

cognitive, and motor skills. ANESTHESIOLOGY 40:453-458, 1974

3. Bruce DL, Stanley TH: Research replication may be subject specific. Anesth Analg 62:617, 1983

Anesthesiology  
74:1161, 1991

## Postanesthetic Hypoxemia and Oxygen Administration

*To the Editor:*—The results and conclusions recently described by Moller *et al.*<sup>1</sup> largely confirm our findings<sup>2</sup> 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 [ $Sp_{O_2}$ ]  $\leq 90\%$ ) 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 hypoxemic when they were receiving oxygen on arrival at the recovery room as well as 1 h later. Although we performed single measurements of  $Sp_{O_2}$  after 10 min of oxygen therapy, while Moller *et al.* monitored  $Sp_{O_2}$  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. Eight 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.<sup>3</sup> This variation in oxygen concentration is related to inspiratory flow rate, tidal volume, and inspiratory to expiratory times ratio.<sup>4</sup> 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

4. Bruce DL, Bach MJ: Effects of trace anaesthetic gases on behavioural performance of volunteers. Br J Anaesth 48:871-876, 1976

(Accepted for publication March 4, 1991.)

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.

JAUME CANET, M.D.  
MONTSERRAT RICOS, M.D.  
FERNANDO VIDAL, M.D.

*Servei d'Anestesiologia i Reanimació  
Hospital Universitari "Germans Trias i Pujol"  
Badalona, 08916 Barcelona, Spain*

### REFERENCES

1. Moller JT, Wittrup M, Johansen SH: Hypoxemia in the postanesthesia care unit: an observer study. ANESTHESIOLOGY 73: 890-895, 1990
2. Canet J, Ricos M, Vidal F: Early postoperative arterial oxygen desaturation: Determining factors and response to oxygen therapy. Anesth Analg 69:207-212, 1989
3. Leigh JM: Variation in performance of oxygen therapy devices. Anaesthesia 25:210-222, 1970
4. Canet J, Sanchis J: Performance of a low flow  $O_2$  Venturi mask: diluting effects of the breathing pattern. Eur J Respir Dis 65: 68-73, 1984

(Accepted for publication March 8, 1991.)

Anesthesiology  
74:1161-1162, 1991

*In Reply:*—The large discrepancy between our findings<sup>1</sup> and those of Canet *et al.*<sup>2</sup> 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 reanalyzed a part of our study.

Our study was a blinded observer study using continuous measurement of oxyhemoglobin saturation ( $Sp_{O_2}$ ) with the pulse oximeter.<sup>1</sup> Canet *et al.*<sup>2</sup> measured  $Sp_{O_2}$  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 hypoxemic if the study was performed with single measurement of  $Sp_{O_2}$ . Of these, only half (corresponding to 5% of the patients) occurred during oxygen administration.