caused an unusually rapid termination of action. The exact nature of this interaction is unclear, but may revolve around the similarities of their steroid nuclei. The interactions may include competition at the myoneural junction, altered protein binding, or induction of hepatic biotransformation. Lack of potency of the drug lot is an additional possibility. However, the pancuronium administered came from two ampules of the same batch. No problem from the drug was encountered in other patients.

We have presented a case that may exemplify a rapid termination of pancuronium-induced neuromuscular blockade. We believe an interaction between the steroid-based pancuronium nucleus and administered corticosteroids caused this abnormality.

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Bupivacaine-induced Seizure after Accidental Intravenous Injection, A Complication of Epidural Anesthesia

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The case of a patient who had generalized convulsions after accidental intravenous injection of bupivacaine is presented.

**Report of a Case**

A 40-year-old woman who had cervical cancer was scheduled for hysterectomy. She was 148 cm tall and weighed 56 kg. There was no past history of epileptic seizure. She did not receive prenasal medication. An epidural catheter was placed into the second lumbar intervertebral space. After aspiration, 75 mg of 0.5 per cent bupivacaine were administered. Upon injection of the drug, the patient became unresponsive and her eyelids started flinching. This was followed by a generalized convolution. The patient was given oxygen by mask immediately, but two more seizures occurred. Diazepam, 5 mg iv, terminated the seizure activity. Venous blood was withdrawn just after the diazepam injection, within 2 to 3 minutes after the first convolution. The operation was completed using narcotic anesthesia (pentazocine, diazepam, and NeO/O2). There was no evidence of postoperative complications. Blood pressure was 120/60 torr before the seizures and 140/70 torr just after them. Pulse rate was 100/min before the seizures and 130/min just after them. The venous plasma level of bupivacaine was 3.0 μg/ml.

**Discussion**

The seizure threshold of bupivacaine has been reported to be 4 μg/ml in the dog. Munson et al. found that the threshold level was 2.5 to 5.7 μg/ml (mean 4.5 μg/ml) in the rhesus monkey. However, Moore et al. reported that a venous blood concentration of 1.2 to 3.4 μg/ml did not induce seizure during epidural block in man. This report is difficult to be assessed because some patients received diazepam for premedication. Also, epidural block is associated with a slower increase in plasma levels of local anesthetics than direct iv injection. In our case the venous plasma level of bupivacaine was 3.0 μg/ml. Ryan reported that the plasma level of bupivacaine during a convolution was 2.5 μg/ml. These levels are lower than previously reported seizure thresholds in man.

The arterial plasma and cerebrospinal fluid levels were higher than venous plasma levels. Drug elimination in blood after iv injection is rapid, especially in the initial few minutes. These are the reasons the venous level of bupivacaine during convulsions in this case was lower than seizure thresholds previously reported. An iv dose of 5 mg diazepam was able to stop the seizure. That is the dose reported to be effective by Munson et al. Routine use of diazepam for premedication of the patient who may receive epidural or local anesthesia is advisable.

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The Use of Profound Hypothermia and Circulatory Arrest for Hepatic Lobectomy in Infancy

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Primary hepatic tumors are uncommon, but most are malignant, and their onset usually occurs prior to the age of 2 years. The lethal course without surgical treatment necessitates prompt therapy, but results have been discouraging, with one series having a two-year survival rate of 10 per cent and a five-year survival rate of 0.4. The surgical technique of right hepatic lobectomy in children has been well described in the surgical literature, but several unusual features of this procedure, dictated by the anatomy of the liver and the principles of cancer surgery, need to be presented to permit understanding of the rationale of our approach to this particular case.

In a procedure for carcinoma of the right hepatic lobe, tapes are placed loosely around the portal vein, hepatic artery, and inferior vena cava (inferior to the right atrium and superior to the renal veins) for possible flow occlusion, to prevent inadvertent tumor and/or air emboli, and to control hemorrhage. With the aid of moderate hypothermia (to 32°C), the total blood supply of the liver may be interrupted for as long as 15 minutes for dissection. In view of the aggressive measures currently advocated, which have successfully negotiated only the immediate operative period, the authors felt that yet more radical steps were indicated to improve the miserable long-term prognosis of the disease. The following is a case report of a right hepatic lobectomy performed on a 10-week-old infant using cardiopulmonary bypass, profound hypothermia, and circulatory arrest.

REPORT OF A CASE

A 10-week-old 5.6-kg female infant was admitted to the hospital for hemihepatectomy for probable hepatoblastoma, diagnosed by angiogram while she was anesthetized with a nitrous oxide–oxygen–relaxant technique. Preoperative laboratory data were all within normal limits.

The patient was unmedicated and was anesthetized with ketamine, 30 mg, im; pancuronium bromide, 0.6 mg, iv, was given; the trachea was orally intubated, and she was mechanically ventilated with humidified 60 per cent nitrous oxide and 40 per cent oxygen. Catheters were placed in the left radial artery and external jugular vein, and esophageal and rectal temperatures, EKG and EEG were recorded. Surface cooling was then instituted using a combination of ice and a cooling blanket. Minute ventilation was reduced, and carbon dioxide (to as much as 5 per cent) was added to the inspired gas mixture, as dictated by serial arterial blood gases. When the rectal temperature reached 28°C (26.8°C esophageal), surface cooling was discontinued and exploratory laparotomy was begun. The tumor was found to involve only the right hepatic lobe; the sternum was then opened, heparin administered, and cardiopulmonary bypass was instituted for 18 minutes to achieve further cooling to a rectal temperature of 18°C (17°C esophageal). At this temperature the child's blood was drained into the pump and bypass was discontinued. Surgical resection required 22 minutes, and bypass was resumed for 42 minutes to return the temperature to 34°C rectally (35°C esophageal). During hypothermia anesthetic requirements were negligible. During the rewarming process a central venous pressure line was placed via the superior vena cava into the right atrium. At the termination of bypass and after protamine had been administered, the central venous pressure trace was noticed to be of poor quality. The line was therefore aspirated and flushed clear. Immediately following this procedure, the patient's condition deteriorated, with profound hypotension, and myocardial cyanosis was noticed by the surgeon. The presumptive diagnosis of intracoronary arterial air was made. Aspiration from the central venous pressure line revealed highly saturated blood, strongly suggesting inadvertent left atrial

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