TITLE: EFFECT OF PREMEDICATION ON CONTINUOUS OXYGEN SATURATION IN THE CARDIAC PATIENT PRIOR TO TRANSPORT TO THE OPERATING ROOM

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Introduction: The degree of hypoxemia caused by a morphine/scopolamine premedication (premed) in cardiac patients is controversial. The studies to date have only determined arterial PO2 once before and once after premed. In addition, the elimination of arterial blood gas sampling may have altered these results. We examined the changes in pulmonary function, as assessed by postoperative arterial oxygen saturation (SaO2) measured continuously by pulse oximetry (PO2) in cardiac surgical patients prior to transfer to the operating room.

Methods: After receiving Clinical Investigation Committee approval, we studied 19 patients undergoing elective CABG. Patients were excluded if they were receiving supplemental oxygen prior to surgery. While breathing room air, in the supine position, each patient's baseline SaO2 was determined on the day prior to surgery. Two hours before surgery, morphine sulfate, 0.1 mg/kg and scopolamine (0.2 mg > 70 yrs; 0.4 mg > 70 yrs) were administered IM to each patient. A continuous recording of SaO2 was made commencing at approximately 1/2 hour prior to premed and continued for approximately 1 1/2 hours after premed. Patients were in the supine position (with maximum of 15° head elevation) breathing room air for the entire study period. An observer at bedside documented proper functioning of the PO2 to rule out motion artifact. In addition, this observer monitored the patient's level of consciousness in an unobtrusive fashion. Intervention would be made only if the SaO2 fell below 85%. Lowest SaO2 values reported included only those that had a duration 21.2s. Significant pulmonary risk factors consisted of: > 40 pack year smoking history, pulmonary symptoms, or chest x-ray findings consistent with chronic obstructive pulmonary disease. Poor ventricular function was defined as a cardiac index of < 2.5 L/min/m² and LVEDP > 18 mmHg and abnormal left ventricular contraction at angiography. Hypoxemia was defined as an SaO2 < 90%. The paired t test was used for statistical analysis with results reported as mean ± SD.

Results: Patient's ages ranged from 35 to 74 years (56.7 ± 12.5) of the 19 patients studied 8 had significant pulmonary risk factors, 2 had poor ventricular function, and no patient had symptomatic congestive heart failure (CHF).

The SaO2 12-h preop was 95% ± 4%. The duration of continuous SaO2 measurement prior to administration of premed was 28 min ± 3 and the lowest SaO2 during this period was 96% ± 3. The duration of continuous SaO2 measurement after premed was 86 min ± 2 and the lowest SaO2 during this period was 93% ± 5. This value was significantly different from both the 12-h preop SaO2 and lowest before premed value (p < 0.01; see figure). The lowest SaO2 after premed occurred at 48 min ± 2.5 after administration of premed. Only one patient became hypoxic (SaO2 < 90%) after premed. His lowest SaO2 was 88% for 2 episodes of twelve seconds each during periods of sleep and intermittent apnea. He had significant pulmonary risk factors and good ventricular function.

Discussion: This is the first study to examine the isolated effect of a morphine/scopolamine premedication in cardiac patients by continuously measuring SaO2 for a prolonged period (36 min ± 2).

Patients with coronary artery disease are at risk for myocardial ischemia and infarction, and arterial hypoxemia can increase this risk. A statistically significant fall in SaO2 occurred after morphine/scopolamine premedication in this study group. However, only one of 19 patients became hypoxic (SaO2 < 90%). Perhaps a patient population with a higher incidence of poor ventricular function or a combination of risk factors might manifest a higher degree of hypoxemia.

Another study in cardiac patients during monitoring line insertion in the operating room after receiving a similar premed reported a much higher incidence of hypoxemia (SaO2 < 90%) in 21/38 patients. It appears that additional stresses such as the head down position, additional IV solution, and facial drapes may account for this different incidence of hypoxemia when compared to the isolated effect of premedication.

This study suggests that patients with good ventricular function in the relatively unstimulated environment of their hospital room had a very low risk of hypoxemia after receiving a morphine/scopolamine premed.