Randomized Evaluation of Pulse Oximetry in 20,802 Patients: II.

Perioperative Events and Postoperative Complications

Jakob T. Møller, M.D.,* Nils W. Johannesssen, M.D.,† Kurt Espersen, M.D.,‡ Odd Ravlo, M.D.,§
Bente D. Pedersen, M.D.,¶ Per F. Jensen, M.D.,‡ Niels H. Rasmussen, M.D.,# Lars S. Rasmussen, M.D.,#
Tom Pedersen, M.D.,¶¶ Jeffrey B. Cooper, Ph.D.,** Joachim S. Gravenstein, M.D.,††
Bent Chraaemmer-Jørgensen, M.D.,†† Mogens Djerres, M.D., §§ Finn Wiberg-Jørgensen, M.D.,||
Lars Hesslet, M.D., Ph.D.,### Sophus H. Johansen, M.D.†‡

Background: The authors describe the effect of pulse oximetry monitoring on the frequency of unanticipated perioperative events, changes in patient care, and the rate of postoperative complications in a prospective randomized study.

Methods: The study included 20,802 surgical patients in Denmark randomly assigned to be monitored or not with pulse oximetry in the operating room (OR) and postanesthesia care unit (PACU).

Results: During anesthesia and in the PACU, significantly more patients in the oximetry group had at least one respiratory event than did the control patients. This was the result of a 19-fold increase in the incidence of diagnosed hypoxemia in the oximetry group than in the control group in both the OR and PACU (P < 0.00001). In the OR, cardiovascular events were observed in a similar number of patients in both groups, except myocardial ischemia (as defined by angina or ST-segment depression), which was detected in 12 patients in the oximetry group and in 26 patients in the control group (P < 0.03). Several changes in PACU care were observed in association with the use of pulse oximetry. These included higher flow rate of supplemental oxygen (P < 0.00001), increased use of supplemental oxygen at discharge (P < 0.00001), and increased use of naloxone (P < 0.02). The rate of changes in patient care as a consequence of the oximetry monitoring increased as the American Society of Anesthesiologists physical status worsened (P < 0.00001). One or more postoperative complications occurred in 10% of the patients in the oximetry group and in 9.4% in the control group (difference not significant). The two groups did not differ significantly in cardiovascular, respiratory, neurologic, or infectious complications. The duration of hospital stay was a median of 5 days in both groups (difference not significant). An equal number of in-hospital deaths were registered in the two groups. Questionnaires, completed by the anesthesiologists at the five partici-


* Research Fellow, Herlev Hospital.
† Junior Staff Anesthetist, Esbjerg Central Hospital.
‡ Junior Staff Anesthetist, Herlev Hospital.
§ Staff Anesthetist, Odense Hospital.
¶ Junior Staff Anesthetist, Glostrup Hospital.
# Junior Staff Anesthetist, Hillerød Central Hospital.
¶¶ Staff Anesthetist, Glostrup Hospital.
** Associate Professor and Director Anesthesia Technology, Massachusetts General Hospital.
†† Graduate Research Professor of Anesthesiology, University of Florida.
# Chairman, Glostrup Hospital.
 §§ Chairman, Esbjerg Central Hospital.
 || Chairman, Hillerød Central Hospital.
### Professor and Chairman, Odense Hospital.
†† Professor and Chairman, Herlev Hospital.

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Address reprint requests to Dr. Møller: Department of Anesthesia, Rigshospitalet, University of Copenhagen, DK-2100 Copenhagen, Denmark.
pulse oximetry. Despite these successes of pulse oximetry, it did not affect the eventual outcome of anesthesia; thus, our main hypothesis was not confirmed. Must we conclude that pulse oximetry should be rejected or reserved for selected patients? We think not. We assume that a similar assessment of other monitors also would yield data that would allow flexible interpretations. The decisions about pulse oximetry and the employment of many other monitors, however, rest on many factors in addition to the scientific demonstration of utility in a selected patient population. 

The conflicting subjective and objective results of the current study, despite an intense, methodical collection of data from a relatively large population, confirms that measuring the effectiveness of interventions to reduce rare, but important events is practically difficult. Improved methods for evaluation of new standards and monitoring equipment are needed if we are to rely upon more than intermediate outcome measures and subjective assessments to judge the effectiveness of implementing costly practices and technologies.

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References


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