Barium Chloride Poisoning – A Case Report with Gastric, Blood, Serum and Urine Barium Concentration

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Objective: This is a report of a rare case of suicidal, oral barium chloride poisoning, confirmed by the determination of barium concentrations in gastric contents, blood, serum and urine using the ICP-MS (Inductively Coupled Plasma Mass Spectrometry) method. The concentrations were compared with the results obtained from a non-intoxicated person.

Case report: A 39-year-old female (64 kg) chemist was admitted to the Toxicology Department 3 hours after ingestion of 20 g of barium chloride (312.5 mg/kg b.w.). At home she had vomited profusely and collapsed. On arrival, the patient was conscious but confused. She experienced general muscle weakness, resulting in respiratory failure which called for mechanical ventilation. Her blood pressure was 90/50 mmHg, heart rate – 150/min. Gastric lavage was performed. Potassium infusions and a 6-hours hemodialysis were started immediately. During the dialysis procedure, a rapid improvement of the clinical condition was observed. After 25 hours of treatment, the patient was discharged from the hospital at her own request, without any complications. The blood tests performed on admission revealed profound hypokalemia (1.3 mmol/l), slightly elevated creatinine levels (1.24 mg/dl), metabolic acidosis (pH 7.19) with high lactate levels (7.5 mmol/l) and leucocytosis (29.3 G/l). An ECG test revealed ventricular tachycardia 150/min. 3 hours post ingestion, barium concentrations determined using the ICP-MS method were: 20.45µg/ml in serum and 150µg/ml in blood (compared to 12.07µg/ml in serum and 7.15µg/ml in blood in a non-intoxicated person). Elevated barium concentrations were detected – 10500µg/ml and 63500µg/ml in urine and gastric contents respectively (compared to 1.21µg/ml in urine and 0.5µg/ml in gastric contents in a non-intoxicated person). The accuracy of the analytical results was assessed with the use of Certified Reference Material (CRMs).

Conclusions: Barium chloride poisonings are very rare and little is known about their pathophysiology and treatment. In the case under consideration, acute poisoning was confirmed by the presence of elevated barium levels in the analyzed samples, compared with the results obtained from a non-intoxicated person. Despite the profuse vomiting at the initial
stage of intoxication, 3 hours post ingestion, the barium level in gastric contents was still high, requiring aggressive decontamination and magnesium sulfates administration.