anesthesia (fig. 1). Of interest is the fact that this contribution of atropine to the slowing of tracheal mucus velocity is still present when the blood concentration of doses of this drug, given intramuscularly, is in decline. Consequently, the effect of atropine on the tracheobronchial tree is more prolonged than may be expected on the basis of its blood levels. This is supported somewhat by the experiences of clinical anesthesiologists when comparing the volumes of tracheal secretions in atropinized and non-atropinized patients during emergence from anesthesia. This decrease in tracheal mucus velocity may not be of clinical importance in normal individuals. However, caution should be exercised when anesthetizing patients who have chronic retention of secretions.

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Thiopental Administration in Acute Intermittent Porphyria Without Adverse Effect

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Acute intermittent porphyria is of special interest to anesthesiologists because of the harmful effects of barbiturate administration during anesthetic induction. Barbiturates are a well-known cause of attacks; in a recent series they were the sole inciting agent in a third of the cases reported and were the most common single offender. Administration of barbiturates to patients with acute intermittent porphyria can culminate in severe neurologic dysfunction, respiratory paralysis, and death. With the exception of allergy, this disease constitutes possibly the only absolute contraindication to the use of thiopental as an induction agent. Herein is reported a case of a young woman who received thiopental during anesthetic induction on two documented occasions. No complications ensued. She was admitted to our hospital six months later for evaluation of ab-

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dominal pain and was diagnosed as having acute intermittent porphyria.

REPORT OF A CASE

A 23-year-old woman was admitted to the Beth Israel Hospital with a chief complaint of recurrent abdominal pain for one year. She had had recurrent dysmenorrhea and menorrhagia with irregularity of menstrual periods since menarche at the age of 15 years. She had sustained birth control pills for regulation of menstrual periods from the age of 17 years to five months prior to admission. During the 8-12 months prior to admission, she had had intermittent sharp pain in the left lower and right lower quadrant of the abdomen. During the same period, she had also occasionally had anorexia associated with nausea but never vomiting. She complained of chronic constipation. Sometimes during an attack of abdominal pain, the patient had ataxia lapses in conjunction with dizziness and triplia. She specifically denied pain in the chest, back, or extremities, paresthesia, muscle weakness, or seizures.

The patient related a history of drug abuse, including secobarbital, pentobarbital, methaqualone, ethchlorvynol, cocaine, and amphetamines. Eight months prior to admission, the patient had been admitted to a neighboring hospital with a diagnosis of endometriosis. Dilatation and curettage had been performed, using thiopental, 250 mg iv, for induction. The patient had been discharged a day later following an uneventful postoperative course. Two months later she had been admitted to another neighboring hospital for evaluation of lower abdominal pain. Radiologic studies of the upper and lower gastrointestinal tract and sigmoidoscopy had been reported as normal. The patient had again had dilatation and curettage, with thiopental used for anesthetic induction. She had been discharged two days later following an uneventful postoperative course.

During the present hospitalization, the patient was evaluated for possible pelvic inflammatory disease and studies were carried out to rule out acute intermittent porphyria. Laparoscopy, performed using nitrous oxide, oxygen, halothane, and suxamethonium, disclosed no abnormality. Thiopental was avoided because of suspected acute intermittent porphyria. Watson-Schwartz tests were positive on two occasions.1 In addition, two 24-hour urinary collections for porphobilinogen were conducted. The results were: first collection, porphobilinogen 3987.0 μg/24 hours (normal to 3,000 μg), coproporphyrin 179.5 μg/24 hours (normal to 21.0 μg), uroporphyrin 35.0 μg/24 hours (normal to 90 μg); second collection, porphobilinogen 8270.0 μg/24 hours, coproporphyrin 21.7 μg/24 hours, uroporphyrin 55.5 μg/24 hours. Stool coproporphyrin was 13.1 μg per gram dry weight (normal value).

DISCUSSION

Acute intermittent porphyria is usually manifested by moderate to severe abdominal pain. In addition to this symptom, constipation, extremity pain, mental changes, and dark urine are commonly encountered. Neurologic symptoms can be protean, encompassing peripheral nerves, autonomic nervous system, brain stem and cerebrum, neuritic pain, areas of hyperesthesia and paresthesia, foot and wrist drop, paraplegia, or complete flaccid quadriplegia. In the present case the diagnosis was established by finding elevated levels of porphobilinogen (PBG) in urine, measured by column chromatography. Stein and Tschudy reported that normal amounts of PBG were never seen during attacks. In contradistinction to other investigators, they could find only one instance of normal PBG even during an inactive period. Although the qualitative determination of PBG by the Watson-Schwartz modification of the Ehrlich aldehyde reaction is specific for acute intermittent porphyria, a high incidence of false-positive results has been reported. Direct measurement of PBG in urine by the column chromatography technique is more accurate in establishing the diagnosis.

Four general categories of agents are known to act as precipitating factors in acute intermittent porphyria: certain drugs, infections, certain steroids, and starvation. Barbiturates, sulfonamides, griseofulvin, mepronamate, isopropylmeprobamate, diphenylhydantoin, glutethimide, methyprylon, imipramine and probably chloridiazepoxide are among the drugs that precipitate attacks. Ergot and pyrazolone compounds also induce attacks. Barbiturates constitute the single most common cause of attacks of the drug group. Eales reported that barbiturates were involved in 74 of 136 acute episodes of acute intermittent porphyria. Barbiturates were the only factor in 30 of these 74 attacks. He reviewed 82 acute attacks in 76 patients from 1955 to 1965. Of these patients, 30 per cent had received thiopental. The attacks resulted in quadriplegia with bulbar paralysis and death in 50 per cent of the patients. Goldberg reported that 77 per cent of patients with paralysis in one series of acute inter-
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mittent porphyria had received barbiturates. He recorded a mortality rate of 25 per cent in a group of 50 patients observed over a five-year period.\footnote{2}

At present there is no treatment that is completely successful in ending attacks; thus, prevention is important. Specifically, inhalation induction of anesthesia is generally safe. In the event of an attack in a previously undiagnosed patient, the anesthesiologist may utilize controlled ventilation, arterial bloodgas and fluid and electrolyte balance monitoring as the keystones in the management of respiratory insufficiency and its complications.

In the present case, an undiagnosed patient with acute intermittent porphyria had received thiopental intravenously on two documented occasions without ill effect. The literature contains few accounts of such immunity. Tschudy commented that five patients in his series had been exposed to barbiturates without complication, but did not specify the nature of the exposure.\footnote{3}

Obviously, the anesthesiologist is in a uniquely precarious position. The disturbing likelihood that many patients who have undiagnosed acute intermittent porphyria may have emergency laparotomy and routinely receive barbiturate induction, or that such patients will require anesthesia for other reasons, compel him to be diagnostically vigilant. Such vigilance is predicated on a knowledge of the multifarious clinical symptoms intrinsic to the disease and the possible disastrous results of an acute attack.

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