two deaths. All patients had undergone general anesthesia: 18 for cesarean section, 15 for emergency and 3 for elective operation, and 1 for vaginal delivery. Two patients required anesthesia postpartum, one to evacuate a hematoma and one to remove a retained placenta. All patients but two had been or were being intubated with a cuffed endotracheal tube.

Of two patients who underwent general anesthesia via mask, one had an intracranial lesion and an elevated intracranial pressure. Mask anesthesia was used to avoid increasing the intracranial pressure further. During induction, with cricoid pressure applied, the patient regurgitated and aspirated a massive amount of gastric contents. The second patient was the patient who required evacuation of a hematoma. An oral surgery resident in his eighth month of an anesthesiology fellowship administered the anesthesia and later commented that he thought, "intubation on all general anesthesia cases meant *before* delivery."

Of the 19 cases for which endotracheal intubation was used, it was recorded as "difficult" for 14. For one patient, seven attempts were required before intubation was accomplished. In another case, four attempts were required.

Cricoid pressure was applied in 16 of the 19 patients who were intubated. Unfortunately, information was not requested that would have characterized the person applying the cricoid pressure and whether or not it was applied appropriately and continuously.

The data accumulated from this survey illustrate important features of obstetric general anesthesia and its potential complications. The lessons to be learned are old ones but worth repeating:

1) General anesthesia for emergency cesarean section is particularly hazardous.

2) A difficult or failed intubation increases the risk of aspiration.

3) Even when accomplished with ease, endotracheal intubation *per se* does not prevent aspiration.

Because either aspiration or difficult or failed intubation occurs when there is little time to deliberate about the subsequent course of action, plans for coping with these complications should be considered beforehand and rehearsed thoroughly. For example, in the event of a failed or difficult intubation, should the patient be allowed to awaken or should the case be continued? Does the indication for cesarean section influence the decision? If the patient is allowed to awaken, what is the next sequence of events? If the case continues, how will anesthesia and ventilation be provided? These and other questions need to be addressed before stressful events occur. Most important, competent personnel should be available to manage these very challenging situations.

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Some Practical Considerations in the Use of the Engstrom EMMA Analyzer

To the Editor:—We have had clinical and laboratory experience with three Engstrom EMMA analyzers over a period of 2 years. We agree with Hays *et al.*[1] in their assessment of the device but would like to make the following comments.

1) The response time of the analyzer to water vapor certainly is long enough to interfere with end-tidal measurements when it is in place in a reciprocating flow of alternately dry and humid gas (fig. 1*A*). We have found that the effect of water vapor can be stabilized by placing the analyzer head at the beginning of the expiratory limb of a nonrebreathing circuit (fig. 1*B*). In this position the head is humidified almost constantly. If the inspired gas is dry, the beginning of expiration can be seen when relatively dry anatomic dead-space gas passes through the

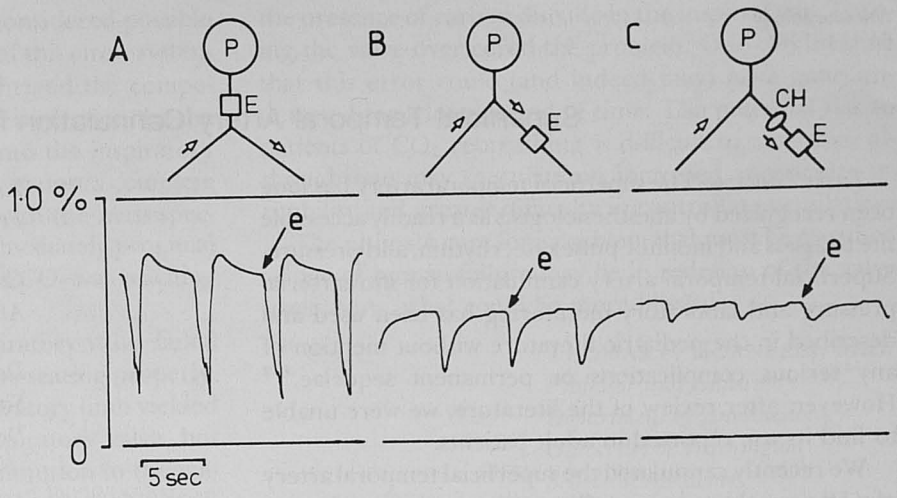

FIG. 1. Effect of expired water vapor on EMMA reading. *A.* In a reciprocating flow of dry inspired and humid expired gas (O_2/N_2O) between nonrebreathing circuit and patient (IPPV). *B.* At the origin of the expired limb of the circuit. *C.* In the same position but preceeded by a condenser humidifier. P = patient; E = EMMA analyzer head; CH = condenser humidifier; e = end-expired reading.

head. The effect can be reduced by placing a condenser humidifier (steel mesh type) upstream of the head (fig. 1*C*).

2) The relative gain factor given by Hayes *et al.* for trichloroethylene was 1.32. Our analyzers have a factor of 0.76—a figure consistent in rank with the other agents' relative solubilities. Some analyzers were released with faulty gain controls.[2] A change in the resistor net is required to reduce the gain to 57% of its original value (personal communication, LKB, England).

3) Two of our three analyzers have been in regular clinical use and have required frequent recalibration (two or three times per month), while the third, confined to the laboratory and dry gases, has seldom required recalibration. The difference in performance may be due to exposure to humidity or the abuses of clinicians!

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Avoiding Sticky Situations

To The Editor:—The arms of many surgical patients are secured routinely to armboards. For some years we have noticed and been dismayed by the pain and discomfort produced by removing tape from the skin and hair of the arms after the tape has been applied directly to the surface of the patient. Usually, this occurs when time becomes short and towels or drapes are not immediately at hand for an interface. Tape adhesives grow even more tenacious, yet *la condition humaine,* alas, remains the same.

A remedy for this sticky situation is at hand. Simply use the nonadhesive side of the tape as the contact surface, and wrap it around the armboard one or more times such that the tape is brought back on itself. The arm is secure, there is less dirty linen, and, most important, no patient discomfort.

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