Spontaneous Cervical Epidural Hematoma Treated by the Combination of Surgical Evacuation and Steroid Pulse Therapy

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Abstract

A 70-year-old man on antiplatelet therapy developed sudden severe back pain in his neck with numbness and weakness in his extremities. On admission, he presented with complete quadriplegia, hypoesthesia, and anuria. Magnetic resonance imaging (MRI) revealed cervical cord compression due to an epidural hematoma posterior to the spinal cord and intramedullary hyperintensity. Surgical evacuation was performed about 12 hours after the onset, but the recovery of neurological deficits was poor. After performing 2 additional administrations of steroid pulse therapy, the patient’s motor dysfunction began to improve and spinal MRI showed a recovery as well. These observations suggest that steroid administration should be considered as a post-operative additional therapy for cases with severe neurological deficits even after surgery.

Key words: spontaneous spinal epidural hematoma, steroid pulse therapy


Introduction

Spontaneous spinal epidural hematoma (SSEH) is a rare disease that can result in permanent neurological deficits if it is not treated in a timely and appropriate manner. Prompt surgical evacuation of the hematoma is reported to be the best therapeutic strategy to achieve a full recovery. Although the therapeutic time window for the surgical treatment varies, the period of 24 to 48 hours from initial ictus seems to be critical (1-5). Other factors which determine the outcome are the preoperative neurological deficits, the duration of complete neurological symptoms, and the intramedullary signal intensity of spinal MR imaging (6, 7). Additional post-operative treatments for patients who present neurological deficits even after the operation have not yet been well defined. This report presents a case of SSEH in which post-operative steroid pulse therapy proved to be dramatically effective for achieving a recovery of the neurological deficits.

These results suggest the above regimen to be the treatment of choice for poor responders to the surgical treatments.

Case Report

A 70-year-old man, who had a history of angina pectoris attacks and a cerebral transient ischemic attack due to internal carotid artery stenosis, had been prescribed aspirin and ticlopidin for a few years before the current event. He developed sudden severe back pain in his neck when he was taking a bath at night. Muscle weakness in all extremities accompanied with hypoesthesia or numbness below the C4 level gradually progressed, thus resulting in atonic complete quadriplegia within half an hour after the initial symptoms. He was brought by ambulance to the emergency room about one and a half hours from onset. Although his blood pressure was 160/80 mmHg, no other cardio-respiratory dysfunction was recognized. He was alert and fully oriented. No neurologic abnormalities were found in the cranial...
nerves and cerebellar system, but he demonstrated quadriplegia, superficial and deep sensory disturbance, anuria and poor bowel movement. With these clinical features, he was presumptively diagnosed to have cervical transverse myelopathy due to an unknown cause. No abnormalities were found in the laboratory examinations. Head and neck MRI was performed immediately after arrival. Head MRI showed only chronic ischemic change in the deep white matter (data not shown). In the neck, no intramedullary high signal intensity by T2 image was revealed, between the C3 and Th1 level, however, an epidural mass located on the portion dorsal to the dural sac was suspected (Fig. 1A). At this point, he was tentatively diagnosed to have SSEH or multiple sclerosis rather than anterior spinal artery syndrome, and treatment was initiated with glycerol and methylprednisolone (1 g). To confirm the diagnosis and evaluate the necessity of surgical treatment, the neck MRI was re-examined about 10 hours after the initial event (Fig. 1B). This time, a transverse intramedullary change was apparent and a hematoma that was compressing the dural sac was clearly detected. A successful surgical evacuation was immediately performed and the sensory disturbance was thereafter reduced to some extent. However, the motor weakness did not recover remarkably and he showed muscle power only with “trace” levels in all extremities. Five days after the operation, steroid pulse therapy was therefore initiated with 1 g of methylprednisolone for 3 days per course plus the intravenous administration of glycerol in an attempt to reduce the intramedullary edema. To prevent deep venous thrombosis and cerebral infarction, anticoagulant and antiplatelet therapies were started as well. Immediately after the completion of the first course, an improvement in the range of motion (ROM) was recognized, and therefore the second course was consecutively administered with a 3-day interval. At the end of these treatments, his muscle power recovered to a “fair” level (Fig. 3). By 20 days after the operation, he was able to do parallel bar walking as part of his rehabilitation. Along with the physical improvement, follow-up studies of MRI revealed a remarkable restoration in which the intramedullary high signal intensity was found to have faded away (Fig. 2A, B).

**Discussion**

SSEH is a rare clinical entity, and only about 500 cases have been reported to date (3). The cause of SSEH varies and it remains to be fully elucidated. Some reports have suggested a relationship with anticoagulant or antiplatelet therapy, hypertension, vascular malformation, venous epidural plexus defects, arterial problems, hematologic disorders, and the rupture of fragile epidural veins by an adjacent herniated disc (3, 8). In the current case, the major cause may well have been due to the double antiplatelet therapy, but the involvement of arterial problems and cervical spondylitis cannot be ruled out. The critical factors which determine the prognosis of this disease are: 1) the time interval from onset to surgical decompression, 2) preoperative neurological deficits, 3) duration of complete neurological symptoms, and 4) intramedullary signal intensity of spinal MR imaging. Shin et al (3) concluded that good outcomes can be expected from surgery within 24 hours, especially within 12 hours, and that the cases with a complete neurological deficit before the operation show statistically remarkable poor outcomes. In the current case, the operation was performed within 12 hours after onset, but the neurological deficits were quite severe. According to the literature, a certain number of cases with mild or rapid resolution of neuro-
Figure 2. A) Sagittal T2WI of the neck MRI immediately after two sets of steroid pulse therapy (10 days after the operation). Note the fainting intramedullary high signals. B) The same view of A) examined at 20 days after the operation. Note the complete restoration of the cervical spine.

Figure 3. Clinical course of this case. The upper row indicates the neurological symptoms, and the lower shows the medical treatments during the hospitalization. PCI: percutaneous coronary intervention, MMT: manual muscle testing.

Logical deficits recover completely without surgical treatments (8-10). So the severity and duration of the preoperative neurological deficits seem to be crucial in the current case. Chang et al (6) suggested that cases with hyperintensity in the spinal cords on T2-weighted images result in poor clinical outcome independent of surgical treatment. Matsumoto et al (7), on the other hand, studied cases of mild cervical compressive myelopathy without surgical treatment and concluded that intramedullary hyperintensity was not related to a poor outcome. These two observations suggested that there might be room for conservative therapy with steroid pulse therapy to improve the neurological status.
in such cases. Ghaly (11) reported the efficacy of intravenous high-dose methylprednisolone administration during the superacute phase. However, no report was found describing steroid administration as a postoperative additional treatment in the acute or subacute phase of clinical course. It is possible that the methylprednisolone pulse therapy was dramatically effective due to the reduction of spinal edema and the suppression of cytotoxic humoral factors such as free radicals and cytokines. The performance of early surgical decompression may also play an important role in keeping the injured spine in the reversible stage. There is no doubt that the best treatment for SSEH is surgical decompression as early as possible, hopefully before the appearance of hyperintensity in MRI. However, even in the cases with poor response to the operation, steroid therapy, including standard pulse therapy and high-dose administration should be considered as a possible additional conservative therapeutic approach.

References


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