Retroperitoneal Hematoma After Spinal Anesthesia with the Paramedian Approach

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We present a case of a patient who developed a retroperitoneal bleeding after spinal anesthesia using 22-gauge Quincke needle, with the paramedian approach. Two attempts were needed to accomplish the block. Four hours later the patient complained of back pain radiating to her left calf, with weakness of the quadriceps muscle. Computed tomography revealed a large retroperitoneal hematoma from bleeding lumbar artery. Angiography failed to demonstrate the vessel. The patient was transfused with packed red blood cells and recovered gradually. She had normal coagulation tests throughout the event.

Case Report

A 55-yr-old woman was scheduled for elective amputation of her right toe because of osteomyelitis. Her medical history included type II diabetes mellitus and ischemic heart disease. Five years before admission she underwent three-vessel coronary artery bypass grafting. The patient had no history of any bleeding disorder. She was treated only with oral hypoglycemics and denied the use of oral anticoagulants, aspirin, or other antiplatelet drugs. She did not take any herbal medications or megavitamins. The patient's height was 1.55 m (body mass index, 33.3 kg/m²), and her vital signs were arterial blood pressure (BP), 110/60 mm Hg and heart rate (HR), 75 bpm. Blood values at that time were as follows: hemoglobin 8.7 g/dL, platelets (Plt) 124,000 per mm³, prothrombin time (PT) = 124% (normal range, 60–140%), international normalized ratio (INR) = 0.96 (range, 0.75–1.3), partial thromboplastin time (PTT) = 34.2 s (range, 27–40 s).

A senior experienced anesthesiologist performed spinal anesthesia using a 22-gauge Quincke needle at the level of L2-3 in which the interspace was best palpated. The left paramedian approach, as recommended for overweight patients, was chosen. The needle was inserted almost to its full length but no cerebrospinal fluid or blood was present during needle advancement or on aspiration. Only the second attempt, at the same side, level, and approach, was successful. Lidocaine 4% 80 mg was administered intrathecally. The surgery was uneventful and lasted 65 min. The patient recovered in the postanesthesia care unit (PACU) for 1 h, her vital signs were normal, she was free of pain at that period, and she was discharged to the ward.

Four hours later the patient complained of progressively worsening back pain radiating to her left calf. Neurologic examination revealed weakness of the left quadriceps muscle, and the foot was very painful with any movement. The foot color was normal, and pulses were palpated on the dorsalis pedis and tibialis posterior arteries. The contralateral leg was free of abnormal neurologic findings. The back looked normal, without tenderness. Her vital signs were BP 130/60 mm Hg and HR 100 bpm. Blood values at that time were as follows: hemoglobin 8.7 g/dL, Plt = 233,000 per mm³, PT = 99.8%, INR = 1.07, PTT = 33.8 s, and fibrinogen = 359 mg/dL (normal range, 160–400 mg/dL).

The patient was transferred to the PACU, where she received 2 U of packed red blood cells (PRBC) and analgesics as needed. An urgent abdominal-pelvic computed tomography (CT) was conducted, showing a large retroperitoneal hematoma. The bleeding vessel was a lumbar artery at the level between L2 and L3 (Fig. 1). Its distance to the skin, in a perpendicular direction, was 6.9 cm. The hematoma was large and extended to the pelvis (Fig. 2); the estimated volume was 200 mL. The patient was examined by a senior surgeon, and after consulting with the radiologist it was decided to embolize the bleeding vessel under angiography.
Through a transfemoral approach, a selective angiography of left lumbar arteries was performed, but the bleeding vessel was not found. Angiography of the left iliolumbar artery was normal as well.

The patient returned to PACU, where she remained for another 10 h. During that period the pain gradually decreased and the patient regained motor ability of the left leg. Repeated blood tests resulted in the following values: hemoglobin = 9.4 g%, Plt = 186,000 per mm³, PT = 92.5%, INR = 1.12, PTT = 34.1 s, fibrinogen = 280 mg/dL. The patient was transferred to the orthopedic department, where she received an additional 2 U PRBC to increase the hemoglobin to 10 g/dL. She was discharged home on the eighth postoperative day in good condition and free of all symptoms.

Discussion

Many of the invasive procedures performed by the anesthesiologist are based on surface anatomy only. Experienced as he or she may be, the anesthesiologist runs the risk of causing bleeding while conducting routine procedures. Coagulation disorders and the use of anticoagulants are known factors that increase the risk of unintentional bleeding (1). Technical difficulties in performing epidural or spinal anesthesia may also increase the risk for bleeding complications, especially in obese patients, in whom the surface anatomy may be misleading. Serious retroperitoneal hemorrhage may occur after lumbar level procedures, such as translumbar aortogram, kidney biopsy, and celiac or lumbar plexus block (2). Usually a large-bore needle is used for those procedures; therefore the risk of vessel trauma may be increased over small-bore spinal needle use. Our case demonstrated significant bleeding and large retroperitoneal hematoma after spinal anesthesia in a patient with normal coagulation profile. The anesthesiologist who performed the block was very experienced, and there was no obvious technical difficulty.

The paramedian approach to the subarachnoid space is useful when it is difficult to flex the patient’s spine or when the interspinous ligaments are heavily calcified. The needle is inserted lateral to the spinous process and directed cephalad and toward the midline. The first significant resistance encountered is the ligamentum flavum, as opposed to the midline approach, where the supraspinous and interspinous ligaments precede the ligamentum flavum. These ligaments produce characteristic resistance, “feel,” as the needle is advanced through them, which guides the anesthesiologist during the procedure. Using the paramedian approach, when the direction is inaccurate the needle may be advanced to the retroperitoneal space or to the pleural space in case of thoracic neuroaxial block. Blood vessels, as well as nerves, could be unintentionally injured. In our case, a lumbar artery was punctured. The large hematoma created pressure that probably led to the neurologic symptoms. Alternatively, transient decrease of the spinal cord blood supply via the lumbar artery could have caused these symptoms. The blood supply to the thoracolumbar cord is derived from the radicular artery known as the artery of Adamkiewicz, which arises from a left intercostal artery at the level of T10-11 (in 75% of cases). It
may arise at another level between T5 and L3. A compromise of the blood supply to the cord could have caused ischemia and the consequent neurologic symptoms.

One could argue that this is a case of spontaneous retroperitoneal hematoma that coincidently occurred several hours after the spinal block. However, there are several arguments against this. Spontaneous retroperitoneal hematoma is usually the result of either abnormal coagulation (3–4) or pathology in one of the retroperitoneal viscera, such as the kidney, adrenal, or pancreas (5–6). Levine et al. (7) reported that the risk of spontaneous retroperitoneal hematoma increases with intensity of anticoagulation, age older than 70 years, and antiplatelet therapy. Our patient had normal coagulation throughout the event, did not receive anticoagulants or antiplatelet therapy, was 55-years-old, and had no evidence of tumor or other lesions involving the retroperitoneal space. Spontaneous retroperitoneal hematoma, when it occurs, is usually anterior to the iliopsoas muscle (8). Our patient bled from a lumbar artery, as shown by the CT scan, and the hematoma was posterior to the muscle. Moreover, the bleeding vessel was at the level L2-3, where the spinal block was performed. Viewing the CT, one could see the proximity of the bleeding artery to the predicted direction of the spinal needle in the paramedian approach. In conclusion, the hematoma was most probably the result of spinal puncture of a lumbar artery.

To diagnose retroperitoneal hematoma the physician has to observe the patient carefully and have a high index of suspicion. In this case, as frequently happens, the anesthesiologist relies on the surgeon for detection of a postoperative problem, as the anesthesiologist’s contact with the patient is limited to the time of surgery and short-term recovery. In the case of suspected bleeding, prompt intervention is required because retroperitoneal bleeding may be fatal (9). The diagnosis requires radiographic confirmation using CT, in which “contrast blush” is characteristic of bleeding vessel, or angiography. The treatment of retroperitoneal hematoma may be surgical (10) or conservative (embolization in case of active bleeding) (11). In either case, the patient should be admitted to the intensive care unit, be monitored carefully, and receive blood transfusion according to the clinical situation and blood tests. Consultation of specialists (e.g., surgeon, radiologist, neurologist) is advocated. This case is a reminder of the danger of invasive procedures, even when using a thin needle.

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References