Postanesthetic Hypoxemia and Oxygen Administration

To the Editor:—The results and conclusions recently described by Moller et al.1 largely confirm our findings2 regarding hypoxemia in the early postoperative period. Among the similarities between these two studies are the number of patients studied (200), the high incidence of postoperative hypoxemia observed, the relationship of hypoxemia to age and type of anesthesia, and the lack of relationship between hypoxemia and other factors such as preexisting pulmonary disease or obesity.

An important point of disagreement between the two studies, however, is in the effect of oxygen therapy to prevent postoperative hypoxemia. Fifty-five percent of the hypoxemic episodes (arterial oxygen saturation [SpO2] ≤ 90%) Moller et al. observed in 32% of their patients occurred when patients were receiving oxygen. By contrast, fewer than 2% of patients in our study were hypoxic when they were receiving oxygen on arrival at the recovery room as well as 1 h later. Although we performed single measurements of SpO2 after 10 min of oxygen therapy, while Moller et al. monitored SpO2 continuously, we do not believe this to be the cause of such a discrepancy in the incidence of hypoxemia during oxygen therapy.

The difference may lie in the way in which oxygen was administered. The patients of Moller et al. received at least 3 l/min nasal oxygen, and depending on the presence of hypoxemia, they might have had the oxygen flow increased. Eighty percent of the hypoxemic episodes occurred because of accidental interruption of oxygen administration. In our study, we administered oxygen with a 35% Venturi mask. It is widely recognized that the inspired concentration of oxygen varies greatly when the gas is given through nasal catheter.2 This variation in oxygen concentration is related to inspiratory flow rate, tidal volume, and inspiratory to expiratory times ratio. An increase in all of these parameters decreases inspired oxygen concentration. The early postoperative period is characterized by variations in breathing pattern due to residual effects of anesthetics and neuromuscular blocking agents, pain, and stimulation of respiration by the staff while patients are regaining consciousness and resuming spontaneous ventilation. Each of these factors affects breathing in different ways which, in turn, increase or decrease the inspired concentration of a fixed flow of oxygen.

For these reasons, we think that in the postoperative period a fixed oxygen concentration device is more advisable to ensure a stable concentration of inspired oxygen. The disagreement between the two studies seems to favor our belief. In any case, further research is necessary to prove the relative efficiency of the different devices for administering oxygen during the early postoperative period.

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REFERENCES


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In Reply:—The large discrepancy between our findings1 and those of Canet et al.2 concerning hypoxemia and supplemental oxygen does not surprise us. When comparing two studies with different objectives, methodology, and material, one often finds disagreement. To illustrate the most obvious major differences in methodology used in the two studies, we have realyzed a part of our study.

Our study was a blinded observer study using continuous measurement of oxyhemoglobin saturation (SpO2) with the pulse oximeter.1 Canet et al.2 measured SpO2 at two fixed single points, 10 or 20 min after arrival in the postanesthesia care unit (PACU) and again after 1 h. We have now analyzed our original data using their time schedule for measurements.

Table 1 illustrates a considerable reduction in the incidence of hypoxemia if we had recorded hypoxemia only 10 and 60 min after arrival in the PACU. Actually, only 9% of the patients would have been identified as hypoxic if the study was performed with single measurement of SpO2. Of these, only half (corresponding to 5% of the patients) occurred during oxygen administration.