Continuous Positive Airway Pressure via Face Mask Is a Dangerous Step Backwards

To the Editor:

I was sorry to see publication in the May 1976 issue (Chest 69:615-620, 1976) of the report by Greenbaum and associates regarding a face-mask technique for delivering continuous positive airway pressure (CPAP) to adults in respiratory distress. Continuous positive airway pressure is no longer a new therapy, nor, alas, is the strapped positive-pressure breathing mask a new device. It is, rather, as antiquated as it is inhumane and unsafe.

The two major risks of the strapped face mask (for delivery of CPAP, intermittent positive-pressure breathing, or any other pressure-breathing use) are (1) aspiration with subsequent highly morbid pneumonia and (2) failure to gain control of the airway at the appropriate time. No intensive care unit offers such close monitoring, even if there is a 1:1 ratio of nurses to patients, that a nurse can be looking directly at each patient every minute. Even if a nurse saw a patient vomit, could that nurse manage to sprint to the bedside, remove the tightly strapped face mask, and clear the vomitus from the oropharynx before the patient took his next breath? Although aspiration did not occur in the small series reported from Pittsburgh by Greenbaum and associates, it seems virtually certain that it would occur in a larger series or in a less well-staffed intensive care unit.

Control of the airway should be an early prophylactic maneuver. An endotracheal tube prevents airway obstruction, prevents aspiration, facilitates airway suctioning, provides a convenient and effective route for obtaining samples for laboratory culture of the airways, and permits immediate institution of mechanical or manual ventilation if these become necessary. All of these advantages are sacrificed if no such airway is in place and instead a face mask is tightly strapped onto the critically ill patient.

Nearly half of the patients in the report by Greenbaum et al went on to require intubation and mechanical ventilation. In some hands the technique of CPAP via face mask will delay institution of more appropriate ventilatory support (in fact, the next step will be for someone to attach a ventilator to one of these strapped face masks, and we will have returned to where we were ten years ago, when the interface of face mask to ventilator was routine). I am especially concerned that some practitioners will try to avoid endotracheal intubation because they are not skilled at it and are reluctant to call in someone who is skilled. They will institute CPAP via face mask instead, foregoing intubation until the patient’s situation deteriorates from critical to tragic. A patient who is sick enough to need CPAP is sick enough to need an endotracheal tube, both to treat his condition and to secure his airway in case he should need mechanical ventilation or resuscitation.

Probably few patients would suffer this therapy long enough to develop pressure necrosis of the facial tissue, but one of the patients in the report by Greenbaum et al seems to have had CPAP via face mask for six days.

Tracheal intubation carries risks; however, to use a face mask instead is, I believe, much riskier, placing some patients in danger of aspiration pneumonia and only putting off the inevitable in others. For some of those, it may be put off until too late.

Philip Kittredge
Editor, Respiratory Care
Cheshire, Conn

To the Editor:

Mr. Kittredge raises important questions about the use of continuous positive airway pressure (CPAP) without tracheal intubation. I will attempt to answer them in order of importance.

Mr. Kittredge’s premise that “a patient who is sick enough to need CPAP is sick enough to need an endotracheal tube” is not well documented. We use intermittent positive-pressure breathing (IPPB) effectively without intubation for short-term assisted ventilation, and the same is true for CPAP. Patients with pulmonary edema seen in the emergency room may be treated with IPPB through a face mask as a “holding” action until diuretic therapy succeeds in reducing extravascular pulmonary water. In fact, fewer than half of the patients treated with IPPB for an episode of pulmonary edema ultimately require endotracheal intubation and mechanical ventilation. While we agree that the majority of patients who require positive end-expiratory pressure also need endotracheal intubation, there are a number of patients who do not require endotracheal intubation. If not needed, it should not be used, since there are drawbacks, including a greater risk of infection, particularly in the compromised host, a type of patient which seems to be rapidly increasing in our intensive care units today. Young alert patients with non-
cardiogenic pulmonary edema are examples of patients who tolerate CPAP by face mask very well without intubation. In this group of patients, we would have to call endotracheal intubation, rather than CPAP via face mask, “inhumane.”

An example may help Mr. Kittredge understand the type of patient for whom CPAP by face mask is clearly a better choice than intubation for assisted ventilation. A 24-year-old diabetic woman developed pulmonary edema following recovery from ketoacidosis. Although her respiratory rate was 40/min and her arterial oxygen pressure was 60 mm Hg with a fractional concentration of oxygen in the inspired gas of 0.7, the patient remained alert. Within an hour of initiation of CPAP therapy, she was comfortable and no longer tachypneic and was sitting up in bed reading. The theory of CPAP therapy via face mask and the alternative, intubation and mechanical ventilation, were explained to her in terms she could understand. The patient was comfortable during the entire period of therapy. Although exhaling with positive airway pressure may be uncomfortable for normal individuals, a patient with a decreased functional residual capacity (FRC) breathes more comfortably during CPAP therapy than during regular spontaneous breathing at ambient pressure. The increase in FRC by CPAP may improve compliance, thereby reducing the work of breathing. This explains why a patient with pulmonary edema receiving CPAP therapy by face mask is more comfortable than an intubated patient or one breathing spontaneously without such assistance. We should not consider the technique to be an uncomfortable one. The patient does not “suffer” from this therapy as much as from its more common alternative, i.e., intubation.

Mr. Kittredge indicates his belief that aspiration will eventually occur, regardless of the safeguards taken (4e, transparent mask, use of a nasogastric tube, limiting the technique to alert patients, and eliminating those who are nauseated or vomiting and those with upper gastrointestinal bleeding). This is a fair argument; however, with careful screening of patients, the risk of aspiration can be minimized while still avoiding intubation.

The benefits of endotracheal intubation listed by Mr. Kittredge are certainly important ones; however, they are irrelevant to the current study. If a patient is admitted to the hospital with pneumonia but without respiratory distress, he is not intubated for the advantages of intubation listed by Mr. Kittredge. The properly chosen candidate for CPAP therapy by face mask, although in respiratory distress, does not require intubation. His spontaneous cough is more efficient than tracheobronchial suctioning for removal of secretions. The use of intubation in such a patient simply to obtain sputum for cultures or to have in place in case the need for mechanical ventilation arises is unnecessary and inappropriate.

As with any technique, CPAP by face mask may be abused by personnel in “a less well-staffed intensive care unit.” But this is an indication to improve staffing and care in some of our intensive care units, rather than to risk increased morbidity by intubating patients who do not need it.

The likelihood of pressure necrosis of facial tissue has been decreased since the publication of our report. We now allow the face mask to be fitted more loosely and compensate for leaks by using a much higher flow rate of the inspiratory gas.

Our study was aimed at trying to find out whether or not the technique of CPAP by face mask is feasible in a modern intensive care unit. The fact that almost half of our patients eventually required intubation and mechanical ventilation reflects our inability to properly identify those where the latter methods are not needed; however, it is not an excuse to withhold CPAP via face mask from patients in whom this treatment will work. Invasive techniques should be avoided if an equally effective or better noninvasive technique is available. Obviously, our next step is to identify more precisely those patients in whom CPAP via face mask is indicated.

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REFERENCES


Infection with Pneumocystis

To the Editor:

I wish to comment on the article entitled “Infection due to Pneumocystis carinii Simulating Lobar Pneumonia” by Byrd and Horn,1 which appeared in the July 1976 issue. Two clinical aspects which I think are helpful in the early suspicion of infection with Pneumocystis are not mentioned. Cough is usually a prominent symptom; moreover, usually it is nonproductive.2 Examination of the sputum fails to reveal the usual evidence of bacterial infection. Secondly, I have noted in several cases that immediately preceding the infection, doses of steroids and immunosuppressant drugs were often reduced. This observation was made in patients with renal transplants who were usually tolerating their transplant well, and for that reason or some associated clinical reasons, the dosage of steroids was reduced. Perhaps this coincided with a highly suppressed state of the im-

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