

Anesthesiology
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In reply:—Blood pressure was recorded throughout the study, and no significant increase was seen with pretreatment or the full dose of succinylcholine or with tracheal intubation. The intraocular pressure during intubation can be affected by inadequate depression of laryngeal and tracheal reflexes, overextension of the head, time taken for intubation, hypoxia, hypercarbia, coughing, or straining. Goldsmith¹ reported increases in intraocular pressure in 57 per cent of cases after intubation without topical anesthesia and slight decreases in 83 per cent of cases when the larynx and trachea were sprayed with local anesthetic prior to tracheal intubation. Thus, coughing and straining are important factors affecting intraocular pressure. Overextension of the head may prevent venous return and thus produce engorgement of the choroid plexus, leading to an increase in intraocular pressure. In our series, intubation was performed with slight extension of the neck and within 1 min. Therefore, in a well-oxygenated patient with

adequate depth of anesthesia and muscular relaxation, there should not be an increase in intraocular pressure during tracheal intubation. A Schiötz tonometer was used because an applanation tonometer was not available. We were aware that frequent measurements with a Schiötz tonometer may decrease intraocular pressure by expressing aqueous fluid from the anterior chamber.

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REFERENCE

1. Goldsmith E: An evaluation of succinylcholine and gallamine as muscle relaxants in relation to intraocular tension. *Anesth Analg (Cleve)* 46:557-561, 1967

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Factors Affecting Measurement of Intraocular Pressure

To the Editor:—The recent article by Verma¹ concerning succinylcholine-induced fasciculations and intraocular pressure deserves some clarifications. Many variables influence intraocular pressure during anesthesia. Choice of drugs, depth of anesthesia, timing of measurement, venous and arterial pressures, sympathetic response, head position, and airway patency are only some of these. Verma does not record the blood pressures associated with each intraocular pressure measurement. Rapid changes in systolic blood pressure, which may occur during endotracheal intubation, may affect intraocular pressure. It is, therefore, important to record blood pressure responses during intraocular pressure measurements. The observation by Verma that intraocular pressure did not change with endotracheal intubation is at variance with previously published results,²⁻⁴ and requires more of an explanation than the general statement that coughing and straining will increase intraocular pressure. Finally, the Schiötz tonometer measures corneal indentation and requires normal corneal elasticity. This technique, used so often in studies of intraocular pressure, is

accurate only to within ± 2 torr (M. W. Grant, personal communication*). Frequent measurements (requiring weighted indentation of the cornea) may decrease intraocular pressure by expressing aqueous humor from the anterior chamber. The Perkins applanation tonometry technique does not rely on gross corneal indentation or normal corneal elasticity, and is accurate to within ± 0.5 torr.⁵

Verma also fails to discuss his findings in relation to two recent articles by Bowen *et al.*³ and Meyers *et al.*⁴ that suggest that eliminating succinylcholine-induced fasciculations does not prevent increases in intraocular pressure.

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REFERENCES

1. Verma RS: Self-taming of succinylcholine-induced fasciculations and intraocular pressure. *ANESTHESIOLOGY* 50:245-247, 1979
2. Wynands JE, Cromwell DE: Intraocular tension in association

- with succinylcholine and endotracheal intubation. A preliminary report. *Can Anaesth Soc J* 7:39-43, 1960
3. Bowen DJ, McGrand JC, Palmer RJ: Intraocular pressures after suxamethonium and endotracheal intubation in patients pretreated with pancuronium. *Br J Anaesth* 48:1201-1204, 1976
 4. Meyers EF, Krupin T, Johnson M, et al: Failure of nondepolarizing neuromuscular blockers to inhibit succinylcholine-induced increased intraocular pressure, a controlled study. *ANESTHESIOLOGY* 48:149-151, 1978
 5. Scheie HG, Albert DM: *Adler's Textbook of Ophthalmology*, Eighth edition. Philadelphia, W. B. Saunders, 1969, pp 420-422

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Acromegalic Patient—Indication for Fiberoptic Bronchoscopy But Not Tracheostomy

To the Editor:—Southwick and Katz¹ recommend that elective tracheostomy be performed either preoperatively or prior to removal of the endotracheal tube when a difficult intubation is encountered in acromegalic patients with glottic or soft-tissue abnormalities. It is well known that tracheostomy is not an innocuous procedure, and carries certain risk and complications. I submit that the complications of a difficult intubation could have been avoided by the use of a fiberoptic bronchoscope. When faced with a difficult intubation, familiarity of the anesthesiologist with the use of the fiberoptic bronchoscope would assure an atraumatic endotracheal intubation and avoid the need for tracheostomy, either pre- or postoperatively.

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REFERENCE

1. Southwick JP, Katz J: Unusual airway difficulty in the acromegalic patient—Indication for tracheostomy. *ANESTHESIOLOGY* 51:72-73, 1979

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Headache Immediately Following Attempted Epidural Analgesia in Obstetrics

To the Editor:—A recent paper in *ANESTHESIOLOGY* brought attention to transient headaches occurring shortly after epidural steroid injections.¹ The authors stated that they were unaware of any reports of such headaches occurring after attempted epidural anesthesia for labor and delivery. We have observed two such episodes in obstetric patients.

Patient 1. A 33-year-old woman, gravida 4, para 3, requested epidural analgesia for labor and delivery. The patient was placed in the right decubitus position and an 18-gauge Tuohy epidural needle was placed by loss-of-resistance (LOR) technique with saline solution and 2 ml air in the L3-4 interspace. Dural puncture inadvertently occurred and was documented by aspiration of approximately 1 ml cerebrospinal fluid. Local anesthetic was not injected. The patient complained immediately of mild frontal cephalgia. The epidural needle was removed and replaced successfully with another at the L2-3 interspace using LOR technique

with saline solution. The patient continued to complain of headache, which was exacerbated by elevation of the head. Sodium chloride, 0.9 per cent, (40 ml), was injected through the epidural catheter, with immediate relief of the cephalgia. Six hours later an additional 40 ml of saline solution were injected prophylactically, and the epidural catheter was removed. The patient underwent an uneventful cesarean section and was discharged several days later without further anesthetic complication.

Patient 2. A 31-year-old woman, gravida 2, para 1, requested epidural analgesia for labor and delivery. An 18-gauge Tuohy epidural needle was placed in the L3-4 interspace with LOR technique using 5 ml air. A catheter could not be advanced into the epidural space, so the needle was removed and repositioned again in the L3-4 interspace with LOR using 4 ml air. The patient described a paresthesia in the right leg and severe fronto-occipital headache upon "epidural" entrance. Aspiration yielded no cerebrospinal fluid. The needle was removed. The patient delivered a healthy infant during mask nitrous oxide-oxygen analgesia. The headache persisted. It was exacerbated when the patient was up-