plied to a tongue depressor and sucked on (like a lollipop) by the patient for 3–5 min.

In conclusion, heightened awareness of the serious potential complication of methemoglobinemia from the use of topical anesthetics, especially those administered via spray, is particularly important for clinicians involved in endoscopic procedures.

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Commentary

Neil S. Harris,* Lindsay A.L. Bazydlo, and William E. Winter

Arterial blood typically transports about 20 mL of oxygen per 100 mL (or approximately 9 mmol O_2/L). Over 98% of the oxygen is bound to hemoglobin. A common misconception is to regard the P_{O_2} as a direct (i.e., linear) indication of blood oxygenation. However, analysis of fresh cell-free plasma yields a perfectly respectable P_{O_2} value, although the hemoglobin concentration of the sample is zero. The starting point for determining the oxygen content of the blood is oxygen saturation of hemoglobin, or SO_2. Oxygen saturation is best determined by multiwavelength spectrophotometry (oximetry) and is defined as the O_2Hb concentration divided by the sum of the O_2Hb and deoxy-Hb. An oximeter will also give the O_2Hb fraction, or FO_2Hb, which is calculated by dividing the O_2Hb by the sum of all of the hemoglobin fractions (including nonfunctional dyshemoglobins—Met-Hb and CO-Hb—if present). In healthy individuals and in most patients, the oxygen saturation and O_2Hb fraction are nearly identical. If a substantial proportion of dyshemoglobins are present, the FO_2Hb will be lower than the SO_2 because the latter analyzes only the fully functional hemoglobins and intentionally excludes the nonfunctional dyshemoglobins. For this reason, the SO_2 is sometimes referred to as the functional saturation.

Most standard pulse oximeters use only 2 wavelengths to determine hemoglobin saturation. Analysis is based upon an assumption that no dyshemoglobins are present. In the presence of either Met-Hb or CO-Hb, the pulse oximetry oxygen saturation will be incorrect—it will match neither the SO_2 nor the fractional saturation determined by multiwavelength oximetry. There is yet another method to determine oxygen saturation. The P_{O_2} and pH can be used to calculate what is sometimes referred to as the O_2sat. Some variations of this calculation include measurements of bicarbonate and hemoglobin. This principle is used by analyzers that do not have oximetry capabilities and by certain point-of-care devices. The O_2sat will be incorrect in the presence of a dyshemoglobin.

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