CASE REPORTS

tionally, one cannot rule out catecholamine depletion as a result of decreased reserves of norepinephrine from chronic drug therapy.3 We postulate that fenfluramine, phentermine, and fluoxetine, acting separately or in combination, precipitated the hypotension, bradycardia, and accompanying symptoms manifested by our patient.

The authors thank Philip Greilich, M.D., and Kwasi Prakab-Asante, M.D., from the Anesthesiology and Pain Management Service, Department of Veterans Affairs Medical Center, Dallas, Texas.

References

3. American Hospital Formulary Service 97. Drug Information. Ed-
pine, guanethidine, and iproniazid on minimum alveolar anesthetic requirement (MAC). Anesthesiology 1968; 29:1155–8
10. Lawson N: Autonomic nervous system physiology and pharma-

Unusual Psychological Manifestation of Systemic Local Anesthetic Toxicity

Stephan C.U. Marsch, M.D., D.Phil.,* Hans-Gerhard Schaefer, M.D., F.F.A.R.C.S.,† Italo Castelli, M.D.‡

SYSTEMIC local anesthetic intoxication is a potentially life-threatening complication that has been repeatedly described. Low plasma concentrations of local anesthetics may produce dizziness, drowsi-
ness, numbness of tongue, tinnitus, dysarthria, and visual disturbances, whereas higher blood levels may result in seizures, coma, and respiratory arrest. Whereas these neurologic symptoms of central nervous system toxicity are familiar to all anesthesiologists, the psychological manifestations of local anesthetic toxicity are less well known. It has been proposed that apprehension about imminent death or the delusion that death has actually occurred is a specific feature of local anesthetic toxicity.1 We present a case in which overt systemic local anesthetic toxicity was associated with a profound psychological experience.

Case Report

A 59-yr-old woman was scheduled for surgery of Dupuytren's contractures of the fourth and fifth finger of her right hand, using axillary plexus block. Preoperatively, she did not take any medica-
tion, and examination revealed no cardiac, pulmonary, neuro-
logic, or mental disease. Oral midazolam, 7.5 mg, was given 1 h

* Assistant Professor.
† Head of Anaesthesia, Kantonsspital, Olten, Switzerland.
‡ Address reprint requests to Dr. Marsch: Department of Anaesthesia, Kantonsspital, Basel 4031, Switzerland. Address electronic mail to: marsch@ubaut.unibas.ch

Key words: Anesthetic agents; complications of anesthesia; central nervous system toxicity; local anesthesia; near-death experience; regional anesthesia.

Anesthesiology, V 88, No 2, Feb 1998

© 1998 American Society of Anesthesiologists, Inc.
Lippincott-Raven Publishers
CASE REPORTS

before her arrival in the operating room. In the operating room, an intravenous cannula was inserted, and routine monitoring was commenced. The ulnar nerve was located in the right axilla by a nerve stimulator connected to an insulated 25-gauge needle, and a 1:1 mixture of 0.5% bupivacaine and 1.5% mepivacaine was slowly injected after it was ascertained that no blood could be aspirated. After administration of approximately 10 ml of the local anesthetic mixture, the patient complained of dizziness, and her speech became slurred. Although no blood could be aspirated through the needle, the injection was stopped immediately. Within 50 s of the onset of her initial symptoms, she became disoriented, agitated, and uncooperative. Oxygen was administered via face mask, and general anesthesia was induced using intravenous thiopentone, 200 mg. Throughout this episode, electrocardiograph (ECG) showed sinus rhythm, and no ventricular dysrhythmias occurred. Mean arterial blood pressure, measured at 1-min intervals, did not decrease below 60 mmHg. Pulseoxymetric oxygen saturation remained above 94%, and no convulsions were observed. Surgery was performed during general anesthesia (enflurane, 60% nitrous oxide in oxygen). After an uneventful intraoperative course, the patient was extubated 125 min after the onset of her first symptoms of local anesthetic toxicity.

In the recovery room, the patient volunteered the following experience. She recalled her arrival in the operating room and the muscle twitches elicited by the nerve stimulator used to identify the ulnar nerve. Suddenly she felt as though she had been lifted and carried away by a large hand, while becoming progressively smaller. Sitting on the hand, she seemed to be surrounded by brilliant light. She encountered, among other persons, her husband and her two sons. Suddenly, she knew that she had died. This did not frighten her, instead, she felt happy and extremely calm. After saying good-bye to her family, she felt as though she had been carried away and dropped into a dark tunnel. The next thing she knew was a nurse talking to her in the recovery room.

Despite our repeated explanations that she had suffered a local anesthetic-induced complication, the patient remained convinced that she had died and come back to life. This patient had been a non-practicing Christian who believed in an afterlife. She had not had any previous experience of this kind or know of others who had had. She had had no fear of death in the preoperative period.

During the reminder of her otherwise uneventful hospitalization and during the first few days at home, she was preoccupied with her experience and had difficulty sleeping. On the day of surgery, she shared her experience with her husband and found him sufficiently supportive to decline the offered support of a psychologist. Several months after surgery, she indicated that her experience had substantially changed her attitude toward herself and her life. She said she now valued her life and health more than she had had before. Further, she indicated she had lost her fear of death and cared more about her family and society.

and procaine administered for the purpose of regional anesthesia, pain relief, or management of ecchymoses. Similar experiences have been reported after the administration of penicillin G procaine. Also, "fear reactions" and panic disorders have resulted from chloroprocaine toxicity. Based on their investigations of cardiac patients suffering from lidocaine toxicity during antiarrhythmic treatment, Saravay et al. identified "doom anxiety," defined as apprehension about imminent death or the delusion that death had actually occurred, as a specific manifestation of lidocaine toxicity.

We report a profound subjective experience associated with systemic local anesthetic intoxication. The patient's account contains most of the features characteristic of what are called near-death experiences. When we administered the 16-item near-death experience scale, she scored 15 out of 32 possible points. Stable hemodynamics and adequate arterial oxygenation during the incident indicate that our patient was not near death. However, previous reports indicate that such experiences do not require closeness to death and that a perceived threat of death may be all that is necessary. As early as 1892, a Swiss geologist published reports from mountaineers who experienced near-death experiences during a fall they survived. Such experiences occur under a variety of circumstances, including altered states of consciousness produced by drugs like LSD and mescaline or dissociative anesthetic agents such as ketamine.

Although the experience we report may be classified as a near-death experience, the phenomenology fits in the framework of psychiatric effects observed with local anesthetic toxicity: in available case reports, death-related content and extreme fear are prominent. The mechanisms by which local anesthetics might induce such experiences remain to be determined. However, these agents have convulsant activity, and complex partial seizures have been known to cause panic attacks and death-related cognitions. Moreover, local anesthetics can have an activating effect on subcortical brain structures. It has been hypothesized that near-death experiences result from a stress-induced limbic lobe syndrome, triggered by increased hippocampal neuronal activity. Apart from a direct effect of local anesthetics on cerebral structures, the experience we describe could have resulted indirectly from the altered consciousness caused by local anesthetic agent toxicity.

Discussion

Vivid fear of imminent death and a delusional belief of having died have been described in patients suffering from toxic reactions to lidocaine, procainamide,
The patient may have felt, as do some persons who receive LSD or ketamine, as though she were dying. Even though local anesthetic agents are widely used, there are only a few reports of psychological experiences associated with their administration. However, near-death experiences are commonly kept secret for fear of being regarded insane. For this reason, anesthesia-related psychological experiences may not be disclosed. Moreover, postoperative visits to patients recovering from anesthesia-related complications do not routinely include questions about the patients' subjective experience. Thus, the incidence of distinctive experiences related to local anesthetic toxicity may be higher than one might gauge from published reports.

How should anesthesiologists deal with experiences of this kind once they have encountered them? First of all, one should keep in mind that any unusual reaction in the perioperative period may be drug-induced and, therefore, resist the temptation to attribute the experience to "neurotic tendencies" or the part of the patient. The experience gained in dealing with patients who have suffered from awareness, "doom anxiety," or near-death experiences suggests that open discussion and direct confirmation of what had happened is important. Considering the potentially long-lasting impact of psychic experiences on attitudes toward life, one should assist the patient in sharing the experience with spouse and family, seeking to overcome fears of being regarded mentally ill.

References