Delayed postoperative spinal epidural hematoma causing tetraplegia

Case report

MASASHI NEO, M.D., PH.D., TAKEHI SAKAMOTO, M.D., PH.D., SHUNSUKE FUJIBAYASHI, M.D., PH.D., AND TAKASHI NAKAMURA, M.D., PH.D.

Department of Orthopaedic Surgery, Kyoto University Graduate School of Medicine, Kyoto; and Department of Orthopaedic Surgery, Osaka Red Cross Hospital, Osaka, Japan

The authors describe a case of postoperative spinal epidural hematoma (PSEH) that developed in a patient 9 days after he underwent laminoplasty. A PSEH is a rare but critical complication of spinal surgery that usually occurs within a few days of the procedure. The authors draw attention to the possibility of delayed PSEH and its triggering mechanism. In this case, a 59-year-old man with no history of bleeding disorder underwent laminoplasty for mild myelopathy. On the 7th postoperative day computed tomography demonstrated no abnormal findings in the operative field. On the 9th postoperative day, while straining to defecate, the patient suddenly felt neck and shoulder pain, and tetraplegia rapidly developed. Magnetic resonance imaging demonstrated a huge epidural hematoma. The clot was evacuated during emergency revision surgery, during which the arterial bleeding from a split muscle wall was confirmed. The postoperative course after the revision surgery was uneventful and the patient had none of the previous symptoms 1 year later.

A PSEH causing paralysis can occur even more than a week after surgery. The possibility of a delayed-onset PSEH should be kept in mind, and prompt diagnosis should be made when a patient presents with paresis or paralysis after an operation. The authors recommend advising patients that for a while after surgery they avoid strenuous activity.

KEY WORDS • surgical complication • spinal epidural hematoma • paralysis

Abbreviations used in this paper: CT = computed tomography; MR = magnetic resonance; PSEH = postoperative spinal epidural hematoma; SSEH = spontaneous SEH.

POSTOPERATIVE spinal epidural hematoma is a rare but well-known complication of spinal surgery.\textsuperscript{1,3,4,7} The incidence of PSEH requiring evacuation is reported to be 0.1 to 0.2%.\textsuperscript{1,3,4} These hematomas can have devastating neurological effects, including sensory, motor, and bladder and bowel disturbances, even if an earlier elective procedure was successful and uncomplicated. Once a PSEH is detected, an emergency operation for evacuation, hemostasis, and possible additional decompression is mandatory.\textsuperscript{1} Rapid diagnosis and surgical treatment maximize a patient’s neurological recovery.\textsuperscript{2} Because PSEH usually develops within a few days, especially within 24 hours of surgery,\textsuperscript{1,4,7} careful observation of a patient’s neurological status is necessary. The risk of hematoma formation, however, should decrease as wound healing progresses. To our knowledge, only one case of delayed PSEH has been reported in the literature, and that was caused by heparinization initiated after surgery.\textsuperscript{6} In the present study, we describe the case of a patient without bleeding tendency in whom a PSEH suddenly developed 9 days after surgery.

Case Report

Examination. This 59-year-old man presented with weakness and numbness in his left hand, bladder function disturbance, left lower-extremity pain and numbness, and intermittent claudication. Physical examination demonstrated no apparent myelopathy except for the mild weakness of his left hand (abduction and adduction of the left fingers, Grade 4/5; grasping power of the left hand, 40 kg; and grasping power of the right, 54 kg). Cervical T\textsubscript{2}-weighted MR imaging revealed C3–T1 canal stenosis and high-intensity lesions at C3–4 and C5–6 (Fig. 1). Lumbar MR imaging also demonstrated L3–4 stenosis. Other examinations showed neither coagulopathy nor hypertension.
Operation. On the basis of these findings, a French door–type C3–T1 laminoplasty was performed. The split laminae were kept open using suture anchors placed in the bilateral lateral masses of C-3, C-5, C-7, and T-1. The surgery was uneventful; the operative time was 149 minutes and the estimated blood loss was 45 ml.

Postoperative Course. Approximately 180 ml of fluid was drained postoperatively, and the drain was removed 18 hours after the operation. The numbness in the patient’s left hand improved, but he complained of feeling moderately strong neck and shoulder pain. We conducted CT of the neck region, which demonstrated no untoward findings, 7 days postoperatively to rule out any abnormality including hematoma (Fig. 2). The pain was thought to be attributable to the wider T-1 exposure than usual that had been required during surgery.

The patient was constipated after the operation. While straining to defecate on the 9th postoperative day, he suddenly felt severe neck and shoulder pain. Tetraplegia rapidly developed, and no voluntary movement of four extremities was possible after 30 minutes (Frankel Grade B function). After an intravenous 250-mg injection of methylprednisolone, slight voluntary movement became possible (Frankel Grade C). Although this dose may be unusual in cases of spinal cord injury, 250 or 500 mg of methylprednisolone has been used traditionally in our institute when the neurological status of a patient has deteriorated postoperatively. Emergency MR imaging demonstrated a huge hematoma compressing the spinal cord (Fig. 3), and an emergency operation was undertaken 10 hours after the onset of symptoms. The hematoma was evacuated, and arterial bleeding from a resplit muscle wall was identified at the distal end of the operative field. After thorough extirpation of the hematoma and complete hemostasis, we confirmed good pulsation of the dural tube.

The course after the revision surgery was uneventful and the patient’s neurological status improved dramatically. One year after the revision surgery, he had no axial or neurological symptoms except for some left lower-extremity numbness, which was attributable to the lumbar canal stenosis.

Discussion

The results of the present case demonstrate that PSEH can occur even more than a week after an operation. The hematoma developed suddenly during an uneventful course of wound healing, which was observed on CT scans taken by chance just before the onset of PSEH. To the best of our knowledge, only one case of delayed
Delayed postoperative spinal epidural hematoma

PSEH, which occurred on the 16th postoperative day, has been reported. Unlike our case, however, that PSEH was related to heparinization, which was initiated on the 12th postoperative day as treatment for deep vein thrombosis in the right leg. In the present case, the patient had no history of bleeding disorders or predisposing factors, and only the strain created in attempting to defecate was thought to be the cause of the bleeding.

There are only a few reports in which the authors have concentrated on PSEH and its risk factors. Kou, et al., have reported 12 cases (0.1%) of lumbar PSEHs among 12,000 spinal procedures and demonstrated that the operation’s risk factors were multilevel procedures and the presence of a preoperative coagulopathy. Awad, et al., reported 32 cases (0.2%) of PSEHs among 14,932 spinal surgeries and noted the following risk factors: age greater than 60 years, the use of preoperative nonsteroidal antiinflammatory agents, Rh-positive blood type, involvement of more than five spinal segments to be surgically treated, hemoglobin level less than 10 g/dl, blood loss greater than 1 liter, and international normalized ratio greater than 2.0 within the first 48 hours; however, they concluded that well-controlled anticoagulation therapy was not associated with an increased risk of PSEH. Among the aforementioned risk factors, only Rh-positive blood type and multilevel procedure applied to our patient.

It is also well known, however, that SSEHs rarely cause neurological symptoms such as tetra- and paraplegia. Although neither the cause nor pathogenesis of SSEH is clear, miscellaneous factors such as hypertension, ingestion of anticoagulant agents, straining, sneezing, lifting, and vascular anomaly have been hypothesized to predispose patients to this condition. In the present study, the patient’s hemorrhage was probably caused by straining while attempting to defecate. Liao, et al., have reported that more than half of their patients with SSEH experienced subjective straining-associated events during initial symptom attacks. This is worth noting, although our case is surely related to the initial operation because the arterial bleeding from the muscle wall dissected during the initial operation was confirmed at the revision surgery.

A patient’s preoperative neurological status and the rapidity of surgical intervention are correlated with the neurological outcome after treatment of a spinal epidural hematoma. In the present case, revision surgery within 10 hours of symptom onset resolved all of the patient’s symptoms. Lawton, et al., demonstrated that patients who underwent surgery within 12 hours had better neurological outcomes than those with identical preoperative Frankel grades whose surgery was delayed beyond 12 hours. The importance of prompt diagnosis and surgery cannot be emphasized enough.

In conclusion, the possibility of delayed PSEH should be kept in mind, and prompt diagnosis should be made when a patient presents with paresis or paralysis after an operation. We recommend advising patients that for a while after operation they avoid strenuous activity.

References


Manuscript received March 3, 2006. Accepted in final form June 14, 2006.

Address reprint requests to: Masashi Neo, M.D., Ph.D., Department of Orthopaedic Surgery, Kyoto University Graduate School of Medicine, 54 Kawahara-cho, Shogoin, Sakyoku, Kyoto 606-8507, Japan. email: neo@kuhp.kyoto-u.ac.jp.