



CASE DEFINITION

Barium

Clinical description

Ingestion of certain forms of barium (e.g., barium carbonate or barium fluoride) in toxic amounts leads to gastrointestinal symptoms (e.g., vomiting, abdominal pain, and watery diarrhea). Within 1--4 hours of ingestion, profound hypokalemia develops in certain instances, and potassium levels <1.0 mmol/L are associated with generalized muscle weakness that might progress to paralysis of the limbs and respiratory muscles (1-5).

Barium sulfate is not absorbed when taken by mouth and is therefore commonly used as a contrast agent for radiographic procedures.

Laboratory criteria for diagnosis

- *Biologic*: A case in which an elevated spot urine barium level (>7 $\mu\text{g/L}$) exists (20), as determined by commercial laboratory tests.
- OR-
- *Environmental*: Elevation of barium compounds in environmental samples, as determined by NIOSH or FDA.

Case classification

- *Suspected*: A case in which a potentially exposed person is being evaluated by health-care workers or public health officials for poisoning by a particular chemical agent, but no specific credible threat exists.
- *Probable*: A clinically compatible case in which a high index of suspicion (credible threat or patient history regarding location and time) exists for barium exposure, or an epidemiologic link exists between this case and a laboratory-confirmed case.
- *Confirmed*: A clinically compatible case in which laboratory tests have confirmed exposure.

The case can be confirmed if laboratory testing was not performed because either a predominant amount of clinical and nonspecific laboratory evidence of a particular chemical was present or a 100% certainty of the etiology of the agent is known.

Barium

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Additional resources

1. Sigue G, Gamble L, Pelitere M, et al. From profound hypokalemia to life-threatening hyperkalemia: a case of barium sulfide poisoning. *Arch Intern Med* 2000;160:548-51.
2. Shankle R, Keane JR. Acute paralysis from inhaled barium carbonate. *Arch Neurol* 1988;45:579-80.
3. Choudhury H, Cary R. Concise international chemical assessment document: barium and barium compounds. Geneva, Switzerland: World Health Organization; 2001. Available at www.inchem.org/documents/cicads/cicads/cicad33.htm.
4. Johnson CH, VanTassell VJ. Acute barium poisoning with respiratory failure and rhabdomyolysis. *Ann Emerg Med* 1991;20:1138-42.
5. CDC. Barium toxicity after exposure to contaminated contrast solution---Goias State, Brazil, 2003. *MMWR* 2003;52:1047-8. Available at www.cdc.gov/mmwr/preview/mmwrhtml/mm5243a5.htm.

This document is based on CDC's best current information. It may be updated as new information becomes available. For more information, visit www.bt.cdc.gov/chemical, or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).

March 16, 2005

Page 2 of 2