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Gastrointestinal Injuries From Magnet Ingestion in Children—United States, 2003-2006

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2 figures, 1 table omitted

INGESTION OF NONFOOD OBJECTS, INADvertently or intentionally, is common among young children and also occurs with older children and adolescents.[1-3] Unless the objects are large or sharp, they usually pass through a child's digestive system without health consequences. However, the Consumer Product Safety Commission (CPSC) has become aware of toy products containing small, powerful rare-earth magnets* that pose unique health hazards to children.[4,5] Since 2003, CPSC staff members have identified one death resulting from ingestion of these magnets and 19 other cases of injuries requiring gastrointestinal surgery. This report describes three selected cases and summarizes the 20 cases of magnet ingestion identified by CPSC that occurred during 2003-2006. Caregivers should keep small magnets away from young children and be aware of the unique risks (e.g., volvulus and bowel perforation) that magnets pose if ingested. When evaluating children who have ingested objects, health-care providers should be aware of potential complications if magnets might be involved.

CPSC and the respective manufacturers announced voluntary recalls of Magnetix magnetic building sets by Rose Art Industries, Inc. (Livingston, New Jersey) in March 2006 and of Polly Pocket™ magnetic play sets by Mattel, Inc. (El Segundo, California) in November.[4,5] However, other toys also include magnets. CPSC is working with the ASTM International† toy safety standard (F 963) subcommittee to address hazards associated with toys containing magnets.

Case 1

On November 22, 2005, a boy aged 20 months, who had been in excellent health, awoke several times during the night complaining of stomach pain. During the next 2 days, he ate little, slept more than usual, and had several episodes of vomiting. His parents thought he had symptoms similar to his father's illness the preceding week. On November 24, during the boy's morning and afternoon baths, his father noted red blotches and a bluish tinge to the boy's feet and hands. Concerned about dehydration, his parents offered cool water, which the boy drank readily. He immediately became lethargic, his abdomen became visibly distended, and he exhibited intermittent loss of consciousness. The boy was taken to an emergency department, where he went into cardiopulmonary arrest within minutes of arrival. Resuscitation efforts failed, and the boy died before a definitive diagnosis was made.

A radiograph taken during resuscitation revealed a large object, measuring 30 mm by 6 mm. Because of its size, the object was thought to be outside the patient. However, at autopsy, nine cylindrical magnets, 6 mm in diameter, were found stacked together in his abdomen. The magnets had magnetically joined across two loops of intestine, causing a volvulus (i.e., twisting of the bowel) that compromised the blood supply to the bowel and led to necrosis, perforation, and sepsis. The magnets had become dislodged from an older sibling's toy building set, which included multiple plastic shapes with magnets embedded in the corners and edges. Although the victim had not been permitted to play with this building set, he might have found dislodged magnets in the carpeting of the family playroom.

Case 2

On September 7, 2005, a boy aged 2 years, 6 months, who had been in excellent health, doubled over in pain, began vomiting, and then had diarrhea. The boy seemed to improve through the next week as his vomiting ceased, although his diarrhea and stomach ache continued. On September 15, after drinking a large amount of water, he began protracted vomiting. The next day, the boy's pediatrician diagnosed dehydration and a suspected bowel obstruction; the boy was sent immediately to the local hospital.

Hospital radiographs revealed a rod-shaped object in the boy's abdomen. His mother recognized the object as three magnetic, rod-shaped pieces from his older sibling's building set, which were attached end to end. The boy was transferred to a health-care facility that had a pediatric surgeon. During laparoscopy the next day, one piece, which had perforated the cecum, fell into the peritoneal cavity. That piece was recovered by open abdominal surgery; the remaining pieces were located in the stomach and removed endoscopically. Each piece measured 25 mm by 7 mm. When shown the pieces, the boy called them "candy." He was discharged from the hospital after 1 week.

Case 3

On May 5, 2006, while using his teeth to separate magnetic pieces from a toy building set, a boy aged 5 years, 1 month, inadvertently swallowed one of the pieces. The boy's mother became concerned he might have swallowed a button battery component of the set; she called the boy's pediatrician, who advised her to take him to a local hospital. Radiographs revealed the magnetic piece in the child's stomach. Doctors advised the mother that the piece would probably pass normally but that she should monitor the child's stool for up to 5 days. Two days later, the boy told his mother that he had swallowed

another toy, a small metal ball; this did not concern her.

By May 18, the mother reported that the magnet and metal ball had not passed; the child's pediatrician ordered another radiograph. Imaging-center staff members reported finding two metal objects stuck together farther along the intestines and advised that they would probably pass naturally. However, on May 24, the pediatrician ordered another radiograph, which showed that the objects had not moved. The next day, the mother informed the pediatrician that she had learned of a fatality that occurred after ingestion of magnets. After consultation with specialists on May 26, an endoscopy was scheduled for May 31. On May 30, the boy began vomiting and was taken to the specialist's hospital and admitted. During endoscopy on May 31, the toy pieces could not be removed, and surgery was required. The surgeon removed two disc-shaped magnets, each 10 mm in diameter, from the boy's large intestine and a steel ball, also 10 mm in diameter, from the small intestine and resected the affected bowel. The patient was discharged on June 2.

Summary

Building sets and toys with powerful rare-earth magnets have been marketed for use by children as young as 3 years. Among the 20 identified cases of magnet ingestion injury, the patients ranged in age from 10 months to 11 years, 6 months (mean: 5 years, 6 months; median: 4 years, 9 months–5 years); 16 (80%) of the patients were aged ≥3 years. Boys accounted for 16 (80%) of the patients. One fatality caused by volvulus, bowel necrosis, and sepsis was identified. Diagnoses in 15 (75%) of the cases included bowel perforations; bowel obstruction and peritonitis each were cited in four cases, and volvulus was cited in three cases. Of the 14 cases for which such data were available, hospital stays ranged from 3 to 19 days (mean: 8.7 days); at least five patients required intensive care.

Among the 20 patients, two children each swallowed 15 magnets; the other 18 children swallowed from one (plus a nonmagnetic metal piece) to nine magnets. In 12 cases, magnets had been dislodged from toy pieces; in three cases, entire magnetic pieces were swallowed intact. Ten children swallowed magnets from their own toys, three swallowed magnets from an older sibling's toy, and three swallowed magnets from toys at day care facilities or school. At least five of the children swallowed magnets or magnetic pieces intentionally, including two who thought they were candy and one who swallowed three magnets on a dare. Five children had potentially relevant conditions, including autism, attention-deficit/hyperactivity disorder, developmental delays, and neurologic disorder.

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CDC Editorial Note: Recent improvements in manufacturing processes have made small, powerful magnets inexpensive and readily available, increasing the potential for exposure of children to magnets in toys and other products. Ingestion of multiple magnets, or ingestion of one magnet and a metal component attracted to magnets, poses a unique health hazard.[6,7] Although these magnets generally are small enough to pass through the digestive tract, they can attach to each other across intestinal walls, causing obstructions and perforations. Initial signs and symptoms of injury are nonspecific, leading to delayed diagnosis and greater injury. Even when caregivers know a child has swallowed magnets, they might assume that such small pieces will pass normally. On radiologic examination, a health-care provider cannot ascertain whether objects swallowed are magnetic and whether they are in separate sections of the gastrointestinal tract with tissue between them. To aid with diagnosis, a compass might be passed close to the abdomen to determine whether an unidentified object in the bowel is magnetic.‡ Once magnetically attached across bowel walls, magnets are unlikely to disengage spontaneously.

Building sets and other toys containing magnets pose a substantial hazard to children who commonly mouth objects. Manufacturers of any consumer product containing magnets should take precautions to keep the magnets in their intended positions within plastic pieces and should consider making larger plastic pieces to minimize the likelihood of ingestion. Similar injuries have resulted from ingestion of magnetic beads, jewelry, and homeopathic aids.[8,9]

Caregivers should keep products with magnets out of environments where children aged <6 years are playing and be aware of the unique risks if ingested. Magnets should never be used to emulate tongue or lip piercing. If caregivers suspect a child has ingested a magnet, they should seek health care promptly. Caregivers also should be aware that children might be reticent to admit ingestion or unable to describe what they have ingested. Delays in diagnosis and treatment can lead to serious or fatal outcomes.

Additional information regarding toy hazard recalls is available at http://www.cpsc.gov/cpscpub/prerel/category/toy.html. Information on product recalls from CPSC and five other federal agencies is available at http://www.recalls.gov.

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*Commonly neodymium iron boron or samarium cobalt magnets.
†Originally known as the American Society for Testing and Materials.
‡The patient must be in an area clear of magnetic fields (e.g., computer monitors or electronic equipment).

Missed Opportunities for Earlier Diagnosis of HIV Infection—South Carolina, 1997-2005

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2 tables omitted

IN SEPTEMBER 2006, CDC PUBLISHED REvised recommendations for human immunodeficiency virus (HIV) testing in health-care settings to (1) increase early detection of HIV infection by expanding HIV screening of patients and (2) improve access to HIV care and prevention services (e.g., by conducting screening in locations such as emergency departments and urgent-care facilities, where persons who do not otherwise access HIV testing seek health-care services).[1] HIV screening is now recommended for patients aged 13-64 years in all health-care settings after patients are notified that testing will be performed unless they decline (opt-out screening). This represents a substantial change from earlier recommendations to (1) offer HIV testing routinely to all patients only in health-care settings with high HIV prevalence and (2) conduct targeted screening on the basis of risk behaviors for patients in low-prevalence settings.[2] This report examines HIV and acquired immunodeficiency syndrome (AIDS) case reporting in South Carolina before the 2006 recommendations were published. During 2001-2005, a total of 4,315 cases of HIV infection were reported in South Carolina. Of these, 41% were in persons (referred to as late testers) in whom AIDS was diagnosed within 1 year of their initial HIV diagnosis.*[4] Of these late testers, 73% made a total of 7,988 visits to a South Carolina health-care facility during 1997-2005 before their first reported positive HIV test. The diagnoses reported for 79% of these visits were not likely to prompt HIV testing under a risk-based testing strategy. These findings suggest that routine, opt-out HIV screening of all patients in health-care settings, rather than risk-based HIV testing, might result in substantially earlier HIV diagnoses in South Carolina.

HIV/AIDS cases have been reportable by patient name in South Carolina since 1986. This analysis used data from the South Carolina HIV/AIDS Reporting System (HARS) for 2001-2005 and included date of first HIV-positive test, date of AIDS diagnosis, and state of residence. Data quality from HARS exceeds CDC minimum standards on reporting timeliness (95% of cases reported within 6 months of a diagnosis) and completeness of reporting (98%, based on a comparison with other data sources) (South Carolina Department of Health and Environment Control [DHEC], unpublished data, 2005).

Since 1996, state law has required that the Office of Research and Statistics (ORS), South Carolina Budget and Control Board receive reports on all diagnoses (classified by *International Classification of Diseases* [ICD] codes) from all emergency departments, hospital inpatient facilities, ambulatory-care facilities, and outpatient surgery facilities within the state. The health-care data for this report were supplied by 60 emergency departments, 62 inpatient facilities, 63 ambulatory-care facilities or outpatient surgery facilities, and 19 free medical clinics in the state, and represent visits that occurred during 1997-2005. ICD diagnoses were grouped into two categories: (1) diagnoses not suggestive of HIV infection and unlikely to have prompted an HIV test (e.g., hypertension, diabetes, and constipation) and (2) diagnoses suggestive of HIV infection that should have prompted an HIV test (e.g., sexually transmitted diseases, symptoms suggestive of acute retroviral syndrome,[5] intravenous drug use, and diseases possibly or probably related to HIV infection[6]).

Data from HARS and ORS were linked using several identifiers, including patient name, date of birth, sex, race/ethnicity, and county of residence. This use of the data was approved by DHEC and the ORS Data Oversight Committee. The data were matched in a secured location by authorized persons who were trained in HARS security and confidentiality guidelines. All identifiers were removed from the analysis dataset provided to investigators, who also signed confidentiality agreements.

During 2001-2005, a total of 4,315 persons with HIV infection in South Carolina were reported to HARS, of whom 1,784 (41.3%) were late testers, including 710 (16.5%) who had AIDS diagnosed within 30 days of their initial HIV diagnoses. Women were less likely than men to be late testers; other demographic and risk characteristics of late testers were similar to those of persons reported to HARS who did not have onset of AIDS within 1 year of their HIV diagnoses. Of the 1,784 late testers, 1,302 (73.0%) had at least one documented visit to a South Carolina health-care facility during 1997-2005 and before the reported date of HIV diagnosis.

A total of 7,988 health-care visits were recorded for the 1,302 late testers who had previously visited a health-care facility. Information on transmission category indicated that 441 (33.9%) of these 1,302 persons were identified as injection-drug users or men who have sex with men, persons with high-risk practices that should have prompted HIV screening if risk histories had been elicited during the health-care visits. However, diagnoses reported for 6,277 (78.6%) of these visits were not likely to prompt an HIV test. Of the 7,988 visits, 6,303 (78.9%) were to emergency departments, 982 (12.3%) to inpatient settings, 594 (7.4%) to outpatient facilities, and 109