

Evaluation of the Nares and the Ear as a Site for Oximetry Monitoring in Intraoperative Surgical Patients

Redford DT, Lichenthal P, Barker SJ. *Anesthesia and Analgesia* 2004; 98: S92 and S94

Introduction

The digit is the primary site for pulse oximetry sensors. Due to infrequent periods of low peripheral perfusion or movement, however, alternative sensor sites are sometimes useful. These researchers tested the nares and the ear as alternative sensor sites, using the Masimo TC-I ("Tip Clip") connected to a Masimo SET Radical pulse oximeter.

Methods

Following IRB approval, 17 adult surgical patients undergoing general anesthesia were monitored with five pulse oximeter sensors. A Masimo SET TC-I sensor placed on the ear, a Masimo SET TC-I sensor placed on the nares, and a Nellcor MAX-FAST forehead sensor connected to a Nellcor N595 pulse oximeter served as test sensors. A Masimo SET LNOP Adt sensor placed on a digit and connected to a Masimo SET Radical pulse oximeter and a Nellcor D25 sensor placed on a digit and connected to a Nellcor N200 pulse oximeter served as controls. Data from all oximeters were continuously recorded. The bias (mean error) and precision (standard deviation of the error) of the control (digit) sensors were compared to the mean bias and precision of the forehead, ear and nares sensors. E7 (the amount of time during which the error was greater than 7% in stable conditions) was also analyzed. Error was defined as the difference between the ear or nares sensor and the control sensors.

Results

	% Bias	% Precision	% E7
Control Value (pooled digit data)	-0.1 ± 0.9	0.5 ± 0.4	n/a
 Masimo SET [®] TF-I	-0.5 ± 0.7	0.7 ± 0.4	1.0 ± 2.0
 Masimo SET [®] TC-I	-0.2 ± 0.7	1.0 ± 1.0	0.7 ± 1.0
Nellcor MAX-FAST Forehead Sensor	-4.0 ± 7.0	3.0 ± 5.0	13 ± 26

Authors Discussion and Conclusions

"Studies from 12 years ago reported that reflectance oximetry sensors performed poorly.¹ Despite advancements in technology, this study demonstrates similar poor performance of the forehead reflectance pulse oximeter. The MAX-FAST sensor attached to the N595 oximeter demonstrated an unacceptable bias and precision and was in error by more than 7% for more than 30% of the total operative time in 18% of patients."

1. *J Clin Monit.* 1991; 7:102-103