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CASE REPORT

Importance of Early Medical Intervention in Bismuth Subsalicylate Intoxication

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ABSTRACT

Bismuth (Bi) is a metallic element with an atomic number of 83 and a molecular weight of 208.9 daltons. It is found in two valencies (3+ and 5+). Bismuth salts are bismuth subsalicylate (BSS), ranitidin bismuth citrate, colloidal bismuth subcitrate, bismuth vanadate, and bismuth subgallate. Bismuth salts, especially bismuth subcitrate and BSS, are commonly used for the treatment of peptic ulcer, functional dyspepsia, and chronic gastritis. Bismuth intoxication is an emergency situation that should be diagnosed and treated immediately. In databases, case reports about bismuth intoxication are quite rare and in these cases, encephalopathy, nephropathy, osteoarthropathy, gingivostomatitis, and colitis were observed. In our case, we aim to present the importance of a rapid treatment procedure for a patient who took 25 tablets of Bizmopen ® and 375 mg amitriptyline to commit suicide.

Keywords: Bismuth, intoxication, lipid emulsion

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INTRODUCTION

Bismuth (Bi) is a metallic element with an atomic number of 83 and a molecular weight of 208.9 daltons. It is found in two valencies (3+ and 5+). Bismuth salts are bismuth subsalicylate (BSS), ranitidin bismuth citrate, colloidal bismuth subcitrate, bismuth vanadate, and bismuth subgallate.

First, bismuth usage in medical history is in 1773.[1] In the early 1900s, approximately two of every 10 children died before the age of four due to an illness called "Cholera Infantum" which was progressed by diarrhea and upset stomach.[1] The first usage of BSS was for the treatment of Cholera Infantum as in the mixture of "mixture cholera infatum." After the mixture, more researches were started to aim the usage of bismuth's salts. In intestinal tract, all bismuth salts are absorbed <1.[2] Bismuth salts, especially bismuth subcitrate and BSS, are commonly used for the treatment of peptic ulcer, functional dyspepsia, and chronic gastritis.[3,4] Case reports about bismuth intoxication are quite rare and in these cases encephalopathy, nephropathy, osteoarthropathy, gingivostomatitis, and colitis were observed.[3] In our case, a patient, who took 25 tablets Bizmopen® and 375 mg amitriptyline to commit suicide was brought to the emergency room 12 h after taking the tablets. She was treated immediately in the anesthesiology and reanimation intensive care unit (ICU) and without any complications, she was transferred to the internal medicine service. In this case, we aim to emphasize that even though all the laboratory values and physical examination are normal, beginning the treatment rapidly can reduce the acute complications especially about the kidneys and can be lifesaving.

CASE REPORT

A 32-year-old 60 kgs woman had been diagnosed by chronic gastritis after her dyspepsia complaint and started to use bismuth, Bizmopen®, for treatment for 3 months. To commit suicide, she took 20 tablets of Bizmopen® and 375 mg amitriptyline. After 12 h, she was brought to emergency

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service due to vomiting and day time somnolence. It is reported that she was vomited several times before reaching hospital. Moreover, in her history, she was only diagnosed with generalized anxiety disorder and chronic gastritis. After gastric lavage was done, the patient was taken to anesthesiology and reanimation ICU. She was conscious but in somnolence. Her vital signs were as follows: Glasgow coma score: 13–14, blood pressure: 109/72 mmHg, heart rate: 119 bpm, in room conditions SpO_2: 97%, temperature: 36.5°C, and respiration rate 20–25/min. Her arterial blood gas analysis was: (Her test results were; Arteriyel blood gases) pH: 7.39, pCO2: 33, pO_2:85 BE: −3.8, HCO_3^{-1}: 21.6, lactate: 1.1, blood urine nitrogene: 12 mg/dl, creatinine: 0.71, aspartate aminotransferase: 36 U/L, alanine aminotransferase: 40 U/L, Na: 134 mmol/l, K: 4.9 mmol/L, Ca: 8.1 mg/dl, white blood cell count: 7.74 K/l, platelet count: 287 K/L, and INR: 1.1. Hepatitis B surface antigen was non-reactive, hepatitis C virus was non-reactive. The blood bismuth level cannot be evaluated due to the lack of measurement equipment.

Lung sounds were bilaterally equal and there were no rales and rhonchi. On cardiological examination, no murmurs were heard and it was normal sinus rhythm only with tachycardia. Electrocardiography pattern was normal. Abdomen was normal; no organomegaly, no rebound, and defense were found. Light reflex was bilaterally positive. Pupils were isochoric. There was no nystagmus. Meningeal irritation signs were negative. Examination of the cranial nerves was normal. Motor, sense, and cerebellar examination was also normal. Deep tendon reflexes (DTRs) were +++/+++ and Babinski reflexes were -/-. The patient had Foley catheter for about an hour before she was admitted to the ICU and there was 100–150 cc/h urine output and its appearance was normal.

There were not any pathological findings about the general physical examination and laboratory values of the patient. She received 160 cc/h intravenous fluid therapy. Multiple drug intoxication was also considered; thus, 20% intravenosus lipid emulsion of 1.5 mg/kg was infused as a loading dose in 1–2 min, and then, infusion is maintained as 0.25 mg/kg as total 250 ml of fluid is infused. The usage of dimercaptosuccinic acid (DMSA) as an antidote for first 5 days 1800 mg/day and the continual 14 days 1200 mg/day was planned to be used. Without waiting for the failure of the renal functions, the patient was received dialysis treatment for 4 h. On the following days, the patient did not require dialysis. The patient received the treatments for 5 days in anesthesiology and reanimation ICU and there were no problems and acute complications. When the patient was taken to internal medicine service for the complete 19 days antidote therapy, she was conscious and with full-orientation and cooperation.

DISCUSSION

The usage of bismuth for medical treatment is in more demand. Case reports about taking bismuth over the therapeutic dose are still rare. There is no consensus on; side effects, the treatment to toxic dosage, and the dosage causing renal damage. In database, one case reports that high level of bismuth (19 g) cause acute renal failure.[5] On another 6 g bismuth causes irreversible renal damage.[6]

Each tablet of Bizmopen® contains 262 mg BSS. Recommended daily therapeutic dose is 4192 mg/day. The patient in the case took 5240 mg (5.24 g) bismuth. In the observation, it is taken into the consideration that even the doses that are a bit higher than the therapeutic dose can cause renal damage according to the database. For this reason, the treatment was started immediately without waiting for failure of the renal functions and decrease in the urine volume. The patient received intravenous hydration, dialysis, and DMSA as antidote.

The therapeutic dose of tricyclic antidepressants is 1–5 mg/kg. Taking over this dosage may cause acute intoxication. Besides BSS, 375 mg amitriptyline was also taken by the patient. It is thought that the somnolence was due to the amitriptyline and as a treatment 20% IV lipid infusion.

CONCLUSION

As conclusion, easy accessibility to the bismuth salts and the increasing usage would cause intoxication story for much more patients. In case of a bismuth intoxication, the ICU doctor firstly needs to take monitorization, renal function tests, urine production per hour, and arterial blood gas measurements in to consideration. Clinicians should always remember that starting the treatment before renal failure may affect the morbidity and mortality in a positive way for intoxication cases.

Disclosures

Informed Consent: Written informed consent was obtained from all patients.

Peer-review: Externally peer reviewed.

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REFERENCES

1. Bierer DW. Bismuth subsalicylate: History, chemistry, and safety. Rev Infect Dis 199;12(Suppl 1):S3-8. [CrossRef]
2. Slikkerveer A, de Wolff FA. Pharmacokinetics and toxicity of bismuth compounds. Med Toxicol Adverse Drug Exp 1989;4:303–23. [CrossRef]
3. Wagstaff AJ, Benfield P, Monk JP. Colloidal bismuth subcitrate. A review of its pharmacodynamic and pharmacokinetic properties, and its therapeutic use in peptic ulcer disease. Drugs 1988;36:132–57. [CrossRef]
4. Cengiz N, Uslu Y, Gök F, Anarat A. Acute renal failure after overdose of colloidal bismuth subcitrate. Pediatr Nephrol 2005;20:1355–8. [CrossRef]
5. Akinci E, Köylü R, Yortanli M, Gümüş H, Köylü Ö, Altintepe L, et al. Acute bismuth intoxication: Acute renal failure, tonsillar ulceration and posterior reversible encephalopathy syndrome. Hong Kong J Emerg Med 2015;22:121–5. [CrossRef]
6. Erden A, Karahan S, Bulut K, Basak M, Aslan T, Cetinkaya A, et al. A case of bismuth intoxication with irreversible renal damage. Int J Nephrol Renovasc Dis 2013;6:241–3. [CrossRef]