A Case Report of Epidural Hematoma after Partial Liver Resection

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[Abstract] Epidural hematoma is an extremely rare but serious complication of epidural anesthesia. The time between the onset of paraplegia to surgery is critically important for determining the neurologic outcomes of the patients. This is a case report of epidural hematoma that developed after the removal of an epidural catheter in a patient who underwent a partial liver resection. Because a subdermal hematoma was noted at the insertion point of the epidural catheter upon admission to the intensive care unit (ICU) after the surgery, the epidural catheter was removed to stop continuous subdermal bleeding. The platelet count at that time had decreased to 64,000/μl and prothrombin time was prolonged to 53% in activity. Ten hours later, the patient complained of paraplegia in both lower extremities which the ICU doctor on duty attributed to persistent epidural anesthesia. Given that neurologic abnormalities persisted for four hours, an emergency MRI was performed that revealed a posteriorly-placed epidural hematoma extending from T6 – T11. Despite emergency laminectomy, the neurologic outcome was poor. This case report highlights the importance of recognizing the potential risks of epidural hematoma following epidural catheter placement and the need for prior communication with anesthesiologists in case clinical coagulopathy occurs.

Key Words: Epidural anesthesia, Hematoma, Liver resection

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Introduction

Epidural hematoma is an extremely rare but serious complication of indwelling epidural catheters1,2. Given that complete recovery of neurologic function is possible if surgery is performed within 8 hours of the onset of paraplegia, early diagnosis of epidural hematoma is critical1. However, identification of an epidural hematoma may be delayed unless the clinicians who are involved in the postoperative management of the epidural catheter are reminded of the potential development of an epidural hematoma3. This case report describes a delayed diagnosis of epidural hematoma that developed after partial hepatectomy, which resulted in poor recovery of paraplegia.

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I  Case Report

A 60-year-old man with a 7-year history of hepatitis C infection was admitted and scheduled to undergo partial hepatectomy for hepatic cancer. The patient was on medication for arterial hypertension and diabetes mellitus. All biochemical laboratory measurements were within the normal limits except for slight elevations in blood sugar (158 mg/dl), aspartate aminotransferase (52 u/l) and alanine aminotransferase (60 u/l) levels. Although the patient’s platelet count was rather low (97,000/µl), bleeding time by the Duke method was at the lower end of the normal method (2 minutes). Prothrombin time (expressed in percent) was 80% (international normalized ratio 1.16) and activated partial thromboplastin time was 30.7 seconds, both of which are within the normal range. The patient was taking cilostazol and ethyl icosapentate until two weeks before surgery for a slight numbness in the lower extremities.

We used both epidural and general anesthesia during the partial liver resection. Epidural puncture was performed with a 17-gauge Tuohy needle at the T9/10 interspace. Entry into the epidural space was achieved on the first attempt, without bleeding, which was confirmed by the loss of resistance technique. An epidural catheter was advanced smoothly 5 cm cephalad without accompanying paresthesia or pain. Blood was not drawn through the catheter at this time. Inadvertent intrathecal and intravascular positioning was excluded by a test dose of lidocaine 1% (3 ml) containing epinephrine before the induction of anesthesia. General anesthesia was induced with propofol, fentanyl and vecuronium, and anesthesia was maintained with sevoflurane in nitrous oxide and oxygen.

The segment 4 liver resection was performed without complications. Total blood loss during the 6-hour surgery was 780 ml and we transfused 400 ml of preoperatively donated autologous blood. One thousand milliliters of 6% hydroxyethyl starch was also intravenously administered. We did not perform a coagulation test during surgery because the blood loss was not massive. On recovery from anesthesia, the patient was normothermic and able to dorsiflex both feet upon request. We controlled postoperative pain by continuous epidural anesthesia with 0.2% ropivacaine and morphine (80 µg/ml at a rate of 2 ml/h). The patient was immediately transferred to the intensive care unit (ICU) in accordance with routine procedures.

Twenty minutes after admission into the ICU, a subdermal hematoma (approximately 5 cm × 3 cm wide × 1.5 cm in height) at the insertion point of the epidural catheter was noted. Blood was not aspirated through the epidural catheter. The epidural catheter was removed and pressure was applied with gauze to stop continuous subdermal bleeding (5:30 PM). Bleeding persisted at the site even after the removal of the epidural catheter and the patient’s platelet count decreased to 64,000/µl. Prothrombin time decreased to 53% (international normalized ratio 1.6) and activated partial thromboplastin time increased to 40.0 seconds, such that 2 units of fresh frozen plasma were transfused.

At 11:00 PM, neither bleeding at the insertion point of the epidural catheter nor neurologic disturbances in lower extremities was noted. However, at 2:00 AM, the ICU nurse noticed a minor weakness in both lower extremities when she changed the patient’s position. At 3:30 AM (10 hours after the removal of the epidural catheter), the patient complained of paraplegia in both lower extremities.
The ICU nurse reported the symptom to the ICU doctor on duty, but the ICU doctor attributed it to persistent epidural anesthesia.

At 6:00 AM, the ICU chief doctor received a report from the ICU doctor on duty that the neurologic abnormalities were still continuing. The ICU chief doctor immediately ordered an emergency computed tomography and magnetic resonance imaging (MRI). The MRI was performed at 8:00 AM and revealed a posterior hematoma extending from T6 to T11 (Fig. 1A). At 11:00 AM, a laminectomy was performed and the site was drained. The epidural hematoma was almost completely removed (Fig. 1B). There was minimal improvement in neurologic symptoms affecting the patient’s right leg during the first month after surgery. Three months after surgery, the patient’s symptoms showed no significant improvement.

The patient’s intercostal muscles became weak leading to impaired lung function and repeated cases of pneumonia. The patient died seven months after surgery due to multiple organ failure resulting from severe pneumonia.

II Discussion

This is a case report of an epidural hematoma that developed after partial hepatectomy with poor neurologic recovery despite laminectomy. To the best of our knowledge, this is the first case report of epidural hematoma following catheter placement in a patient after liver surgery. Preoperatively prescribed antiplatelet drugs (cilostazol and ethylicosapentate) were probably not responsible for the epidural hematoma because these drugs were discontinued two weeks before surgery and the preoperative bleeding time was normal.
Many patients presenting for hepatic surgery have coagulopathy or thrombocytopenia which makes them ineligible for an epidural anesthesia\(^0\)\(^\text{–}^6\). However, a previous study on epidural catheter placement in a group of patients undergoing liver surgery indicates that pain relief may be provided with epidural anesthesia to patients undergoing minor resections (i.e., uni- and bisegmentectomies) because the changes in coagulation are mild (i.e., 20% decrease in prothrombin time) and brief (i.e., 1 day)\(^7\). Given the benefits of an epidural catheter for postoperative pain management, we decided to administer epidural anesthesia to this patient, despite a decrease in preoperative platelet level and slight disorders in liver function.

In this case, we cannot identify the timing of the onset of the hematoma because insertion of the epidural catheter was atraumatic and was performed by a well-trained anesthesiologist who did not note blood in the epidural needle or catheter. We believe that the epidural hematoma did not occur at the time of catheterization. The presence of a subdermal hematoma and clotting disorders at the time of transfer into the ICU indicate susceptibility to bleeding, suggesting that epidural hematoma formation may have occurred as a result of epidural catheter removal during the nadir of the coagulation status. Because bleeding at the insertion point of the epidural catheter persisted even after the removal of the epidural catheter, we cannot rule out the possibility that the catheter may have provided an egress for the epidural hematoma.

There was a 14-hour delay between removing the epidural catheter and the MRI scan. This is principally because the ICU doctor on duty attributed the paraplegia found 10 hours after the removal of the epidural catheter to the epidural anesthetic. This decision may not be extremely unusual because in a retrospective analysis of 413 patients who received postoperative epidural analgesia (0.0625% bupivacaine with fentanyl 3.3\(\mu\)g/ml), 14 patients still complained of some degree of muscle weakness 24 hours after catheter removal\(^3\). As shown in previous case reports on epidural hematoma, an emergency MRI scan is often not performed until 24–48 hours after the onset of neurological symptoms\(^3\)\(^–^9\) and early diagnosis of epidural hematoma may be difficult especially when paraplegia develops slowly, as in this case. Back pain is less frequently a clinical presentation of epidural hematoma\(^3\), but the patient did not complain of back pain. Thus, it is recommended that ICU nurses continue neurological evaluation of the lower limbs at 4-hour intervals for a 24-hour period after removal of the epidural catheter\(^9\).

Most importantly, the potential risk of epidural hematoma associated with an indwelling epidural catheter must always be kept in mind by the surgeons and nurses who are involved in the postoperative management of patients. In this case, the ICU doctor on duty was a surgeon and unfortunately did not consult an anesthesiologist on the potential development of an epidural hematoma. This case report highlights the importance of recognizing the potential risks of epidural hematoma following epidural catheter placement and the need for prior communication with an anesthesiologist in case clinical coagulopathy, such as subdermal hematoma, occurs.

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References


肝部分切除術後に硬膜外血腫をきたした1症例

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肝部分切除術後に硬膜外血腫を発生した1症例を経験した。手術終了直後、集中治療室にて硬膜外カテーテル挿入部位に皮下血腫が認められたため、止血目的にて硬膜外カテーテルを抜去した。カテーテル抜去10時間後、患者が両下肢の麻痺を訴えた。集中治療室当直医は麻痺を硬膜外腔に投与された局麻麻薬によるものと判断したが、4時間後に施行されたMRIにてT6–T11に及ぶ硬膜外血腫が発見された。ただちに椎弓切除術が施行されたが、神経学的予後は不良であった。術後管理に携わる医師は、硬膜外カテーテル留置に伴う硬膜外血腫の危険性および出血傾向を確認する時期には事前に麻酔科医に相談する必要性を認識すべきである。

Key Words: 硬膜外麻酔，血腫，肝切除