Effect of Hemiparetic Stroke on Pulse Oximetry Readings on the Affected Side

Christine Roffe, MD; Sheila Sills, RGN; Kathryn Wilde, PhD; Peter Crome, MD, PhD

Background and Purpose—Hypoxia is common after stroke, and monitoring by pulse oximetry is suggested in the acute phase. Physical changes on the affected side or intravenous infusions may affect oximeter readings. This study was designed to test whether pulse oximetry recordings are the same on the affected and nonaffected sides in stroke patients.

Methods—Oxygen saturation (Sp O2) and heart rate (HR) were assessed simultaneously in the left and right hands in patients with hemiparetic stroke over a 3-hour period with 2 Minolta Pulsox-3i oximeters attached to the index fingers.

Results—Fifteen patients (53% men; 67% left hemiparesis; mean age, 73 years [SD, 7.5 years]) were recruited. HR and Sp O2 (12 measurements per minute) were monitored. The maximum difference between simultaneous left and right arm readings was 2% Sp O2, HR fluctuated more, but no affected/nonaffected side pattern was seen. Means for each patient of HR and Sp O2 for the affected and nonaffected sides were compared by t tests. Mean Sp O2 was 96% (SD, 1%) on both sides. Mean HR was 81 bpm (SD, 11 bpm) on the affected side and 80 bpm (SD, 10 bpm) on the nonaffected side. There was no significant difference between the 2 sides for either parameter (n=15; P=0.86 for Sp O2 and P=0.91 for HR).

Conclusions—Oximeters can be attached to either the affected or nonaffected side in hemiparetic stroke. (Stroke. 2001; 32:1808-1810.)

Key Words: anoxia ■ hemiplegia ■ hypoxia ■ oxygen ■ stroke management

Patients who have suffered a stroke are prone to respiratory problems for a number of different reasons. These include alterations in the central regulation of respiration,1 sleep apnea,2,3 weakness of the respiratory muscles on the hemiplegic side,4,5 aspiration,7 chest infections,8,9 left ventricular failure,8 and pulmonary emboli.8,9 While routine oxygen supplementation cannot be recommended by current evidence,10 treatment guidelines for acute stroke unanimously support treatment of hypoxia.11,12 The European Ad Hoc Consensus Group suggested that all patients with acute stroke should have their oxygen saturation monitored continuously or at frequent intervals.12 Pulse oximetry allows oxygenation to be monitored continuously and noninvasively.13

Motion artifact can be a major problem in the interpretation of oximeter readings.13-17 In patients with stroke, such problems may be reduced by placing the oximeter probe on the affected side. However, there is no published evidence confirming that readings on the affected and nonaffected sides are comparable. Stroke-related edema, changes in vasomotor tone, and skin temperature may potentially alter oximeter readings on the affected side. Many patients with a stroke will have an intravenous drip in situ within the first few days, and this may also affect readings.13-17

This study was designed to test whether oxygenation, as assessed by pulse oximetry, is the same in the affected and nonaffected sides in hemiparetic stroke patients.
Oximetry Results From the Left and Right Hands of 15 Acute Stroke Patients

<table>
<thead>
<tr>
<th>Patient</th>
<th>HR, bpm</th>
<th>SpO₂, %</th>
<th>Affected Side</th>
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</table>

Values are mean (SD).

Discussion

In hemiparetic stroke patients, the results of pulse oximetry are not affected by the side to which the probe is attached. The pulse oximetry recordings are not affected by the presence of an intravenous infusion running at a standard rate. Pulse oximeters can therefore be attached to either the affected or nonaffected side. Since there is likely to be less movement artifact on the affected side, placement of the oximetry probe on the affected side is recommended.

Acknowledgements

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References


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