and extension. Sensory examination showed anesthesia on T1 dermatome and its continuity. TCR was bilaterally negative. His vital signs were as follows: blood pressure 130/80 mmHg, pulse rate 95 bpm, SpO2 97 %. ECG showed sinus rhythm. Laboratory examinations were as follows: WBC: 9.3 x 10³/u, Hgb: 14.4 mg/dl, PLT: 243 x10³/u, aPTT: 61.2 seconds, PT: 42 seconds, INR:3.54. Biochemistry tests were in normal limits. A spinal MRI showed an appearance consistent with a SCEH that narrowed the spinal cords from posterolateral aspect at the level between C3 and T1 (Figure 1-2). The patient developed weakness in both lower extremities on follow-up and thus an urgent surgical intervention was scheduled. Prior to operation, human prothrombin complex concentrate (PCC) (Cofact®) 80 ml/1U was administered to reverse anticoagulation. A control INR level was found 1.5 after 15 minutes and the patient was operated by the neurosurgery department on an emergent basis upon development of advanced neurological deficit that rapidly progressed over a period of 1 day. During the operation the hematoma between the levels of C3 to T1 was evacuated with left posterior laminoplasty. He progressed to have tetraplegia postoperatively and was transferred to Anesthesiology and Reanimation unit while intubated. During follow-up his neurological status did not improve and he was discharged with persistent tetraplegia and a tracheostomy tube. A control cervical MRI examination showed that the compression largely disappeared after the operation.
**DISCUSSION**

SCEH is either traumatic or spontaneous.\(^1\) It is a rare condition accounting for less than 1% of space-occupying lesions in spinal cavity.\(^12\)\(^{-}\)\(^14\) No underlying cause can be found in 40-50% of the cases, while vascular malformations, hypertension, neoplasia, anticoagulant therapy, surgical intervention, lumbar puncture, trauma, chronic renal failure, and increased intraabdominal pressure with coughing or sneezing may account for the other half of the cases.\(^14\)\(^{16}\) Our patient developed SCEH due to OAC use. The female/male ratio has been reported 1:1.4. Despite being observed in all ages, these lesions appear more commonly after fifth decade.\(^12\)\(^{15}\) Our patient was a male patient in his second decade. The most common localizations for SCEHs are cervicothoracic and thoracolumbar regions.\(^1\)\(^{12}\) Cervical bleedings tend to occur at lower cervical region. Cervical epidural hematomas with progressive neurological deficit may be show a rapid clinical course and cause death.\(^3\)\(^{11}\) Consistent with the literature, our patient had a hematoma at the lower cervicothoracic section with a rapid and progressive clinical course. Anticoagulant and antiplatelet medication use is one of the most significant causes of SCEH. In such patients aPTT, INR, thrombocyte count, and bleeding-clotting time should be necessarily checked.\(^16\) Our patient had an aPTT of 61.2 seconds, a PT of 42 seconds, and an INR of 3.54, all of which were higher than normal levels. Anatomically, spinal epidural hematomas originate from epidural venous plexus or small arteries located between two the layers of dura mater. Beatty ve Wilson, on the other hand, advocate that the pressure inside the venous plexus cannot overcome CSF pressure and cause bleeding.\(^18\) MRI, myelography, and computerized tomography are used for diagnosis of SCEH. CT reveals the bleeding asa a hyperdense epidural mass and has a limited role in differential diagnosis or determining the timing of bleeding. The rate of diagnosis has increased since the advent of MRI.\(^11\) The latter shows some superiorities compared to other imaging techniques. Sagittal MRI determines the lower and upper boundaries of epidural hematoma with a high precision.\(^19\) Furthermore, it clarifies the anterior or posterior location of hematoma and reveals chordal compression when it exists.\(^20\)\(^{21}\) Determination of the hematoma boundaries and differentiation from dura mater is possible on T1 and T2 weighted images. Hematomas commonly appear homogenous and isointense on T1 images during the acute phase between 0-24 hours. They may also rarely appear hypointense or hyperintense. T2 weighted images demonstrate a heterogenous hyperintense appearance accompanied by hypointense regions in acute phase.\(^22\) During the subacute phase (after 24 hours) the lesions usually appear hyperintense on T1 and isointense with CSF on T2.\(^19\) We also diagnosed our patient with the help of cervical MRI. The treatment of SCEH involves surgical decompression, during which hematoma evacuation and decompressive laminectomy are typically performed. Particularly cervical epidural hematomas, owing to their association with increased mortality, constitute an emergency that needs to be diagnosed more rapidly and decompressed immediately upon detection. A surgical therapy as early as possible will provide as much benefit as possible because of neurological deficits occurring solely by compression of neural tissues without invading them and the resulting ischemic processes. Patients with no neurological deficit who had a stable course may be monitored without surgery. Literature reports have provided cases with spontaneous resolution, albeit very rarely.\(^11\) An urgent decompression surgery was performed in our case owing to sudden-onset neurological deficit. As reported by Jamjoom, SCEH is typically recognized during operation despite typical signs and symptoms. Thus, we would like to emphasize the importance of remembering SCEH as a possible etiology in spinal cord compression of unknown origin.\(^23\) When no pathologies could be elucidated in diagnostic examinations aimed at cervical region, an intracranial mass, stroke, or infection should be suspected and a cranial imaging modality should be immediately obtained.\(^2\) We could not detect any intracranial pathology in...
In conclusion, epidural hematoma due to oral anticoagulant use dose should be meticulously followed according to INR. Anticoagulants have a narrow therapeutic window and even cases with spinal midline localization should be surgically addressed. In cases with anterior epidural localization, on the other hand, hematoma evacuation via laminectomy is the preferred surgical approach. In cases with anterior epidural localization, on the other hand, hematoma should be evacuated via anterior approach. Since the chance for neurological recovery is directly related to the time from the onset of bleeding to surgical decompression, surgery should be performed without delay. It has been demonstrated that cases with no prominent neurological deficit or clinical and radiological deterioration may respond favorably to methylprednisolone and rest alone and disappear spontaneously. Our case was urgently operated to evacuate hematoma owing to his neurological deficits on examination at emergency department and rapidly progressive clinical course. Unfortunately he did not recover completely despite hematoma evacuation.

CONCLUSION

In conclusion, SCEH is a serious condition with high morbidity and mortality unless treated in a timely fashion, which is usually suspected in physical examination and diagnosed by MRI. It should be taken into consideration in cases with spinal mass. In cases with newly developed neurological deficit, an urgent decompression surgery following emergent spinal MRI examination may provide patients with early neurological recovery. Since oral anticoagulants have a narrow therapeutic window and even slight over anticoagulant may lead to spontaneous bleeding events, these drugs should be used with great care and the dose should be meticulously followed according to INR levels.

REFERENCES


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