of fairly severe hepatitis on the second occasion, although it may have mitigated against the more severe damage that has been reported to result from anesthetic concentrations of methoxyflurane, with the associated mortality rate of 58 per cent.\(^1\)

Of interest, too, was the evolution towards a predominantly cholestatic clinical and biochemical form of hepatitis. This does not appear to have been previously reported in cases of presumed anesthetic-associated hepatitis.

**Bilateral Hypoglossal-nerve Palsy Following a Second Carotid Endarterectomy**

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Surgical treatment of carotid-artery disease is common. When the dissection requires retraction of the hypoglossal nerve, hypoglossal-nerve palsy can occur. When an operation on the contralateral carotid artery takes place prior to full recovery from hypoglossal-nerve palsy, bilateral hypoglossal-nerve palsy can occur. This may subject the patient to difficulties with speaking, swallowing, and maintaining a patent airway in the supine position.

**REPORT OF A CASE**

A 50-year-old black man, 172 cm tall, weighing 84 kg, underwent a right carotid endarterectomy following a history of transient ischemic attacks and left-sided numbness with arteriographic evidence of right and left carotid occlusive disease. The only complication following this procedure was right hypoglossal-nerve palsy manifested by deviation of the tongue to the right.

Thirty days after the initial operation a left carotid endarterectomy was performed. The patient was in no distress. Medications were diazoxide and methylpapa for hypertension. Physical examination revealed a left carotid-artery bruit and deviation of the tongue to the right. EKG was consistent with left ventricular hypertrophy.

The patient was premedicated with morphine sulfate, 10 mg, and scopolamine, 0.4 mg, im. Anesthesia was induced with 350 mg thiopental, iv, and the trachea intubated following 100 mg succinylcholine, iv. Anesthesia and muscle relaxation were maintained with nitrous oxide:oxygen, 2:1, fentanyl, and pancuronium bromide. Following completion of 70-minute surgical procedure, 100 per cent oxygen was administered and 3 mg prostigmine and 0.6 mg glycopyrrolate were given iv. The patient also received 0.2 mg naloxone, iv. Prior to removal of the endotracheal tube, the patient was breathing adequately, with a respiratory rate of 14/min. He appeared responsive, and the trachea was extubated. Although active, the patient had total respiratory obstruction without an oral airway. Additional prostigmine, 1 mg, with atropine, 0.4 mg, was given iv, and naloxone was administered iv (0.4 mg in divided doses), to reverse any residual muscle relaxation and narcosis. The patient continued to have airway obstruction and to fight to sit up. Physostigmine, 0.5 mg, was then given iv to reverse any possible scopolamine-induced delirium. The situation remained unchanged.

This fighting, delirious patient was finally allowed to sit up. Sitting, his airway cleared, he calmed down, and he became rational. It was then noticed that the patient had poor muscle control of his tongue, and speech was impaired. Thus a diagnosis of bilateral hypoglossal nerve

**REFERENCES**


palsy was entertained. The postoperative course
was uncomplicated except for difficulty with eat-
ing, swallowing, and speech, and upper airway
obstruction in the supine position. He adjusted
well and was discharged five days after opera-
tion. Full recovery was expected.

DISCUSSION

Anesthetists should be aware of problems
associated with bilateral hypoglossal-nerve
palsy following bilateral carotid endarterec-
tomies. Unilateral hypoglossal-nerve palsy,
easily detected by ipsilateral deviation of
the protruded tongue, causes minimal dis-
ability. Bilateral nerve palsy can cause air-
way obstruction, impairment of speech, and
difficulty with eating. Damaged myelinated
nerve may regain function no more rapidly
than 2 mm per day. If possible, total re-
cover of unilateral hypoglossal-nerve palsy
should be allowed prior to operation on the
contralateral carotid artery.

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A New Method for Positioning Endotracheal Tubes

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Endotracheal intubation may be complica-
ted by inadvertent insertion of the tube
down to the level of the carina or even into
a mainstem bronchus. Three methods are
currently used to determine proper tube loca-
tion: 1) a portable chest x-ray, which is ex-
pensive, inconvenient, and frequently not
immediately available; 2) rapid inflation and
deflation of the cuff with palpation in the
suprasternal notch—not useful with low-

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pressure, large-volume, prestretched cuffs;
3) auscultation for breath sounds—notoriously
inaccurate and of no value if the tube is at
the carina. Described herein are basic fea-
tures of a new method that is simple, safe,
non-invasive, inexpensive, and should ensure
proper tube localization.

METHODS

A sophisticated electromagnetic sensing
 technique allows detection of a special
flexible circumferential foil marker band, ap-
proximately 3 mm wide, 25 microns thick,
and weighing 50 mg. The band is fused into
the endotracheal tube at the proximal cuff-
tube junction without increasing the external
diameter, narrowing the internal diameter,
or changing the inherent properties of the
tube (fig. 1). Prototype tubes with this modifi-
cation were fabricated to our design by
Portex Ltd. A simple, hand-held, pocket-
sized, battery-powered, electronic detector
was developed in our laboratories to sense
the proximity of the marker bands. The
detection system is based on using a com-