In retrospect our method of inducing anesthesia with thiopental and succinylcholine might not have been the ideal. However, the degree of splinting from the pneumoperitoneum and thus the difficulty in ventilating the patient was not anticipated. The patient was restless, mentally retarded, obese, and dyspneic, though not cyanosed at this time. Both inhalation induction and awake endotracheal intubation were considered and rejected as being too difficult and time consuming. Paralysis with rapid intubation of the trachea was the immediate goal and did, in fact, allow immediate surgical intervention.

If pneumoperitoneum is suspected, endotracheal intubation, awake or asleep, without prior artificial ventilation is indicated. If there is respiratory embarrassment in association with pneumoperitoneum, abdominal decompression by trocar and cannula should be performed before induction of anesthesia.

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Intraocular Pressure after Transurethral Prostatic Surgery

K. Reed Peters, M.D.,* Jesse Muir, M.D.,† Daniel W. Wingard, M.D.‡

A problem associated with transurethral resection of the prostate gland (TUR P) is acute water intoxication.[1,2,3] Visual disturbances have been attributed to cerebral edema resulting from this. These latter cases involved one patient with blurred vision,[4] another seeing only a faint glow,[5] and another who thought he was going blind.[6] No intraocular pressure (IOP) measurements were made in these three cases.

Two patients recently complained of transient blindness following TUR P at the University of Nebraska Medical Center. This blindness resolved with correction of the hyponatremia.

We questioned whether transient blindness might be due to an increase in IOP from water absorption rather than cerebral edema. The purpose of this investigation was to study changes in IOP that may be related to the absorption of the non-electrolyte irrigating fluid employed in patients undergoing TUR P.

Materials and Methods

Twenty-two patients between the ages of 54 and 81 years (mean age: 67) were scheduled for a TUR P. Approval for the study was granted by the Committee on Human Investigation at the University of Nebraska Medical Center. Preoperative informed consent was obtained from each patient.

Preoperative serum electrolyte determinations (Na^+, K^+, Cl^-, pH, CO_2) were obtained. Pre- and postoperative visual acuity was examined with a Rosenbaum pocket vision screener. Drug histories were obtained to note any drugs which might change the patient's IOP. None of the patients were premedicated.

Seven of the twenty-two patients had general anesthesia. No muscle relaxants were used. Two were anesthetized with thiopental/narcotic/N_2O/O_2 technique, three with halothane/N_2O/O_2 and one with enflurane/N_2O/O_2. The remaining patients received subarachnoid or epidural block. Schiøtz tonometry was performed bilaterally approximately 20 min after induction of general anesthesia and after fixation of the block in patients with conduction anesthesia.

Intravenous fluid therapy consisted of 5 per cent

* Assistant Professor, Department of Anesthesiology, University of Nebraska Medical Center.
† Instructor, Department of Anesthesiology, Mayo Medical School.
‡ Professor, Department of Anesthesiology, University of Nebraska Medical Center.

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Key words: Anesthesia: urologic. Complications: glaucoma. Eye: intraocular pressure. Toxicity: water.

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TABLE 1. Intraocular Pressure Changes Associated with Serum Na^+ Changes

Patient	Anesthetic	Preoperative Na^+ (mEq/l)	Postoperative Na^+ (mEq/l)	Preoperative IOP (torr)		Postoperative IOP (torr)	
				Left	Right	Left	Right
1	Halothane	142	131	12	12	17	17
2	Spinal	135	116	17	17	19	22
3	Spinal	143	122	17	14.6	17.6	15
4	Spinal	140	124	9.5	7.5	10	10
5	Halothane	139	119	14.6	14.6	18.5	18.5
6	Spinal	139	122	9.5	12.2	14.6	14.6
7	Spinal	140	118	29	20	20.6	20.6
8	Epidural	134	122	17.3	14.6	14.6	12.2
9	Meperidine Thiopental N_2O/O_2	131	102	20	20	20	20
10	Spinal	139	114	17.5	18.9	12.2	12.2
11	Spinal	139	125	12.2	12.2	12.2	12.2
12	Spinal	138	140	17.3	17.3	17.3	12.2
13	Spinal	135	131	14.6	14.6	12.2	12.2
14	Meperidine Thiopental N_2O/O_2	138	139	15	14.6	13	12
15	Spinal	143	144	15	14.6	12.2	14.6
16	Spinal	138	134	14.6	15.9	12.2	17.3
17	Halothane	137	142	17	17	16.7	16.7
18	Halothane	134	133	15.9	12.2	12.2	12.2
19	Enflurane	134	134	16	16	16	17
20	Spinal	138	137	15.5	15.5	15.5	16
21	Spinal	137	134	15.9	15.9	15.9	15.9
22	Spinal	136	132	20.6	15.9	24.4	18.9

dextrose in Lactated Ringer's solution. The bladder irrigation solution used for all the patients was 1.5 per cent glycine. Postoperative electrolytes were obtained and indentation tonometry was measured upon the patient's admission to the recovery room. Changes in IOP were compared with the change of serum sodium in two groups of patients (>10 mEq/l Na^+ change *vs.* <10 mEq/l Na^+ change).

Results

Two of the patients (patients 1 and 2, table 1) had a history of open angle glaucoma and were being treated with timolol maleate eye drops (a beta-blocker used to lower IOP). These were the only patients who complained of visual disturbances after TUR P. Visual acuity changed from 20/400 to 20/800 in patient 1 and from 20/20 to a level greater than 20/800 in patient 2. This latter subject had a sensation of blurry vision immediately postresection. The remaining patients had no change in visual acuity, although eleven patients had a drop in serum Na^+ greater than 10 mEq/l.

Decreases in serum Na^+ of 14 mEq/l or more in this study were associated with the typical symptoms of water intoxication: somnolence, restlessness and confusion. Patient 2 convulsed in the recovery room.

There were no significant changes in IOP of the left eye alone, the right eye alone, or the average of both eyes with changes in serum Na^+.

Discussion

The measurement of IOP should take into account two factors: 1) A significant amount of the globe is surrounded by the sclera which has its own rigidity and the curvature of the cornea varies from individual to individual.[7,8] 2) There are both vascular and aqueous pathways by which fluid may enter or leave the eyes. A measurement method should not affect the fluid volume of the eye.[9]

Schiøtz tonometry involves the use of a weighted metal plunger which indents the cornea. The degree of indentation for a specified weight is inversely related to the IOP. Scleral rigidity will affect the measurement since the cornea is indented. As the scleral rigidity increases, the indentation of the cornea will decrease and the measurement of IOP will be falsely high. However, in 95 per cent of cases, scleral rigidity is within a normal range.[7] Repeated measurements taken close together will give a falsely low measurement. Ours were at least one hour apart. Schiøtz tonometry is very simple to learn and fairly accurate in most cases. Values up to 25 torr are considered normal.[7]

Effect of Water Loading. A test, developed by oph-

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thalmologists to detect early abnormalities in the resistance to outflow of fluid from the eye is the Water Drinking Provocative Test.[9] The test requires the patient to drink one liter of water after he has fasted four hours. Within 40–45 min of oral consumption of water, a rise in IOP occurs if outflow resistance is elevated as in glaucoma. As high as 94 per cent of patients with open angle glaucoma will have an increase in IOP and a decrease in the outflow facility of the eye, whereas only 6 per cent of normals experience such changes.[9] A rise in IOP greater than 9 torr is pathological.[10] The effects of induced ocular hypertension in responsive normal eyes and glaucomatous eyes are an enlargement of blind spots, the appearance of para central scotoma and a nasal step.[10] These are pressure dependent visual field defects that vary in onset and occurrence. The absorption of large amounts of hypotonic solutions occur even more rapidly by the intravascular route in a TUR P and such visual field changes could explain these visual disturbances. But none of our patients had increases in IOP large enough to be considered pathological. Thus, we agree with Defalque and Miller who felt that cerebral edema was the cause of visual disturbances.[5]

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Hemodynamics, Plasma Histamine, and Catecholamine Concentrations during an Anaphylactoid Reaction to Morphine

Nabil R. Fahmy, M.D.*

Morphine is frequently given intravenously as the main anesthetic drug for cardiac surgery and as the narcotic component in nitrous oxide–narcotic-relaxant anesthesia because of minimal cardiovascular effects.[1] In some patients, however, hypotension occurs usually secondary to histamine release.[1,2] In the case report below, we describe a patient who had an anaphylactoid reaction to morphine in which changes in hemodynamic function were correlated with plasma histamine and catecholamines levels.

* Associate Professor of Anaesthesia, Harvard Medical School, Boston, Massachusetts.

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Address reprint requests to Dr. Nabil R. Fahmy: Department of Anesthesia, Massachusetts General Hospital, Boston, Massachusetts 02114.

Key words: Anesthetics, intravenous: morphine. Allergy: anaphylactoid reaction. Sympathetic nervous system: catecholamines. Histamine.

Report of a Case

A 45-year-old, 57-kg white woman was scheduled for a left total hip replacement. She gave no history of drug allergies and was not receiving medication prior to admission. The patient had no history or clinical evidence of cardiopulmonary disease and was enrolled in an ongoing study of intravenous narcotic drugs with her consent. She was given diazepam, 10 mg orally, 90 min prior to surgery. On arrival in the induction room, peripheral venous, arterial, and right atrial catheters were inserted under local anesthesia. Hemodynamic monitoring included measurement of heart rate, right atrial and systemic arterial blood pressures,

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