

U.S. Consumer Product Safety Commission

LOG OF MEETING

SUBJECT: "High-Powered Magnet Ingestions by Children" – Presentation by the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN)

DATE: June 5, 2012

TIME: 3:00 PM - 4:00 PM.

PLACE: CPSC, Bethesda, MD

ENTRY SOURCE: Lori E. Saltzman, CPSC Health Sciences

COMMISSION REPRESENTATIVES: see attached list

NON CPSC REPRESENTATIVES: see attached list

SUMMARY:

The meeting was requested by NASPGHAN. Jay Howell (CPSC) and Monica Garcia (CPSC) opened the meeting by discussing the rules of the public meeting and restrictions placed on the CPSC staff with respect to anti-lobbying. As government employees, CPSC staff is prohibited from encouraging or supporting grass roots lobbying of Congress. NASPGHAN is in Washington D.C for the purpose of addressing members of Congress on June 6 about their concerns with high-powered magnet ingestions. CPSC staff would listen to the presentations by the physicians of their first hand experiences treating children and would engage in information gathering discussions as appropriate.

After introductions, the meeting followed the agenda provided by NASPGHAN (see attached). The presentations by the pediatric gastroenterologists included a discussion of their interest in this topic, a case presentation, clinical presentations of children who ingested high-powered magnets and information on serious long term health consequences of the internal injuries and corrective surgeries, an informal survey conducted by the pediatric gastroenterologists, use of the Agency's NEISS (National Electronic Injury Surveillance System) data, collaboration efforts with the American Academy of Pediatrics (AAP), educational efforts by NASPGHAN, and future plans.

After the presentations, there was a brief dialogue between the Health Sciences' staff and the presenters, which included questions by the staff about techniques used to retrieve the magnets, anatomical areas where magnets have been located, and coatings found on the magnets.

Packets of written materials provided by NASPGHAN are attached.

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High-Powered Magnet Ingestions by Children

Presentation to the U.S. Consumer Product Safety Commission
by the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN)
June 5, 2012, 3:00-4:00 pm

Agenda

- 3:05 – 3:15pm **Opening Statement and Introduction of NASPGHAN Representatives**
Maria Oliva-Hemker, M.D.
NASPGHAN Public Affairs and Advocacy Committee Chair
Johns Hopkins School of Medicine, Johns Hopkins Children's Center, Baltimore, MD
- 3:15 – 3:20pm **Case Presentation**
Ian Leibowitz, M.D.
Inova Fairfax Hospital for Children, Fairfax, VA
- 3:20 – 3:25pm **Spectrum of Clinical Presentations**
Marsha Kay, M.D.
Cleveland Clinic, Cleveland, OH
- 3:25 – 3:40pm **Physician Survey Data Presentation**
A. Robert Noel, M.D.
Louisiana State University Health Science Center, Children's Hospital of New Orleans,
New Orleans, LA
- 3:40 – 3:50pm **National Electronic Injury Surveillance System Data Presentation**
Mazen Abbas, M.D.
Walter Reed National Military Medical Center, Washington, DC
- 3:50 – 3:55pm **Collaborations with American Academy of Pediatrics (AAP)/NASPGHAN Magnet Podcast**
Mark Gilger, M.D.
Texas Children's Hospital, Houston, TX
- 3:55 – 4:00pm **Overview of NASPGHAN Awareness and Educational Efforts and Closing Remarks**
Kathleen Schwarz, M.D.
NASPGHAN President
Johns Hopkins School of Medicine, Johns Hopkins Children's Center, Baltimore, MD

High-Powered Magnet Ingestions by Children

Presentation to the U.S. Consumer Product Safety Commission
by the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN)
June 5, 2012, 3:00-5:00 pm

NASPGHAN Participants

Mazen Abbas, D.O., M.P.H.
Walter Reed National Military Center
Bethesda, MD

Jennifer Woo Baidal, M.D.
Boston Children's Hospital
Boston, MA

Camille Bonta, M.H.S.
NASPGHAN Washington Representative
Washington, DC

Jennifer Dotson, M.D., M.P.H.
Nationwide Children's Hospital
Columbus, OH

Mark Gilger, M.D.
Texas Children's Hospital
Houston TX

Roberto Gugig, M.D.
Children's Hospital Central California
Madera, CA

Sanjiv Harpavat, M.D.
Texas Children's Hospital
Baylor College of Medicine
Houston, Texas

Maria Oliva-Hemker, M.D.
Johns Hopkins School of Medicine
Johns Hopkins Children's Center
Baltimore, MD

Marsha Kay, M.D.
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Cleveland, OH

Amethyst Kurbegov, M.D.
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Jose Armando Madrazo de la Garza, M.D.
Instituto Mexicano del Seguro Social
Universidad Nacional Autonoma de Mexico
Mexico, City

Amy Manela
NASPGHAN Foundation
Director, Public Health Education Initiatives
Potomac MD

R. Adam Noel, M.D.
Louisiana State University Health Science Center
Children's Hospital of New Orleans
New Orleans, LA

Regino Gonzalez-Peralta, M.D.
University of Florida
Gainesville, FL

Bryan Rudolph, M.D.
Children's Hospital at Montefiore
Einstein School of Medicine
Bronx, NY

Kathleen Schwarz, M.D.
Johns Hopkins School of Medicine
Johns Hopkins Children's Center
Baltimore, MD

John Snyder, M.D.
Children's National Medical Center
Washington, DC

Margaret Stallings
Executive Director, NASPGHAN
Flourtown, PA



About NASPGHAN

Incorporated in 1972, The North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN), with more than 1500 members, is the leading society in the field of pediatric digestive diseases.

NASPGHAN's mission is to improve the quality of care and health outcomes for infants, children and adolescents with disorders of the gastrointestinal (GI) tract, the liver and nutritional conditions by promoting advances in clinical care, research and education. NASPGHAN strives to be the effective voice for pediatric digestive health.

NASPGHAN has succeeded because its diverse, yet cohesive membership, along with volunteers, staff, and alliances with other interested organizations, responds to the needs of the pediatric gastroenterology community by providing a wide variety of programs and services.

About NASPGHAN Members

Pediatric gastroenterologists are physicians who have received training in the field of pediatrics followed by subspecialty training in the care of children with digestive disorders and nutritional problems. Examples of some of these diagnoses include abdominal pain, diarrhea, constipation, vomiting, gastroesophageal reflux disease, celiac disease, gastrointestinal bleeding, Crohn's disease, ulcerative colitis, hepatitis, biliary atresia, pancreatitis and obesity.

Pediatric gastroenterologists also receive specialized training in endoscopic procedures such as upper GI endoscopy, flexible sigmoidoscopy and colonoscopy, as well as performance of procedures including esophageal and rectal manometry and liver biopsy. NASPGHAN physicians represent a diverse spectrum of health care specialists, from academic faculty and private practitioners to physician scientists.

Research

To enhance the body of knowledge that ultimately leads to improved patient outcomes, NASPGHAN and the NASPGHAN Foundation (www.naspghanfoundation.org) encourage and support the research endeavors of physician scientists and clinical investigators seeking solutions and cost-effective, pragmatic approaches to problems faced by children with digestive diseases.

Patient Education and Advocacy

Through the NASPGHAN Foundation and NASPGHAN's patient website (www.gastrokids.org), reliable medical information is provided to patients and families. The NASPGHAN Foundation has successfully launched several disease-specific Digestive Health for Life™ educational campaigns that target both health professionals and the public. Diseases targeted by these educational campaigns include: gastroesophageal reflux disease, celiac disease, inflammatory bowel disease, eosinophilic esophagitis, and obesity.

Professional Education

NASPGHAN (www.naspghan.org) provides a full range of educational opportunities for pediatric gastroenterologists, pediatric gastroenterology nurses and allied health professionals, including an annual Scientific Meeting and robust Postgraduate Course. Every four years, NASPGHAN participates with its sister societies in Latin America, Asia and Europe in the World Congress of Pediatric Gastroenterology, Hepatology and Nutrition. NASPGHAN holds accreditation with commendation from the Accreditation Council for Continuing Medical Education.

Scientific and Professional Publications

In an effort to keep the larger gastroenterology and pediatrics community abreast of advances in pediatric digestive diseases, NASPGHAN, in partnership with the European Society for Gastroenterology, Hepatology and Nutrition (ESPGHAN), publishes the highly respected *Journal of Pediatric Gastroenterology and Nutrition (JPGN)*. Through a rigorous evidence-based process, NASPGHAN is also involved in preparing clinical practice guidelines, which are published in JPGN and related scientific journals.

Dear NASPGHAN colleague:

As you may know, there have been a significant number of reports of neodymium magnet ingestions by infants and children, and these ingestions can lead to intestinal perforations and surgery. NASPGHAN is trying to ascertain the **prevalence and outcome** of these magnet ingestions, so that we can educate our physician members, the public, and lawmakers as to their hazard. We are conducting a research study which involves a survey asking for your demographic information and information on any cases of magnet ingestions that you or any of your colleagues have managed.

Please take the time to fill out this survey. If you have NOT been involved in a magnet ingestion case, the survey will take under 5 minutes to fill out. If you HAVE been involved in such cases, we estimate it will take approximately 5 minutes per case. Your participation is encouraged but voluntary, and we will remove your identifying information from the data prior to analysis.

Amazon gift certificates will be given to three members who complete the survey (determined at random).

Thanks for your help,

Kathy Schwarz, NASPGHAN president
Athos Bousvaros, NASPGHAN president-elect
Petar Mamula, NASPGHAN endoscopy committee
Mark Gilger, NASPGHAN advocacy committee
Maria Oliva-Hemker, NASPGHAN advocacy committee
R. Adam Noel, NASPGHAN member at large, Principle investigator

Principle Investigator Contact Information:

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Rare Earth Magnet Ingestion Survey

Part I Demographic Information

- 1) Last Name _____ First Name _____
- 2) Email address _____ 3) State where practice is located _____
- 4) How long have you practiced at this location? Years _____ Months _____
- 5) Are you a pediatric gastroenterologist who has provided care in the last 5 years (either as a fellow or practicing pediatric gastroenterologist)? Yes _____ No _____ (if no stop survey if yes continue with question 6)
- 6) How long have you been practicing pediatric gastroenterology
- A. Currently in training (clinical or research fellow)
 - B. 5 years or less after completing fellowship
 - C. 6-10 years in practice following fellowship
 - D. 11 to 20 years
 - E. more than 20 years
- 7) How would you characterize your clinical practice setting?
- A. Solo practice
 - B. Multispecialty group practice
 - C. Hospital affiliated pediatric GI practice.
 - D. Academic medical center based pediatric GI practice
- 8) Besides yourself, are you aware of **anyone in your practice** who has been involved in the evaluation and/or management of an ingested magnet foreign body in the last 10 years?
- A. Yes
 - B. No
- 9) Have you **personally** been involved in the evaluation and/or management of one or more than one ingested magnet foreign bodies in the last 10 years? Please count any cases you were involved as a **GI fellow or attending physician**, not as a resident.
- A. Yes
 - B. No

If answer to question 8 is YES, please proceed to next page.

If answer to question 8 is NO, then STOP survey.

Part II Magnet Ingestion time prevalence information

10) Have you been involved in any magnet ingestions in the past 10 years? ____yes ____no
If the answer to 10 is no then stop questionnaire at this point

11) How many rare earth foreign body ingestions have you managed in the following time frames?

- A. _____ ingestions in past year
- B. _____ ingestions between 1 to 3 years ago
- C. _____ ingestions between 3 to 5 years ago
- D. _____ ingestions between 5 to 10 years ago

Part III Individual ingestion data (fill out 1 sheet per ingested Magnet Case)

1) What year did this ingestion occur?

- A. 2012
- B. 2011
- C. 2010
- D. 2009
- E. 2008
- F. Before 2008

2) Gender of patient

Male ____
Female ____

3) Age of patient ____ years ____ months

4) Race or ethnicity of patient

- A. White
- B. Black
- C. Hispanic
- D. Asian
- E. Other _____

5) What was your involvement in this case?

- A. Primary Care Taker
- B. Attending associated with case but not primary
- C. Pediatric Trainee (fellow)
- D) Consulting pediatric Gastroenterologist

6) Intervention

- A. Evaluation and /or Observation at your institution (go to question 9)
- B. Endoscopy only (go to question _____)
- C. Surgery only (go to question _____)
- D. Endoscopy and Surgery (complete rest of questionnaire)
- E. Other Intervention (Lavage, Golytely ETC) (go to question 28)

7) Were there any risk factors for ingestion of the magnets?

- A. Psychiatric Disorder
- B. Developmental Disorder
- C. Peer Pressure (dare)
- D. Pretend body art or piercing
- E. Infant or Toddler
- F. Other (_____)

8) What was the time period between reported ingestion and endoscopic or surgical intervention?

- A. 0 -12 hours
- B. 13-24 hours
- C. 25-36 hours
- D. 37-48 hours
- E. Longer than 48 hours

9) What was the reason for no intervention at your institution?

- A. No magnets were identified on evaluation
- B. The patient was determined to not require endoscopic intervention
- C. The patient was transferred to another facility for endoscopic removal
- D. The patient required surgical intervention and was transferred to another
- E. A colleague of mine (adult GI) performed the endoscopy.
- F. A colleague of mine (pediatric GI) performed the endoscopy
- G. Other reason for no intervention at you institution please describe below

Reason: _____

If the answer to question 9 is E or F, **please ask your colleague to fill out this survey**

Part IV Diagnosis

10) Was a radiograph done?

- A. Yes
- B. No (go to Part V)

11) What type of radiograph?

- A. Abdominal Film single view
- B. Abdominal film multiple views
- C. Chest radiograph
- D. Other _____

12) Location of Magnets on Radiograph (Circle all that apply)

- A. Esophagus
- B. Stomach
- C. Duodenum
- D. Small intestine past duodenum but proximal to terminal ileum, IC valve Cecum
- E. Terminal ileum, IC valve, Cecum
- F. Colon past cecum
- G. Other _____

13) Were Serial x-rays done as surveillance to help determine the need of endoscopic or surgical intervention?

- A. Yes
- B. No

14) If radiograph was not the method of identifying the ingested method, how were they identified?

- A. At endoscopy
- B. At surgery
- C. Other _____

Part V Endoscopic Intervention

If Endoscopy was not performed skip the next section and proceed to Part VI

15) Type of Endoscopy (Circle all that apply)

- A. Upper Endoscopy (EGD) only
- B. Enteroscopy (distal to ligament of trietz)
- C. Colonoscopy
- D. Other _____

16) Did you identify any magnets during the endoscopic procedure?

- A. Yes
- B. No

17) Did you remove any magnets during the endoscopic procedure?

- A. Yes
- B. No (go to question 22)

18) If you removed any magnets from the patient during the procedure, where were those magnets found:

- A. Esophagus
- B. Stomach
- C. Duodenum
- D. Proximal small intestine (beyond the duodenum)
- E. Ileum
- F. Colon

19) What device(s) were used to remove magnets? (Circle or list all that apply)

- A. Snare with net (Roth net)
- B. Snare without net
- C. Grasping forceps (alligator or other hinged jaw forceps)
- D. Wire basket
- E. Multiple prong forceps
- F. Other _____

20) If you removed magnets during this procedure, how many magnets were removed during this endoscopy session?

- A. 1
- B. 2
- C. 3
- D. 4-10
- E. More than 10 (How many?_____)

21) What was the outcome of the endoscopy?

- A. No magnets found
- B. Endoscopic removal of all magnets no complications.
- C. Endoscopic removal unsuccessful – all or some magnets left in GI tract
- D. Endoscopic removal of magnets successful but complicating lesion noted requiring surgery
- E. Endoscopic removal of magnets successful but complicating lesion noted requiring further Endoscopic intervention (_____)
- F. Other _____

22) What was the short term outcome (within 7 days) post endoscopy?

- A. Patient improved, required no additional intervention
- B. Patient required abdominal surgery to remove magnets
- C. Patient required abdominal surgery for other complication
- D. Patient did not require surgery but required prolong hospitalization for other reasons

23) What lesions were noted at endoscopy?

- A. No lesions noted
- B. Mucosal erythema or shallow erosion
- C. Deep pressure lesion but not perforation
- D. Perforation or fistula noted
- E. Other _____

Part VI

If no surgery was performed skip this section and go to question 29

24) What type of surgical intervention was performed?

- A. Laparotomy
- B. Thoracotomy
- C. Laparoscopy
- D. Other

25) Were magnets removed at surgery?

- A. yes
- B. No go to question 27

26) How many magnets were removed at surgery?

- A. 1
- B. 2
- C. 3
- D. 4-10
- E. More than 10 (How many? _____)

27) What was type of surgical intervention was done? (Circle all that apply)

- A. Magnet removal
- B. Single perforation or fistula repair
- C. Multiple perforation or fistula repair
- D. Bowel resection
- E. Other _____

28) What was the short term outcome (within 7 days) post surgery?

- A. Patient improved, required no additional intervention
- B. Patient additional surgery for other reasons
- C. Patient did not require surgery but required prolong hospitalization for other reasons

29) What was the long term outcome of this case?

- A. Patient did well no further intervention
- B. Patient needed follow up endoscopy for lesions noted during original procedure and then no other medical interventions were needed
- C. Patient require long term care secondary to complications from magnet ingestion
- D. Other _____

Thank you for completing this Survey

Please indicate if you participated in the initial informal pediatric GI bulletin board survey in April 2012 Yes _____ No _____

Clinical Research Application

Protocol

Abstract and Details

5/20/2012

Protocol Abstract

This is a survey of pediatric gastroenterologists belonging to North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) about their managed cases of ingested neodymium magnet. This survey has been approved by the executive council of NASPGHAN for distribution to its members using survey monkey. The purpose of this survey is to obtain accurate data on the prevalence and morbidity associated with neodymium magnet ingestions in pediatric patients. Reports of neodymium magnetic ingestions surfaced in 2002. From 2003 to 2006, 20 cases of children with magnet ingestion and injury were reported by the Center for Disease Control. The U.S Consumer Products Safety Commission (USCPSC) issued a warning in 2007, after it documented one death of a child following ingestion of such magnets, as well as 33 other cases of injury. In 2008 the first "magnet ball cube toy" the "NeoCube" was developed followed by the "Buckyball" in 2009. These adult desk toys became very popular and increased the exposure to neodymium magnets. Each unit of the neodymium magnet has about 125 to over a 1000 magnetic balls. An informal survey of NASPGHAN members in April 2012 identified more than 80 magnet ingestions, requiring 29 endoscopies, 27 surgeries, and 28 bowel perforations. Because of this apparent increase in magnet ingestions the NASPGHAN executive board requests a formal study done prior to developing an official position regarding magnet ingestion. The survey will test the null hypothesis that prevalence of magnet ingestions is not increasing with time and that time to intervention and removal does not affect outcomes. This survey will provide more structured data sets than the present collection of case reports to assess the impact that these neodymium magnets has on the health of children. This information is essential for the education of the public, physicians and for making public policy.

Principal Investigator

Robert Adam Noel MD, Associate Professor of Pediatrics, Pediatrics Gastroenterology, Children's Hospital of New Orleans,

Principal Investigator's qualification and experience

Dr. R. Adam Noel is an Associate Professor in Pediatric Gastroenterology and Nutrition at LSUHSC New Orleans. He is the Director of Endoscopy at the Children's Hospital of New Orleans practicing academic clinical pediatric gastroenterology since 1993. He is currently the media spokesperson on magnet ingestions for the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN), He is a recipient of the NASPGHAN Fellowship Research Award and the NASPGHAN Young Investigator Award. Dr. Noel has ten journal publication, two text book chapters and sixteen abstracts presented at National meetings.

Co-investigator

Charles Otu-Nyarko MD, Fellow, Pediatrics Gastroenterology.

Children's Hospital of New Orleans.

Protocol Title

National Survey of Neodymium Magnets ingestion in Children

Duration of study

The anticipated start date of the study is 5th May 2012. The expected completion will be May 2013. The length of an individual's participation will last approximately 30minutes to 45 minutes.

Purpose of study

Primary Objective

To accurately identify the prevalence and morbidity associated with the ingestions of neodymium magnets in children in the United States over **the past 10 years** .

Secondary objectives

1. To evaluate physician assessment and methods of intervention in children who have ingested magnets.
2. To identify the risk factors associated with ingestions, populations at risk and what factors are associated with different outcomes.

Rationale

We noticed an increase in magnetic ingestions during the first 4 months of 2012 in a children's hospital in New Orleans. Secondary to this observation we asked members of NASPGHAN about cases seen in the past 2 years. This informal survey answered by 33 pediatric gastroenterologists reported 84 cases. 33 of these cases had a successful endoscopy, 6 had unsuccessful endoscopies, and 27 patients had surgeries with 28 perforations and 3 bowel resections reported. Because of this initial data indicating the existence of a potential health issue to children, the North American Society of Pediatric Gastroenterology Hepatology and Nutrition (NASPGHAN) requested an official survey of questions recommended by their executive counsel. This survey was generated as in response to finding the true prevalence and morbidity associated with neodymium magnet ingestions. This research therefore involves a survey about the ingestion of rare earth magnets. It will be sent to all pediatric gastroenterologist that are members of the North American society of Pediatric Gastroenterology and Nutrition.

Background

History of magnet ingestion and gastrointestinal injuries

The neodymium magnet was invented in 1982 by General Motors, Sumitomo Special Metals & the Chinese Academy of Science. It is a combination of neodymium, iron and boron alloy. It produces a powerful magnet that is at least 5-10 times stronger than older iron-based magnets. They can sustain weight 1,300 times their own weight. They are used in many household products (cordless tools, hard drives, magnetic resonance imaging, hybrid electric engines, etc.) (1).

The earliest report of magnet ingestions with bowel perforation with less powerful magnets was in 1995 (2). In 2002, McCormick et al reported 24 cases of penile, ears, nasal and gastrointestinal tract injuries from magnet in children 7 to 15 years of age (3). From 2003 to 2006, 20 cases of magnet ingestion and injury in children (ages 10 months to 11 years old) were reported in the Center for Disease Control's Morbidity & Mortality Weekly Report (75% of cases had bowel perforations, 20% contracted peritonitis and mean hospital stay was 8.7 days) (10). In 2006, recommended age for magnet children's toys was raised from 3 years to 6 years (7, 8, 10). In 2007, the U.S Consumer Products Safety Commission (USCPSC) issued the first warning, noting the possibility of high-powered magnets detaching from children's toys causing injury and even death if swallowed (7,8). At that time, the USCPSC was aware of the death of a 20-month-old-child after swallowing such magnets, as well as 33 other cases of magnet ingestion of which at least 18 required emergency surgery for removal (7, 8,16). By 2008, the USCPSC had documented more than 200 reports, many of those cases requiring emergency surgery to remove the magnets (16). In 2008; the first "magnet toy" ball was sold as the NeoCube. This was followed by the Buckyball in 2009. The USCPSC in 2009 issued a ban on the sale of rare-earth magnets to children under age 14 years (16). Manufacturers failed to comply and a recall was ordered by the USCPSC on 175,000 packages. Within months however, the manufacturers of these products relabeled their products "for adults only" and sales continued.

In spring of 2012, an informal survey through the NASPGHAN bulletin board reported 84 cases of rare-earth (neodymium) magnet ingestions with significant morbidity.

New Populations at risk

Current cases of magnet ingestion involve magnets that are marketed as desk toys and “stress” relievers for adults. These are sold in sets of 200 or more and are purchased on the Internet and in retail outlets. In the past mainly toddlers and high risk groups such as patients with autism or behavioral problems were the populations who ingested most foreign bodies (9). Now new at risk populations including normal adolescents and teenagers use these high-powered magnets to mimic piercings by placing two or more on their ear lobes, tongue or nose. Ingestion of these magnets is therefore seen in children of all ages (3). A survey from the CDC from 2003 to 2006 showed gastrointestinal injuries following magnet ingestion in children ages 10 months to 11 years with highest injuries recorded for children 4 years of age (10).

Mechanism of Injury

After swallowing more than one magnet or another piece of metal, the remarkably attractive force allows the magnets in the intestine to find each other (9, 11). Regardless of the tough but thin tissue of the bowel wall which may be between them, they still stick together with great strength and do not break apart (figure 1) (4, 10). After staying attached for long enough, ischemia, pressure necrosis and perforation of the bowel often occur (3, 6, 9, and 15). The resulting injuries include volvulus, bowel perforation, fistula and severe infection that may result in serious, lifelong and costly consequences including intestinal resection (4,7, 8,10, 13).

FIGURE 1. Abdominal radiograph of a boy aged 3 years, noting three attached magnets that resulted in volvulus (i.e., twisting of the bowel) and multiple bowel perforations



Photo/Consumer Product Safety Commission

Medical Intervention

Currently, management of a child suspected of swallowing more than one magnet or a magnet and another piece of metal involves emergency evaluation (6). Magnet location amenable to endoscopy is removed as initial x-ray evaluation cannot determine the exact location or whether the bowel wall is compressed between the magnets (3). Serial x-ray is employed if the magnets are moving along the gastrointestinal tract. However, failure to document free movement necessitates emergent endoscopic or early surgical removal (5, 12, 14, and 15). Despite known complications associated with high power magnet ingestions there has been no uniform standard of care to this point.

Study Design

The survey will ask questions only about cases that involve magnet ingestions and will not target any particular ethnic group. The participating physicians will review their own records to complete the survey. The survey will obtain to information containing direct patient identifiers.

Study Population

The study populations will be the children who have ingested magnets and the physicians who participated in their care since 2002.

Research Procedure and activities

A survey that has been developed by the NASPGHAN executive committee by using survey monkey will be distributed to NASPGHAN members to answer prevalence questions as well as the assessment and outcome of each case submitted. The survey has six parts. The first part is a demographic survey of the physician filling out the survey. The second part involves questions of general prevalence of ingested magnets by children in the past 10 years.

The third and all subsequent parts of this survey are filled out for each case the physician has managed. The third part specifically retrieves general demographic information about the individual child at the time of the ingestion. The fourth part of the survey involves questions on how the magnet ingestion was diagnosed. The fifth part involves question about endoscopic intervention and the sixth part is about surgical intervention. There will be no direct patient identifying information asked in this survey.

Once the survey is done the data will be organized by the investigators and specifics on the name of the physician answering the survey and the location of the incident will be substituted by an assigned code or number. The key to these substituted codes or numbers will be kept locked in Dr R. Adam Noel's office at the Children's Hospital of New Orleans. The relabeled and organized data will be sent back to NASPGHAN so that a statistician selected by the executive committee of NASPGHAN can analyze the data. Once the data has been analyzed, the analyzed data-sets will be sent back to Dr R. Adam Noel for publication purposes.

Potential Risk

Since there are no direct patient identifiers used in this study and the physicians who provide the information will be de-identified there is minimal to no risk for patients reported in this study. The physician's participation is voluntary and there will be no direct identifiers use in the data analysis or in publication.

Potential benefit

Because this is a survey there is also no direct benefit to patients.

The study will provide information that will result in more knowledge and awareness of the risk factors for ingestion of these powerful magnets as well as associated morbidity. This data will be fundamental in physician education, physician education of patients and education of the public in general about the risk of rare earth magnet ingestions. It will also provide useful information to the public policy entities that are responsible for overseeing the safety of consumer products as well as those entities that are responsible for the health of children. The data obtain on the risk associated with the assessment and treatment of children with ingestions obtained from this study will be useful in developing algorithms for managing neodymium magnet ingestions

Safety Precaution

The safety precautions involve further de-identifying of site and physicians associated with this survey. This is a historical survey of magnet ingestion to physicians about their experience not a survey to the patients. This method of taking the survey further protects the patient's identity.

Alternatives

The only alternative to doing this survey would be to obtain the data directly from patients. This would be a daunting and much more expensive process. A direct patient survey would also include an additional risk of identity exposure.

Bibliography

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