CASE REPORT

GREEN URINE AND ALTERED MENTAL STATUS: A CASE OF INTOXICATION

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Green coloured urine is atypical as it usually signifies the presence of an exogenous substance. Several substances in literature have been associated with green urine including propofol, biliverdin, metoclopramide, methylene blue, indigo blue, amitriptyline, methocarbamol, indomethacin, promethazine, cimetidine and food colourings. We present here a case of middle-aged man who presented to our ER with altered mental status and green coloured urine with positive urine toxicology reports for benzodiazepine.

Keywords: Benzodiazepine; Green Urine; Overdose; Toxicology; Emergency Medicine

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INTRODUCTION

Typical urine from a healthy individual is yellowish-brown in colour with no suspended particles or casts. The urine usually derives its colour from a pigment called urochrome.[1] Variation in urine colour can be attributed to concentration / dilutional effect, presence of coloured food or dyes in cooking, ingested substances or metabolic derangements.[2] Green urine is unusual and it usually signifies the presence of ingested substances (including herbicides and propofol), food colours or biliverdin which is a product of haemoglobin degradation.[1,3,4] We report here a case of a middle aged male who presented with green coloured urine that could possibly be related to benzodiazepine intoxication. We did an extensive literature search and did not come across any article attributing benzodiazepines as the cause of green urine.

CASE REPORT

A 64-year-old Pakistani gentleman was admitted to emergency room with complaints of drowsiness, loose stools and vomiting for 1 day. According to the family, the patient was doing well when he developed complaints of loose stools and vomiting after having a cup of tea at his workplace with his friends. Patient had three episodes of vomiting which were not bilious or projectile in nature and contained only undigested food particles.

He also had a complaint of diarrhoea which initially was semisolid in consistency and later became watery. No associated fever, headache, photophobia, neck pain, limb weakness or numbness, skin rash, joint problems or abdominal pain were reported. There was no history of any psychiatric illness in the past. Patient then developed altered mental status and was brought to our hospital.

On arrival in emergency room patient had a pulse of 85/minute, blood pressure was 135/75 mmHg and was afebrile. On examination he was drowsy but arousable and was obeying all commands. He was not icteric. The pupils were constricted and speech was slightly slurred. Power in all four limbs was 5/5 with down going planters. There was no facial deviation. Mild bilateral chest crackles were appreciated. Rest of the systemic examinations was unremarkable. After the patient was catheterized, around 600 ml of green coloured urine drained in the Foley's catheter bag (Figure-1).

Figure-1: Green Urine (right) drained after placing initial Foley's, the urine later turned yellow (left) after administration of IV fluids

Laboratory results were as follows: Haemoglobin: 11.7 g/dl, White blood count: 17,000/mm3 (neutrophils 89.6% and lymphocytes 5.7%), Platelets: 240,000/mm3, Sodium: 144mmol/L, Potassium: 4.5 mmol/L, Chloride: 114 mmol/L, Bicarbonate: 16.8 mmol/L, Blood urea nitrogen: 17 mg/dl, Creatinine: 1.1 mg/dl, Magnesium: 2.0 mg/dl, Calcium: 9.8 mg/dl, INR: 1.04 and random blood sugar was 192 mg/dl. Arterial blood gas revealed: pH of 7.37, PO_2 84, PCO_2 37 and HCO_3 22. Liver function test was unremarkable with ALT 25 u/L, AST 33 u/L and Alkaline phosphatase

60 u/L. Urine detailed examination exhibited green colour urine with occasional white blood cells but no casts or nitrites. Urine toxicology report was also obtained which was positive for benzodiazepine. Serum levels for acetaminophen, salicylates and alcohol were unremarkable. Patient was managed conservatively with intravenous fluids and metoclopramide for nausea/vomiting. Patient was not given flumazenil as he showed significant improvement on conservative management. Patient was observed and monitored closely for any focal neurological deficits. His urine colour changed to normal with the passage of time (Figure-1). He was advised for admission for further work up; however, the family refused as patient had improved clinically within 24 hrs of his arrival in the ER. Ultimately, patient left against medical advice before further diagnostic testing could be pursued.

DISCUSSION

Urine discoloration has been attributed to ingested substances or metabolic by-products of on-going processes within the body. Several substances have been reported in literature for causing green discoloration of urine. Shim *et al*. compiled data from several case reports and articles and reported that green discoloration can be caused by following: Pseudomonas infection, Propofol, biliverdin, metodopramide, methylene blue, indigo blue, amitriptyline, methocarbamol, indomethacin, promethazine, Cimetidine and food colorings.**Error! Bookmark not defined.**

We considered the possibility of drug ingestion including amitriptyline, cimetidine and promethazine but our patient did not report any intake of these medications. Green colour can also be due to Propofol infusion but our patient had no such history.[5–7] Biliverdin, a product of haemoglobin degradation, has also been associated with green urine; however, the patient did not have any clinical evidence of jaundice. Additionally, we also excluded the possibility of exposure to substances such as methylene blue, indigo blue, food colours, mefenacet and imazosulfuron based on history obtained from patient and his family.[3,4,8]

Our patient had positive urine toxicology of benzodiazepine which concurred with patient's presenting signs and symptoms. Metoclopramide is a known cause of green urine and was administered to our patient but not till after the Foley's catheter had been placed and green urine collected. Other known major causes of green urine were ruled out based on clinical presentation, patient history and laboratory investigations. We planned to perform a thorough toxicological investigation along with brain imaging but unfortunately the patient discharged against medical advice. The patient was followed up via telephone and was reportedly doing well. The patient had no history of addictions and we were unable to determine how he received the benzodiazepine due to the patient leaving against medical advice. Nevertheless, we performed a thorough psychiatric evaluation to rule out a suicide attempt. Unfortunately, benzodiazepines remain easily available without monitoring mechanisms in Pakistan.[9,10] Extensive literature review did not present any case that has reported describing benzodiazepines as a cause of green colour urine. To our knowledge, there are two cases describing green urine secondary to Zaleplon which has a pharmacological profile similar to benzodiazepines acting as a full agonist for the benzodiazepine α_1 receptor located on the $GABA_A$ receptor complex in the body.[11]

One case suggested the cause as flumazenil overdose[12] while the other suggested the colour is attributed to indigo carmine in the zaleplon capsules[13] Our patient was managed conservatively without Flumazenil antidote; however, many capsule preparations of benzodiazepines contain colouring agent indigo carmine which forms the capsule shell composition. We ruled out all major known causes that change urine colour but were unable to perform definitive diagnostic tests to determine most likely compound. A likely cause could be that large quantities of small dose capsules can contribute to significant units of indigo carmine leading to change in urine colour and give a false positive result which can be supported by dramatic urine colouration and changing back to yellow colour soon after starting supportive management.

One learning outcome could be that everyone working in acute care settings should be aware that urine discoloration in an acute setting is possibly related to intoxication. The capsule shell dyes can possibly cause green colour urine and this knowledge can serve as a sign of benzodiazepine overdose. It can also help avoid unnecessary investigations and concern in an acute setting.

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