endotracheal tube and an oral airway. We report a case of uvular edema that occurred in the absence of an endotracheal tube.

A 19-year-old woman, 12-weeks pregnant, was admitted for a therapeutic abortion. The patient had no known medical problems, was not taking any medications, and had no known allergies. The patient was given Maalox®, 30 ml po, 45 min before surgery. She had no other premedication. Anesthesia was induced with sodium thiopental, 300 mg, iv, and fentanyl, 100 μg, iv, and the anesthesia was maintained with N_2O and O_2. An oral airway was inserted to facilitate ventilation by mask. An additional 450 mg sodium thiopental were given in divided doses during the case. Upon awakening in the recovery room 45 min after the procedure, she complained of a sore throat and marked difficulty in swallowing. The patient had no respiratory obstruction.

Examination revealed a markedly swollen uvula and an erythematous oral pharynx. The patient was afebrile and a throat culture taken at this time, later showed no growth. The patient was given diphenhydramine, 50 mg, iv, and hydrocortisone, 100 mg, iv. Twelve hours later, the sore throat had improved and the uvula was decreased in size.

In reviewing the literature, the only cases of uvular edema associated with anesthesia were believed caused by either a reaction to scopolamine or atropine, or as a complication of endotracheal intubation.[1,2] In the absence of an endotracheal tube or anticholinergic drugs, we believe the marked uvular edema we observed may have been due to entrapment of the uvula between the hard palate and the oral airway.

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An Unusual Cause of Leakage in an Anesthesia System

To the Editor: —A complete, daily check of the anesthesia machine is a mandatory part of safe anesthetic practice. Recently, we observed an unusual leak in an anesthesia system which was not found by routine recommended safety checks.[1]

Following topical anesthesia and an intravenous induction, the patient was nasally intubated with the aid of succinylcholine. Ventilation was effective with a semi-closed circle system before and after intubation. The pressure relief valve was closed and the flexible connector hose from a previously adjusted and tested Isolette® Ventimeter Ventilator* was connected to the conventional bag fitting in the anesthesia circuit. The ventilation appeared adequate and breath sounds were satisfactory.

Elevation of the operating table and anesthesia circuit to the surgeon's operating level caused excessive strain and kinking of the ventilator connector hose. The ventilator, which was attached to the anesthesia machine by the machine connector pipe in a pin clamp

* NARCO Medical Co., Warminster, Pennsylvania.

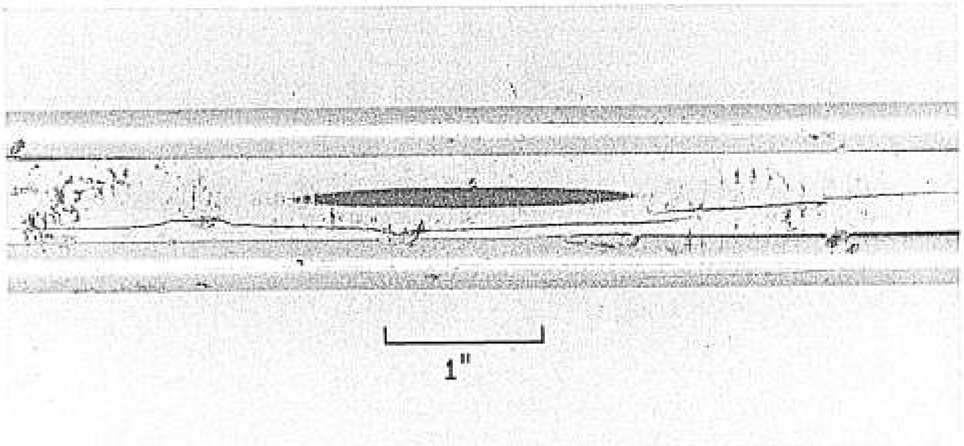

FIG. 1. Machine connector pipe displaying the fine longitudinal cracks.

fitting, was elevated to reduce kinking in the connector hose. At this time, breath sounds were noted to be markedly diminished and an audible leak noted as the ventilator bellows descended. With return of the reservoir bag to the anesthesia circuit, no significant leaks were detected and effective ventilation was easily reestablished. Thorough examination of the ventilator fittings revealed several fine, longitudinal cracks in the machine connector pipe (fig. 1). Raising the ventilator and applying the screw clamp caused displacement of the fatigued metal pipe. This appeared as a variable leak in the ventilator system, depending upon the pressure and location of clamp application.

In retrospect, we speculate that this problem may have been present in previous cases but with no obvious cause or a variable leak of any great magnitude. The ventilator had been in active use and had passed all routine equipment checks. In fact, the area of metal fatigue was not obvious unless the connector pipe was deformed by a clamp or other pressure over the precise area of vulnerability; but there were several such areas along the length of the pipe. We hope that this report will serve to reemphasize the need to carefully reexamine all metal fittings which are prone to fatigue. Furthermore, it represents a major design flaw when a part of the ventilator circuit is also used as a structural mount and thereby subjected to the recurrent stress of daily operating room usage.

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Factors Affecting Rebreathing in T-piece Circuits

To the Editor:—The article by Byrick and Janssen on the effect of respiratory waveforms on rebreathing in T-piece circuits[1] provides useful and provocative information. But like many papers on the subject,[1] the authors' interpretation of their own results is flawed.

If a patient's respiratory waveform does affect rebreathing in a T-piece system—and it probably does[3]—this article fails to prove it. Unfortunately, the authors did not take into account a variable known to affect the amount of rebreathing in a Mapleson-D system:[4,5] the ratio of fresh gas flowrate ($\dot{V}_F$) to minute volume ventilation ($\dot{V}_E$). For instance, in their table 1, they report (in the upper left hand cell) that when $\dot{V}_F$ was 100 $ml \cdot kg^{-1} \cdot min^{-1}$, mean $\dot{V}_E$ was 4.34 l/min in their enflurane group, and 8.83 l/min in their halothane group. Assuming that the patients' body weights were comparable between the two groups and averaged 70 kg (and therefore $\dot{V}_F$ averaged 100 $ml \cdot kg^{-1} \cdot min^{-1} \times 70$ kg = 7.0 l/min) then the ratio $\dot{V}_F/\dot{V}_E$ was 1.6 in the enflurane group, but only 0.8 in the halothane group, a twofold difference. On this basis alone one would expect to see little rebreathing in the enflurane group, but quite a lot in the halothane group. This is just what was found.

One could argue, in support of the authors' hy-

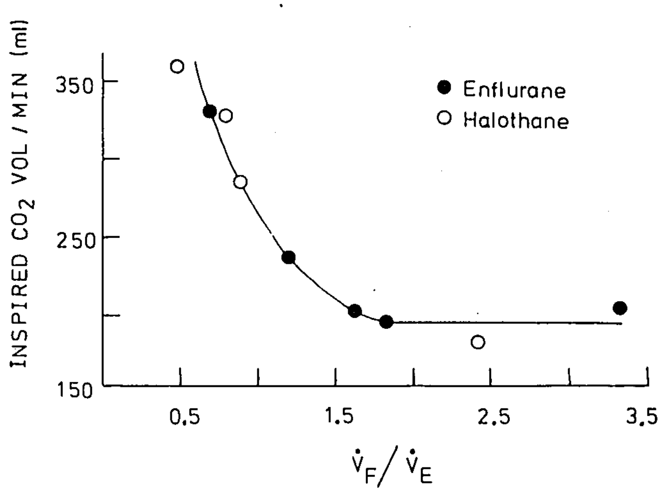

FIG. 1. Calculated $\dot{V}_F/\dot{V}_E$ ratios for both anesthetic groups at each fresh gas flowrate plotted against the inspired CO_2 volume per minute.