Prolonged Sedation in the Elderly after Intraoperative Atropine Administration

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Postoperative sedation from scopolamine is well known. Less appreciated is that the more commonly used anticholinergic agent, atropine, can also cause postoperative sedation. We recently encountered two elderly patients in whose cases prolonged sedation probably was secondary to doses of atropine considerably smaller than those reported to cause sedation.

REPORT OF TWO CASES

Patient 1. A 78-year-old, 58-kg woman underwent a radical vulvectomy. She had mild hypertension but was otherwise healthy. Morphine, 5 mg, and atropine, 0.4 mg, were administered im 80 min prior to induction. Anesthesia was induced with thiopental, 225 mg, and tracheal intubation was facilitated by succinylcholine, 100 mg. Morphine, 2.5 mg, was given at the time of the incision, and anesthesia was maintained with nitrous oxide, 70 per cent, and enflurane, 1.5 to 0.4 per cent, in a semiclosed system. During the latter half of the four-hour procedure, the concentration of enflurane administered was less than 1 per cent. The anesthesia was unremarkable except for several episodes of bradycardia, treated with atropine. The total dose of atropine, including that given for premedication, was 2.1 mg.

Four hours postoperatively the patient was still somnolent. Oriented but not delirious, she responded to painful stimuli, though only poorly to verbal stimuli. Blood pressure was 150/100 torr, pulse rate 100/min, and respiratory rate 20/min, and axillary temperature 36 C. She had not received any narcotic or sedative drug in the recovery room. Phystostigmine, 2 mg, was given iv, and the patient promptly became oriented, complaining of a dry mouth.

Patient 2. A 78-year-old, 64-kg man had a cholecystectomy and common duct exploration. Except for moderate hearing loss and chronic bronchitis, he was in good health. Eighty minutes prior to induction, he received meperidine, 50 mg, pentobarbital, 100 mg, and atropine, 0.5 mg, im. He arrived in the operating room alert an hour later. Anesthesia was induced with thiopental, 200 mg, and succinylcholine, 100 mg, was given prior to endotracheal intubation. Despite supplementation of 70 per cent nitrous oxide with fentanyl, 0.2 mg, the patient became hypertensive a few minutes after the incision was made. Enflurane (to as much as 5 per cent) in 50 per cent nitrous oxide was substituted; no further narcotic was given. Twenty minutes before the end of anesthesia, which lasted two and a half hours, enflurane was discontinued. During closure of the skin, neostigmine, 2.5 mg (with atropine 1.0 mg), was given to antagonize the effect of d-tubocurarine, 18 mg. Bradycardia prompted the administration of additional atropine, bringing the total dose to 2.3 mg. The endotracheal tube was removed when the patient could exert an inspiratory force greater than 20 cm H2O, although he was somnolent when unstimulated.

Two and a half hours postoperatively the patient was still somnolent, responding to only painful and vigorous physical stimuli. Blood pressure was 150/90 torr, pulse rate 80/min, respiratory rate 18/min, and rectal temperature 35.7 C. Phystostigmine, 2 mg, was administered iv, and within 2 min the patient opened his eyes and sat up, complaining of incisional pain.

DISCUSSION

These elderly patients were somnolent two to four hours after otherwise uneventful anesthesia. Although laboratory studies were not performed, nothing suggested that respiratory depression, hypoxia, hypercapnia, or hypoglycemia was causing this somnolence. The doses of narcotics given seemed appropriate for our patients' ages, and neither pupil size nor respiratory rate implicated narcotization. Furthermore, neither patient received a long-acting sedative drug such as diazepam or scopolamine; the second patient had been premedicated with pentobarbital, but he was alert 80 min later. Finally, somnolence is unlikely two to four hours after anesthesia with relatively insoluble agents. In common to both patients, however, were their advanced ages and the moderately large doses of atropine given.

It is well known that scopolamine produces a central anticholinergic syndrome consisting variously of confusion, agitation, delirium, drowsiness, or coma. Atropine can cause the same central effects, but is only a tenth to a sixth as potent as scopolamine. Postoperative delirium has been attributed to atropine in doses of 0.2-0.6 mg; however, somnolence generally does not occur in clinical settings because it requires at least 2 mg. Forrer and Miller used 32-212 mg atropine to produce coma as a treatment for psychosis, while others have shown that 5-10 mg doses cause drowsiness, inattention to detail, and slowing of the electroencephalogram in healthy young volunteers. Somnolence occurred "in at least five [elderly] patients" who received atropine, 0.3-0.5 mg, iv, every three to four hours, to a total of "less than 4 mg" during 24 hours, for bradycardia complicating myocardial infarction; an 83-year-old woman became

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comatose after a total of 3 mg given intravenously within three hours for bradycardia.7

Our patients' prompt responses to physostigmine support our belief that atropine was the cause of their somnolence. The ability of physostigmine to reverse scopolamine-induced sedation is well established,6 as is its ability to antagonize the effects of very large doses of atropine.2 However, Hill11 feels that the arousal response to physostigmine following anesthesia is nonspecific and occurs with a large variety of sedative drugs regardless of mechanism. This conflict is more apparent than real. Evidence suggests that acetylcholine is the transmitter in some pathways concerned with arousal and awareness.2 Anticholinergic drugs then would tend to decrease the level of consciousness. In contrast, anticholinesterase agents such as physostigmine would tend to increase the level of consciousness, regardless of the cause of depression. If, however, the agent causing the somnolence were an anticholinergic drug, one might expect a very prompt awakening in response to physostigmine.

The sedative effect of a moderately large dose of atropine is usually not considered in the differential diagnosis of postoperative somnolence, particularly in the elderly, who are apparently more prone to experience central anticholinergic effects.12,13 Recognition of this possible cause and the use of physostigmine where appropriate may avoid unnecessary tests, as well as shorten the period during which these patients are at risk from the sequelae of postoperative somnolence. This problem can be avoided, however, by remaining aware of and minimizing the total dose of atropine in these patients. In particular, one should reconsider the need for anticholinergic premedication14 in current practice, as well as the use of glycopyrrolate,15,16 an anticholinergic agent that cannot cause central effects because its quaternary structure precludes crossing the blood–brain barrier.