Death of a Child After Ingestion of a Metallic Charm -- Minnesota, 2006

Lead-based paint remains the most common source of lead exposure for children aged <6 years. However, one report determined that 34% of children aged <6 years with lead poisoning in Los Angeles County had been exposed to items containing lead that had been brought into the home (*1*). These items might include candy, folk and traditional medications, ceramic dinnerware, and metallic toys and trinkets. Exposures to some of these items can result in life-threatening BLLs of ≥100 µg/dL (elevated BLLs are ≥10 µg/dL for children and ≥25 µg/dL for adults) (*2*). In 2004, a child in Oregon had a BLL of 123 µg/dL after ingesting a necklace with high lead content (*3*). The same year, the Consumer Product Safety Commission (CPSC) recalled 150 million pieces of imported metallic toy jewelry sold in vending machines.* Some lead-contaminated items intended for use by children are manufactured in countries with limited government regulation of lead in consumer products (*4*). With the decline in BLLs in U.S. children (*5*), widespread education of the dangers of lead paint, and systematic reduction of lead hazards in U.S. housing, acute ingestion of lead-containing items has become increasingly more common as a source of life-threatening BLLs.

This report describes the death of a child from acute lead poisoning caused by lead encephalopathy after ingestion of a heart-shaped metallic charm containing lead; the charm had been attached to a metal bracelet provided as a free gift with the purchase of shoes manufactured by Reebok International Ltd. On March 23, a voluntary recall of 300,000 heart-shaped charm bracelets was announced by CPSC and Reebok† (Figure). Health-care providers should consider lead poisoning in young children with increased intracranial pressure, unexplained and prolonged gastric symptoms, or a history of mouthing or ingesting nonfood items. Health-care

providers also should warn caregivers against allowing children to mouth any metal objects.

In mid-February 2006, a boy aged 4 years with a previous medical history of microcephaly and developmental delay was brought to a hospital pediatric emergency department in Minneapolis, Minnesota, with a chief complaint of vomiting. Probable viral gastroenteritis was diagnosed, and the boy was administered ondansetron, an antiemetic; his parents were encouraged to increase his fluid intake, and he was released. He returned to the emergency department 2 days later with intractable vomiting, poor oral intake, "sore tummy," and listlessness. He was dehydrated and had normal blood sodium and elevated blood urea nitrogen levels. He received intravenous fluid replacement and was admitted to the hospital.

The next day, about 10 hours after admission, the boy became agitated and combative and exhibited possible posturing. During transport to the radiology department, the boy suffered a respiratory arrest associated with seizure-type activity. He was resuscitated and placed on mechanical ventilation. He was administered a computer tomography (CT) scan of his head and of his chest and radiographs of his abdomen. The CT scan revealed diffuse cerebral edema, and the boy underwent emergent ventriculostomy and decompressive craniotomy. A heart-shaped object was observed on his abdominal radiographs but it was thought to be a radiopaque temperature probe on his body. When the radiographs were examined again, the object was recognized as a foreign body in his stomach, and testing for heavy metal levels was requested.

The next day, a BLL of 180 μg/dL was reported; cerebral blood flow studies indicated no flow to the brain, and the boy met clinical brain death criteria. On the fourth day of hospitalization, the child was removed from life support and died. Upon autopsy, a heart-shaped charm imprinted with "Reebok" was removed from the child's stomach. The mother recognized the object as a charm that came with a pair of shoes belonging to another child whose home her son had visited. The mother was not aware that her son had ingested the charm, and he had no history of ingesting nonfood substances.

One day after the boy's death, a Minneapolis Department of

Regulatory Services inspector examined the child's residence. The inspector identified no lead-paint hazards in the home and only one slightly elevated lead-dust level (260 μg/ft^2) on a window sill (U.S. Environmental Protection Agency [EPA] threshold for windowsill hazard is 250 μg/ft^2). Seven other dust samples were below the EPA threshold.

Acid digestion testing performed on the ingested charm by the Minneapolis Public Health Department Laboratory using EPA protocol 3050[§] determined that the charm consisted of 99.1% lead. CPSC suggests that tests for leaching be conducted on those items containing more than 0.06% lead by weight. A charm similar in size and shape to the one ingested, with Reebok imprinted on it, was obtained by Minneapolis Department of Regulatory Services staff members at an athletic shoe store in Minneapolis and tested by the same laboratory using the same method. Results determined that the charm consisted of 67.0% lead by weight. The same staff member purchased another look-alike charm with a pair of athletic shoes from the Reebok Internet site; this charm was tested by the same Minneapolis laboratory using the same testing method and determined to contain only 0.07% lead by weight.

In Atlanta, Georgia, CDC staff members purchased four pairs of athletic shoes of the same brand, including two pairs with look-alike charm bracelets and two pairs with both charm bracelets and shoelace charms, from local stores and from the company's Internet site; they also obtained a promotional charm bracelet from a different athletic shoe manufacturer. Acid digestion analyses were conducted using either EPA protocol 3050 or NIOSH protocol 7300,[¶] which offers a similar acid-digestion method for measuring lead content; analyses of these items revealed lead contents ranging from 0.004% to 0.044% by weight.

The variation in lead content revealed by the tests in Minneapolis and Atlanta is consistent with previous test results for small, inexpensive metallic jewelry (*6*). The variations in lead content of the charms purchased in Atlanta stores and from the company's Internet site were not as varied as those in Minneapolis, likely indicating different suppliers or production lots.

As the variation in lead content in these products indicates, alternatives to lead are available. Restriction or elimination of nonessential uses of lead in consumer products should be part of a proactive strategy that prevents exposure to these products and is preferable to relying on case finding to identify lead exposure hazards.

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* Available at http://www.cpsc.gov/CPSCPUB/PREREL/prhtml04/04174.html.

† Available at http://www.cpsc.gov/cpscpub/prerel/prhtml06/06119.html.

§ Available at http://www.epa.gov/SW-846/pdfs/3050b.pdf.

¶ Available at http://www.cdc.gov/niosh/nmam/pdfs/7300.pdf.