Macroglossia—A Positional Complication

ROSEANNE G. MCALLISTER, M.D.*

Neurosurgeons frequently utilize the sitting position for cervical laminectomies and posterior fossa craniotomies to aid exposure and to decrease bleeding in the surgical field. There are two recognized hazards of the sitting position: air embolus, secondary to dural venous tear and subatmospheric pressure of veins in an area above the right atrium, and hypotension secondary to venous pooling in the dependent extremities.

This report documents a heretofore unreported complication of the use of the sitting position for neurosurgical operations.

REPORT OF TWO CASES

Patient 1. A 22-month-old boy was admitted to UCLA Hospital with a diagnosis of Bell's palsy. At the age of 3 months, decreased use of the right hand had been noted. Physical examination was unremarkable except for right facial paralysis secondary to right seventh cranial nerve palsy and equivocal ataxia. Roentgenograms of the skull were within normal limits. The electroencephalogram showed diffuse slow-wave activity. A brain scan showed frontal accumulation which was not intracranial. A pneumoencephalogram showed diffuse enlargement of the fourth ventricle, a tilt to the right, and right-sided enlargement of the brain stem, and cerebral angiography disclosed a nonvascular, possibly cystic, mass in the cerebellar hemisphere. Previous anesthesias for a hernia repair, pneumoencephalogram, and cerebral angiogram were uneventful.

A craniotomy was performed with halothane–nitrous oxide–oxygen anesthesia, using a no. 5.0 oral endotracheal tube with a no. 2 oral Guedel airway left in place. The intraoperative course was unremarkable. After 6 hours, anesthesia was discontinued and the patient was noted to have a massively swollen, firm, beefy red tongue protruding from the mouth. Because of the swollen tongue, the endotracheal tube was left in place. Respirations were alternately depressed and hyperpneic, with retractions becoming increasingly severe over the next two hours in the recovery room. Pulse rates ranged from 140 to 180/min. After 2 hours, blood-gas values with the patient breathing room air spontaneously were: *p*H 7.22; P_{CO_2} 18 torr; P_{O_2} 90 torr; base excess 19 mEq/l. A roentgenogram of the chest taken at this time was normal. Dexamethasone had been administered intraoperatively and was continued into the postoperative period. The patient was returned to the operating room two hours postoperatively and a tracheostomy was performed under halothane–nitrous oxide–oxygen anesthesia. A no. 3 tracheostomy tube was inserted, and immediately thereafter retractions seemed somewhat decreased and, clinically, the tongue seemed less firm, although the neck seemed fuller. The patient was maintained on assisted ventilation for 31 hours, at which time he was noted to have dilated, nonreactive pupils bilaterally, with decreasing blood pressure and pulse rate. Re-exploration of the posterior fossa was carried out under nitrous oxide–halothane anesthesia. No mass or hematoma was found in the posterior fossa. On the fourth day after the first craniotomy, the patient had an unexplained cardiac arrest and died. Autopsy revealed diffuse cerebral edema, two duodenal ulcers (one perforated), atelectasis and congestion of both lung fields, 200 ml blood-stained and bile-stained peritoneal fluid, hemorrhage of the entire posterior portion of the tongue, and left uncal herniation.

Patient 2. A 45-year-old man underwent a craniotomy in the sitting position under halothane–nitrous oxide–oxygen anesthesia. A 9.5-mm oral endotracheal tube and no. 5 oral Guedel airway were in place. At the end of the 10-hour procedure, the patient was noted to have massive beefy red, firm macroglossia. The endotracheal tube was left in place, but within 24 hours postoperatively the edema had regressed and the trachea was extubated uneventfully. Dexamethasone was administered intraoperatively and postoperatively.

DISCUSSION

Venous drainage of the tongue is via the lingual vein, which passes from the tip of the tongue back under the mucous membranes, following the lingual artery on the undersurface of the tongue to lie between the lingualis and hypoglossus muscle. It then receives the sublingual and dorsalis lingual veins and passes back and downward to empty into the internal jugular vein.[1] The lymphatic drainage of the tongue is via the submucosal plexus, draining ultimately into the deep cervical nodes along the internal

* Associate Physician, Department of Anesthesiology, UCLA School of Medicine, Los Angeles, California 90024.

Accepted for publication July 18, 1973.

jugular vein between the level of the digastric and the omohyoid.[2]

The anatomic features of lymphatic and venous drainage of the tongue, when combined with the position during a sitting craniotomy, *i.e.*, extreme flexion of the head with the chin resting on the chest, plus the presence of an oral airway, make apparent the potential for venous and lymphatic obstruction of the tongue for a prolonged period, leading to postoperative macroglossia. Especially important is the correlation of inciting factors and events with the laryngeal anatomy of the infant or child; *i.e.*, high larynx, small tracheal diameter, and apparent large tongue (secondary to the high larynx and insertion of the tongue). Thus, what would be a moderate compromise of the airway due to edema in the adult may become severe and even life-threatening in the child.

Possible measures which might prevent this complication include: (1) Use of a bite block instead of an oral airway in patients in the sitting position with flexion of the head. (2) When a head holder with a chin bar is used (rather than pin head holder), checking that the bar supports the mandible and does not compress soft tissues.

These two cases probably had the same etiology, which is unrelated to the use of the mandibular bar in the first case. The extreme flexion of the head against the chest, with both endotracheal tube and oral airway in place, compressed the base of the tongue between the airway, tube, and tracheal rings, causing venous obstruction over a prolonged period.

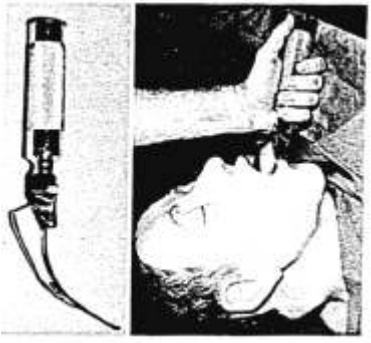
REFERENCES

1. Broomel J: Anatomy and Histology of the Mouth and Teeth. Philadelphia, Blakiston, 1923, pp 31–32
2. Grant JCB: Method of Anatomy. Baltimore, Williams and Wilkins, 1965, pp 681–683

A New Use for an Old Blade

DUKE B. WEEKS, M.D.*

More than 60 laryngoscope blades have been introduced since Dr. Kirstein reported his experience with the Autoskope.[1] Each inventor has designed his blade to permit endotracheal intubation when anatomic or environmental conditions are unusual. The Polio blade (fig. 1),† a modification of the Macintosh curved blade, is such a specially designed instrument. This blade, originally introduced by Dr. Foregger in 1954, was designed for use in patients enclosed in "iron-lung" respirators.[2] The obtuse angle facilitated emergency endotracheal intubation in patients confined in these tank respirators because the handle did not impinge upon the neck plate during laryngoscopy. With the advent of positive-airway-pressure ventilators, this unique blade has been relegated to near-obscurity.



FIGS. 1 *(left)*, Polio blade, and 2 *(right)*, Polio blade in use.

* Assistant Professor, Department of Anesthesia, Bowman Gray School of Medicine of Wake Forest University, Winston-Salem, North Carolina 27103.
Accepted for publication July 18, 1973.

† The Foregger Company, Inc., Allentown, Pennsylvania 18105.