

# Turning green with shock

W.J. Wiersinga<sup>1\*</sup>, D. Limmathurotsakul<sup>2</sup>, A.C. Cheng<sup>3</sup>

<sup>1</sup>Department of Internal Medicine, Academic Medical Centre, University of Amsterdam, the Netherlands, <sup>2</sup>Mahidol-Oxford Tropical Medicine Research Unit, Mahidol University, Bangkok, Thailand, <sup>3</sup>Department of Epidemiology and Preventive Medicine, Monash University, Infectious Diseases Unit, Alfred Hospital, Melbourne, Australia, \*corresponding author: tel.: +31 (0)20-566 91 11, fax: +31 (0)20-697 71 92, e-mail: W.J.Wiersinga@amc.uva.nl

## CASE REPORT

A 65-year-old female rice farmer from north-east Thailand was brought to the emergency room by her family with complaints of fever and mental confusion since one day. At physical examination she was agitated and confused, hypotensive (80/40 mmHg), tachycardic (120 beats/min) and body temperature 38.5°C with warm peripheries. Otherwise, there were no findings suggestive of focal infection. Limited laboratory investigations were performed, which showed a normal leucocyte count, a mild anaemia and acute renal insufficiency (serum creatinine 150 µmol/l). After admission to the ward for intravenous fluid treatment, a urinary catheter was inserted and the patient was found to have green urine (*figure 1*).

## WHAT IS YOUR DIAGNOSIS?

See page 294 for the answer to this photo quiz.

**Figure 1.** *Green urine*



ANSWER TO PHOTO QUIZ (PAGE 291)  
TURNING GREEN WITH SHOCK

## DIAGNOSIS

The combination of discolouration of urine (blue-green), severe hypotension, and an altered consciousness level was suspected to be caused by intoxication with methylene blue. On specific questioning, her family reported her use of 'Marwitt's Wonder Kidney Pills', a non-prescription complementary medicine intended for patients with kidney problems, with methylene blue as one of the active ingredients (*figure 2*). It was unclear as to what dose and for how long she had used this drug. With only supportive treatment the patient made a quick and uneventful recovery and was discharged a few days after admission.

Methylene blue is used for the treatment of methaemoglobinemia<sup>1</sup> as well as a dye for tests of surgical leaks and anastomoses and to stain the parathyroid glands in surgery. However, at high levels, a metabolite of methylene blue induces methaemoglobinemia.<sup>2</sup> The discolouration noted

in the urine is typical, and the intravenous administration of methylene blue is associated with apparent cyanosis and spuriously low oxygen saturations.<sup>1,3</sup> The acute ingestion of more than 4 mg/kg is potentially associated with serious toxicity. Treatment is generally supportive, although for acute ingestion, oral charcoal may prevent absorption. Exchange transfusion may be indicated if methaemoglobin levels are >70%. Overdosage is associated with nausea, abdominal pain, headache, sweating, hypotension, arrhythmias.<sup>3</sup> Caution is required in patients with glucose-6-phosphatase deficiency as methylene blue may cause severe haemolytic anaemia. In addition, methylene blue may also precipitate serotonergic syndrome in patients on SSRIs.<sup>4</sup>

Use of complementary 'herbal' medicines is common in Thailand. Adrenal crisis following discontinuation of herbal 'Yaa chud' or 'Yaa tom', containing dexamethasone, or precipitated by infections are a common problem (Cheng, personal experience). This case furthermore illustrates the potential disastrous side effect of the addition of methylene blue to non-prescription complementary medicine.

**Figure 2.** Marwitt's Wonder Kidney Pills, a non-prescription complementary medicine intended for patients with kidney problems with methylene blue as one of the active ingredients



## REFERENCES

1. Strauch B, Buch W, Grey W, Laub D. Successful treatment of methemoglobinemia secondary to silver nitrate therapy. *N Engl J Med.* 1969;281:257.
2. Lamont AS, Roberts MS, Holdsworth DG, Atherton A, Shepherd JJ. Relationship between methaemoglobin production and methylene blue plasma concentrations under general anaesthesia. *Anaesth Intensive Care.* 1986;14:360.
3. Blass N, Fung D. Dyed but not dead--methylene blue overdose. *Anesthesiology.* 1976;45:458.
4. Khavandi A, Whitaker J, Gonna H. Serotonin toxicity precipitated by concomitant use of citalopram and methylene blue. *Med J Aust.* 2008;189:534.