Green urine after motorcycle accident

Julia Lepenies, Evjenia Toubekis, Ulrich Frei and Ralf Schindler

Department of Nephrology and Internal Intensive Care Medicine, University Clinic Charité, Campus Virchow-Klinikum, Humboldt-University Berlin, Berlin, Germany

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Case

A 16-year-old boy had a severe motorcycle accident with fractures of thoracic vertebrae 2–4, subarachnoidal haemorrhage, spinal haematoma and lung contusion. After referral to our clinic, a laminectomy and a stabilization procedure of the vertebrae were performed. The postoperative course was complicated by respiratory failure and delayed weaning from the respirator due to pulmonary infection. A cerebrospinal fluid fistula was suspected, the patient underwent surgery for placement of a cerebrospinal fluid drainage 10 days after the accident. Sensory and motor functions remained impaired from Th 3/4 downward.

One week after the accident, the urine was noted to be of a very distinctive green colour (Figure 1).

Laboratory tests on admission were normal for serum sodium, potassium, calcium, creatinine, urea, protein, liver enzymes, alkaline phosphatase, gamma-glutamyl transferase, lipase and blood count. The initially elevated bilirubin (5.2 mg/dl) normalized after 4 days. During the onset of the pulmonary infection serum CRP and leukocytes were elevated. The creatinine clearance was 60 ml/min. The urine dipstick was normal, the urine sediment revealed a few crystals but no cellular elements or cylinders. Porphyrins could not be detected in the urine.

The abdominal ultrasound showed normal sized kidneys, an enlarged spleen (14 cm) and was otherwise normal.

Medication included dopamine, methylprednisone, antibiotics (amoxicillin, ciprofloxacin), muscle relaxants and sedatives (midazolam, propofol, fentanyl), low-molecular weight heparin, clonidine, fluids and parenteral nutrition with addition of electrolytes, vitamins and iron. The patient had not received methylene blue.

What was the reason for the discoloration of the urine?
Discussion

The colour of urine may change due to endogenous and exogenous substances. A red colour can be noted with haemoglobinuria, myoglobinuria or porphyria, as well as with several pharmacological substances (e.g. metronidazol, phenacetin, phenytoin).

Green urine may be due to the application of methylene blue or indigo blue, but our patient did not receive these substances at any time. Biliverdin (as an oxidation product of bilirubin) turns the urine into a green colour—in this patient the serum bilirubin levels had already decreased several days before the appearance of the discoloration, and the urine stick for bilirubin and urobilinogen was negative.

There were no signs for a fistula (e.g. rectovesical). There were no signs of an urinary tract infection, all urine cultures were negative. The only remaining possibility was a side effect of one of the drugs given.

The appearance of discoloration of the urine associated with administration of propofol has been described in several case reports [1–4]. The reaction is probably due to a phenolic green chromophore which is conjugated in the liver and excreted in the urine [4]. Propofol is a sedating and muscle relaxing agent, often used for sedation in patients in need of mechanical ventilation. The sedating and muscle relaxing effect is probably due to inhibition of calcium influx into smooth muscle tissue and interaction with receptors for the neurotransmitter gamma-amino butyric acid. It has a high solubility in lipids and is rapidly distributed into tissues. Several metabolites of propofol are excreted in the kidney. Besides discoloration of the urine, propofol may produce other, more serious side effects, especially in paediatric patients. These side effects include cardiovascular (hypotension, bradycardia [5], myocardial ischaemia [6]), neurological (decreased anxiety, sedation, muscle relaxation) and metabolic changes (lactic acidemia [5], hyperlipidaemia). The existence of a ‘propofol-infusion syndrome’ has recently been discussed [7].

Other possible drugs that may lead to green discoloration of the urine are cimetidine, promethazine, amitriptyline, indomethacin or phenyl butazone [8].

After stopping the propofol infusion the green colour of the urine disappeared within 2 days.

Teaching point

Green urine in the setting of an intensive care unit sometimes reflects serious conditions but may be in other cases just an indicator of drug effects.

References