

## Clinical picture

QJM

### Treatment of methemoglobinemia resulting in green urine

A 75-year-old male became cyanotic and hypoxic (saturating 83–87% on ambient air) shortly after undergoing transesophageal echocardiography prior to cardioversion for atrial fibrillation. Benzocaine spray was used for local pharyngeal anesthesia. Administration of 100% O<sub>2</sub> by non-rebreather mask did not improve O<sub>2</sub> saturation and arterial blood gases showed a pH of 7.45, partial pressure of carbon dioxide of 33.8 mm Hg, a partial pressure of oxygen of 336 mm Hg and O<sub>2</sub> saturation of 98%. Methemoglobinemia was suspected clinically and methemoglobin level was checked which was elevated at 47.3%. The patient was given methylene blue (1 mg/kg) intravenously and his saturation improved significantly. Subsequent methemoglobin levels were 1.2% and 0.7% at 4 h and 12 h after treatment, respectively, and the patient remained asymptomatic. The treatment resulted in green discoloration of the patient's urine (Figure 1) which normalized gradually over the next 48 h.

Hemoglobin contains iron in the ferrous (Fe<sup>2+</sup>) form. Upon oxidation this ferrous iron is converted to ferric form (Fe<sup>3+</sup>) and results in the formation of methemoglobin. In healthy individuals, methemoglobin level is usually maintained below 2%.<sup>1</sup> Acute methemoglobinemia can occur with exposure to a variety of drugs and toxins. Signs and symptoms are directly related to the degree of methemoglobinemia and levels above 70% are often considered fatal. Intravenous methylene blue is considered the treatment of choice for this condition.<sup>2</sup> Treatment with methylene blue often results in harmless blue–green discoloration of urine, which usually normalizes over next 24–48 h.<sup>3</sup> Benzocaine is a commonly used topical anesthetic agent and benzocaine-induced methemoglobinemia can be rare but a life threatening condition.

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**Figure 1.** Urine bag showing green urine.

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