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A Case of Green Urine after Ingestion of Herbicides

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The development of discolored urine may have many possible causes. Here we present the case of a 76-year-old woman who was admitted after ingesting the inorganic herbicides, mefenacet and imazosulfuron. Her urine color changed to green almost immediately. Since the patient had no specific medication or medical history we considered that the most likely cause of the change in urine color was the ingestion of the herbicides. Spectrophotometric analysis of the urine was conducted and a peak was observed in the green area of the wavelength spectrum. These findings show that mefenacet and imazosulfuron should be considered in the differential diagnosis of green discolored urine.

Key Words : Green Urine; Drug Toxicity; Herbicide

INTRODUCTION

Normal urine is clear and amber colored due to the presence of urochrome, an amorphous pigment[1)]. Variations in color saturation are due largely to differences in urine concentration, but may also be caused by changes in pH, ingested substances and metabolic abnormalities[2)]. It is unusual for urine to develop green discoloration without the addition of either exogenous substances such as medications and food dyes or endogenous pigments such as biliverdin. Here we report a case of green urine hue that developed after the ingestion of herbicides.

CASE REPORT

A 76-year-old woman was admitted to the hospital following the ingestion of approximately 150 cc of inorganic herbicide (proprietary name : Magma® ; mefenacet, imazosulfuron). She wan initially admitted to the local hospital 1 day before being transferred to our hospital. The patient presented to her local hospital with cyanosis of the lips and hands and her urine was noted to be a very distinctive green color (Figure 1). The patient was referred to our hospital because methemoglobinemia was suspected due to the symptoms of cyanosis and green urine. There was no other drug history. She was treated in the intensive care unit. On examination, her vital signs were blood pressure 140/70 mmHg; heart rate, 98 beats/min; a respiratory rate, 18 breaths/min; body temperature 36.6℃ Clinical examination confirmed cyanotic discoloration of her lips, tongue, fingers, and toes and that her urine was a green color.

Laboratory results were as follows: hemoglobin, 12.6 g/dL; total bilirubin 0.8 mg/dL; blood urea nitrogen, 6.4 mg/dL, and creatinine 0.7 mg/dL. Urinalysis revealed a green colored urine with a pH of 7.0, a specific gravity of 1.011, negative for bilirubin and protein and 5-9 red blood cells per high power field. Arterial blood gas analsyis showed a pH 7.42, pCO_2 38 mmHg, HCO_3^- 25 mEq/L, pO_2 of 132 mmHg and an oxygen saturation of 98.8%; the pulse oxymeter was 98% with oxygen supplied via a nasal canula. The urine culture was negative. Because the patient had cyanotic lips and hands, she was treated with methylene blue because methemoglobinemia was suspected. However, her methemoglobin level was normal and further hypoxia was not observed; therefore administration of methylene blue was stopped. After conservative treatment only, the

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Table 1. Causes of green colored urine (2, 8, 9)

Pseudomonas infection	Amitriptyline
Propofol	Methocarbamol
Biliverdin	Indomethacin
Metodopramide	Promethazine
Methylene blue	Cimetidine
Indigo blue	Food colorings

Figure 1. The Patient's urine on admission.

cyanosis of the fingers and toes improved and the urine color returned to normal by the seventh day of admission.

DISCUSSION

Discoloration of the urine may be due to endogenous or exogenous substances. A red colored urine is observed with hemoglobinuria, myoglobinuria or porphyria, as well as drugs including metronidazole, phenytoin and rifampicin[3]. Green colored urine is an uncommon clinical finding that may have several possible causes including medications, dyes or infections (Table 1).

Ehrig et al.[4] reported that blue dyes such as Food Dye and Color Blue Number 1, used for enteral feeding, are possible sources of green colored urine in patients with ulcerative colitis. In addition, there have been many reports on the association of green colored urine with the administration of propofol after surgery[5-7]. Green urine may be due to the application of methylene blue or indigo blue[4, 5], but our patient did not have any history to suggest an explanation for the green colored urine. Bilirubin has also been associated with green urine;

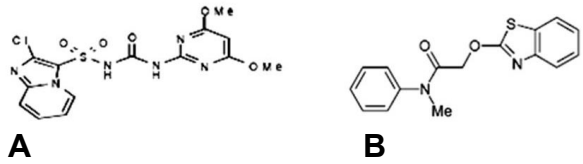

Figure 2. The structures of imazosulfuron (A) and mefenacet (B).

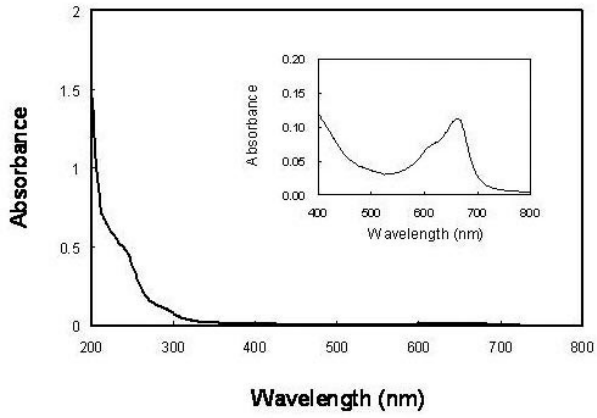

Figure 3. The absorbance spectrometry of the patient's urine. There was a peak in the green color area (630 nm) of the wavelength spectrum. Small box magnified the wave range from 400 to 800 nm.

however, our patient had a normal serum bilirubin level and the urinalysis was negative for bilirubin and urobilinogen. In addition, there were also no signs of urinary tract infection and the urine culture was negative.

We considered the possibility that mefenacet and imazosulfuron (Magma®) were the cause of the green discolored urine. Mefenacet and imazosulfuron are the main ingredients of magma®; these structures are shown in Figure 2. However, we do not know whether these two compoounds caused the green urine or alternatively whether metabolites of the main ingredients in the herbicides, or other components, were responsible for this change. A sample of the patient's urine was sent to a reference laboratory for spectrophotometric analysis, which showed an absorption peak at 630 nm. in the green color In conclusion, green urine in the setting of a patient admitted to the intensive care unit may reflect a serious condition such as methemoglobulinemia. However, the green urine that was observed after ingesting the herbicide Magma was clinically benign area of the wavelength spectrum (Figure 3).

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