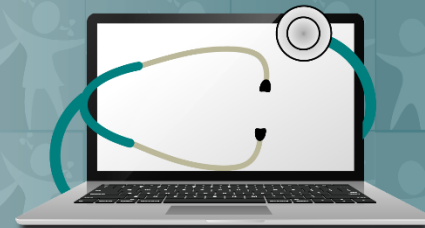




PEHSU NATIONAL CLASSROOM

Pediatric Environmental
Health Specialty Units



www.pehsu.net/nationalclassroom.html



Webinars

Series of scientific webinars that provide a forum for discourse on scientific issues.

Live and On-Demand

Case Conferences
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Evidence-based online courses on a variety of children's environmental health topics.

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Resource Catalog

Fact sheets, journal publications, reports, and other resources for parents, community members, patients and healthcare professionals

Topics included:
Air Quality, Pesticides,
Natural Disasters, BPA,
Mold, Lead, Mercury



Mid-America Pediatric Environmental Health Specialty Unit: Case Conference

Jennifer Lowry, MD

Director, Mid-America Pediatric Environmental Health Specialty Unit

Children's Mercy - Kansas City

Federal Region 7

Acknowledgements/Disclaimer

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Learning Objectives:

At the end of the presentation, the participant will be able to:

- Describe the activity of the PEHSU as it pertains to lead poisoning surveillance in Region 7
- Discuss controversies in management when uncommon sources are found to cause elevated lead levels in children
- Recognize unintended consequences from acute exposures to environmental toxins such as mercury



Case Presentation 1

Case

- 2-year-old presents to pediatricians office for well child check
- Appears well. No developmental concerns at this time.
- Child is a picky eater, but seems well nourished.
- Younger sibling in home.
- Lead questionnaire performed with no concerns.



Mandatory Blood Lead Screening Questionnaire

To be completed at each KBH screen from 6 to 72 months

Does your child: (circle response received)	DATE: (MM/DD/YYYY)			
1) Live in or visit a house or apartment built before 1960? (This could include a day care center, preschool, the home of a baby-sitter or relative, etc.)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
2) Live in or regularly visit a house or apartment built before 1960 with previous, ongoing, or planned renovation or remodeling?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
3) Have a family member with an elevated blood lead level?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
4) Interact with an adult whose job or hobby involves exposure to lead? (Furniture refinishing, making stained glass, electronics, soldering, automotive repair, making fishing weights and lures, reloading shotgun shells and bullets, firing guns at a shooting range, doing home repairs and remodeling, painting/stripping paint, antique/imported toys, and/or making pottery)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
5) Live near a lead smelter, battery plant, or other lead industry? (Ammunition/explosives, auto repair/auto body, cable/wiring stripping, splicing or production, ceramics, firing range, leaded glass factory, industrial machinery/equipment, jewelry manufacturer or repair, lead mine, paint/pigment manufacturer, plumbing, radiator repair, salvage metal or batteries, steel metalwork, or molten (foundry work))	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
6) Use pottery, ceramic, or crystal wear for cooking, eating, or drinking?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
One positive response to the above questions <u>requires</u> a blood lead level test. Please, remember blood lead level tests are required at 12 and 24 months, regardless of the score. Was blood drawn for a blood lead level test?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Interviewing Staff Initials:				

Staff Signature:

Patient Name:

ID Number:

Blood lead level: 43 mcg/dL

More History

- Mom states they own home.
- The home was built in 1982.
- The child is not in daycare and stays home with mom.
- There is bare soil around the porch and in the back yard, but the child spends minimal time in that area of the yard.
- No ethnic or cultural activities of concern.
- No hobbies of concern.

Key History

- Dad works for a printing company.
- Company is small with only 8 employees.
- Dad does not wear PPE and does not receive biomonitoring.
- He believes the ink they are using contains lead, but doesn't know for sure.
- He was not given any information regarding hazards in the workplace.

What do you do?

Further Investigation

- Because dad has elevated levels, OSHA is contacted.
- Investigation finds significant violations within the workplace.



Case Presentation 2

History of Present Illness

- Chief complaint: Decreased appetite
- Presented to PCP with parental concern of decreased appetite and abdominal pain
- Concern for developmental delay
- No recent acute illnesses

Past Medical History

- Birth history
 - Uncomplicated pregnancy
 - Adequate prenatal care
 - Full term via uncomplicated SVD
- Newborn screen was normal
- No prior hospitalizations
- No prior surgeries

Past Medical History

- No medications
- No adverse drug events
- Family history
- Father with HTN and MGM with Type 2 DM
- Immunizations: Received 15-month vaccines per mother

Social History

- Living in Kansas City, Missouri
- Healthy 5-year-old sibling
- No concerning occupational exposures for parents
- Family originally from El Salvador
- No use of herbal supplements in the home

Review of Systems

- Constitutional: No fevers, chills or night sweats
- Head: No headache or loss of consciousness
- Eyes: No vision changes, diplopia, blurry vision or eye drainage
- ENT: No congestion, epistaxis or rhinorrhea
- Cardiovascular: No palpitations or syncope
- Respiratory: **Cough** but no shortness of breath, wheezing or increased work of breathing

Review of Systems

- GI: ***Abdominal pain, decreased appetite*** and ***hard stools*** but no diarrhea
- GU: No dysuria, increased urinary frequency or decreased urine output
- Skin: No rashes, easy bruising or skin lesions
- Neurologic: ***Speech delay*** but no focal deficits
- Endocrine: No unexpected weight loss/gain, no hair or nail changes
- Heme/Lymph: No enlarged lymph nodes or pallor

Physical Exam

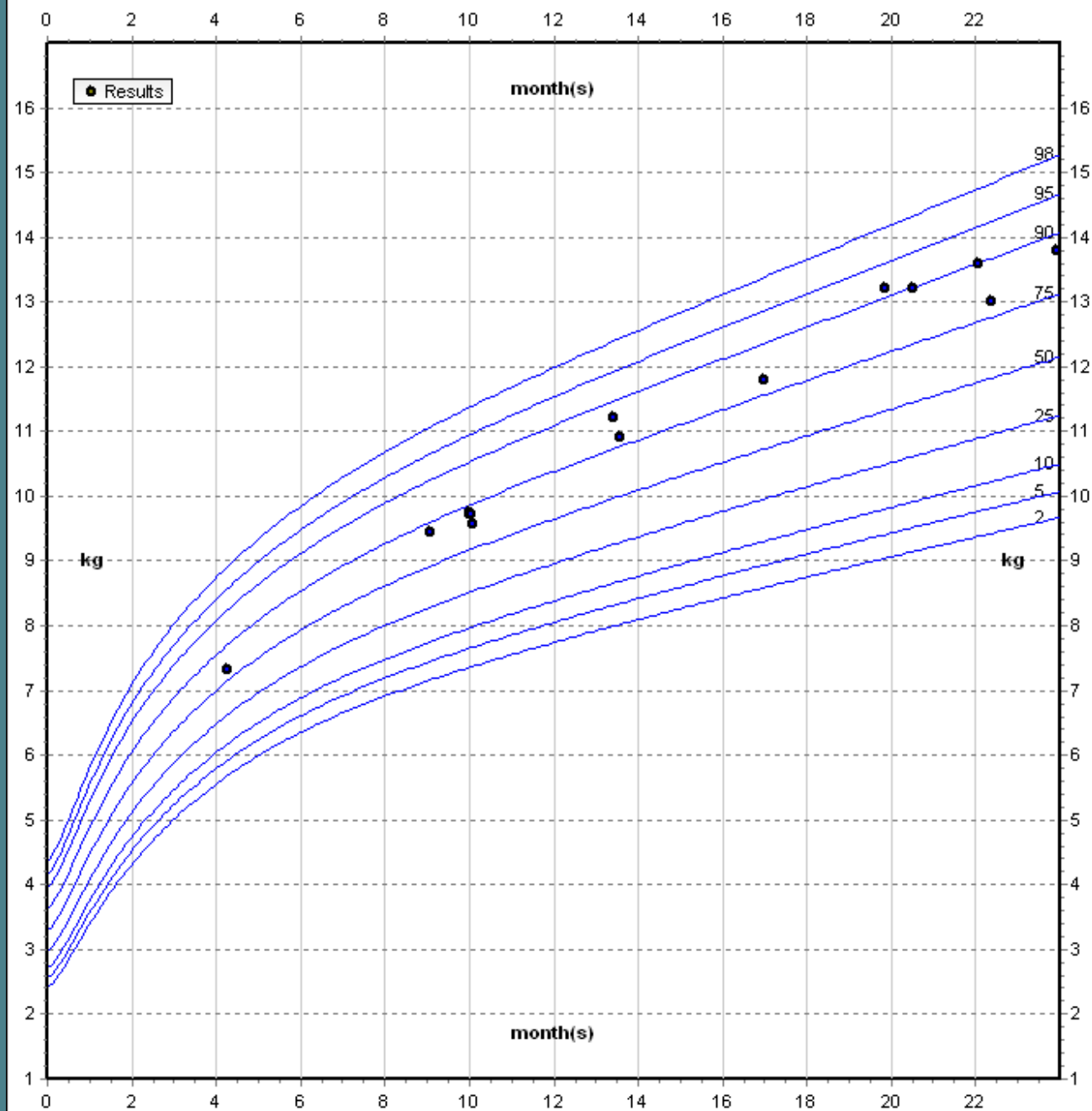
Vital Signs: T:36.5 P:108 R:22 BP:105/65
WT:84%tile (WHO)

- General: Well-appearing, playful, alert
- Head/Neck: NCAT, neck is soft and supple
- Eyes: PERRLA, EOMI, no discharge noted
- ENT: TMs non-erythematous, non-bulging, intact
- Chest: CTAB, no wheezing, rales or rhonci
- CV: RRR, no murmurs, cap refill <2 seconds

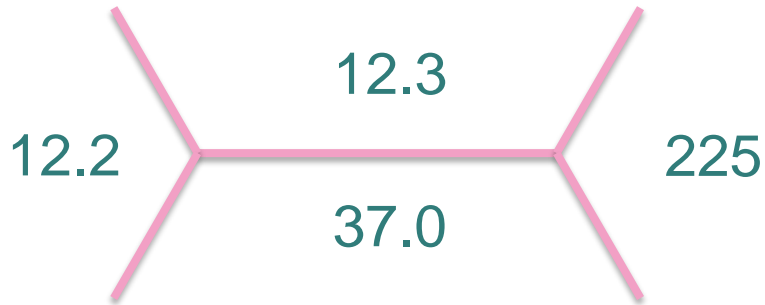
Physical Exam

- Abdomen: **Mild tenderness to palpation, mildly distended**, normal BS, no masses or organomegaly
- Lymph: No lymphadenopathy
- Extremities: Full ROM, no deformity
- Neuro: No focal deficits, **speech delay noted**
- Psych: mood and affect appropriate for age
- Skin: No rashes, bruising or lesions

CDC's WHO Weight-for-age, 0-2 years, Boys

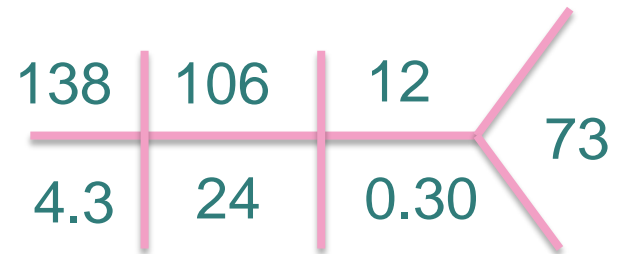


Labs



MCV 68 (80-99)
RDW 16.2 (<14.5)

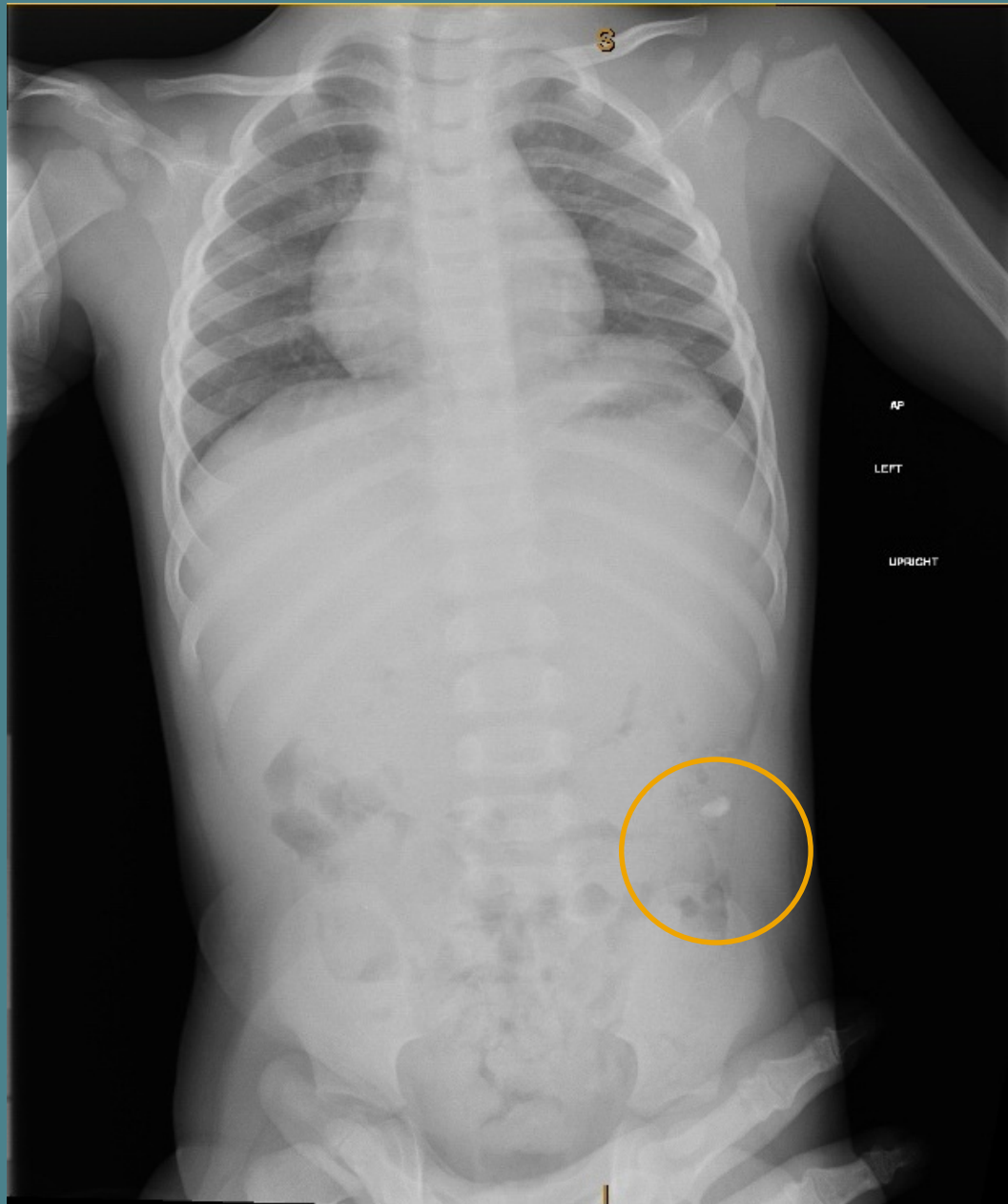
Protein	6.9 gm/dL (6.2-8.3)
Albumin	4.1 gm/dL (2.9-5.1)
Total Bili	0.3 mg/dL (0.0-1.2)
Direct Bili	0.0 mg/dL (0.0-0.4)
Indirect Bili	0.3 mg/dL (0.0-1.2)
Alk Phos	292 unit/L (110-320)
AST	46 unit/L (20-77)
ALT	40 unit/L (5-50)



AG=8 (7-14)

Ca 9.8 (8.6-10.5)

Lead Level: **50 mcg/dL**



Patient's abdominal film, CMH

Clinical Course

- Seen by PCP and blood lead level (BLL) was 42 mcg/dL
 - 12 months of age BLL was 6 mcg/dL
- Abdominal radiograph
 - Radio-opaque foreign body
- Direct admission to CMH general pediatrics team

Clinical Course

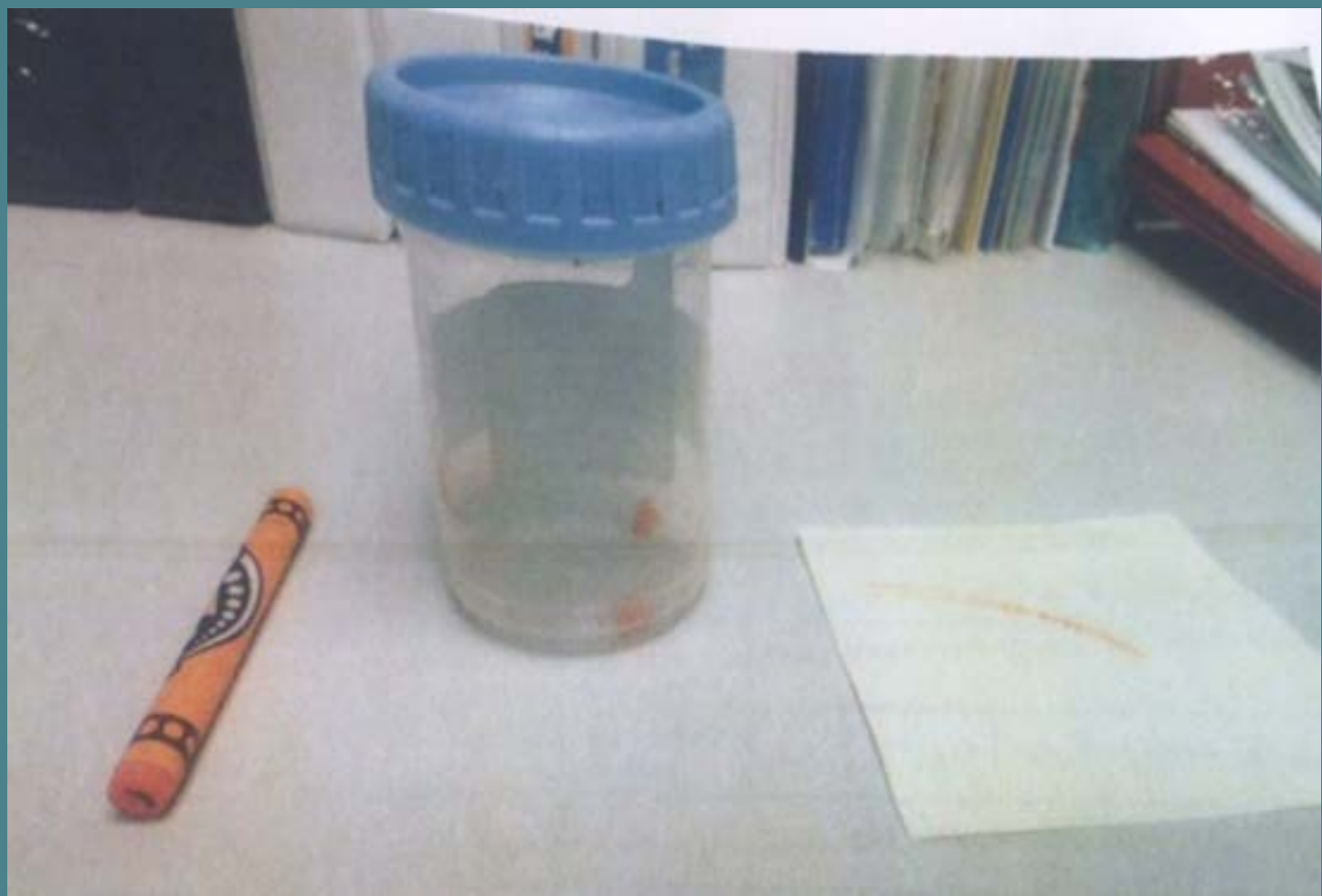
- Toxicology consulted
 - Repeat lead level 50 mcg/dL
 - Pica and environmental concerns
 - Succimer 100 mg PO TID x 5 days followed by 100 mg PO BID x 14 days
 - Recommended home assessment

Clinical Course

- Enema and Miralax to hasten foreign body passage
- Hospital Day 1 he passed foreign body which was identified as a crayon
- Follow up abdominal radiograph showed no foreign body



Google Images



Foreign Body Analysis

- Crayon wrapper (from home) 2.3 ppm
- Crayon sample from diaper 0.65 ppm
- 1.2 ppm is acceptable lead content



Home Assessment

- Health Department was notified
- Soil sample >1000 ppm (standard is 400 ppm)
- Dust samples were also elevated



Follow Up

- Blood lead level decreased to 24 mcg/dL after one month
- Hearing and Speech Clinic referral was made by PCP for speech delay at age 21 months





Case Presentation 3

History

- Poison center called by outside hospital for a 19-year-old with suicidal ideation.
- Patient states he drank a “flask” of elemental mercury one hour ago.
- Patient seems confused and agitated.
- KUB reveals large radio-opaque mass in stomach with numerous areas of opacity throughout the intestinal tract.
- **Blood mercury: 125 mcg/L**
- **Urine mercury (24-hour): 650 mcg/L**

Ongoing treatment

- Gastric lavage attempted with some results of elemental mercury. Environmental services contacted to manage mercury obtained from stomach.
- Patient admitted for ongoing care. Whole bowel irrigation started with frequent mercury containing stools “flushed down the toilet”.
- KUB obtained with vomiting in Radiology. Mercury vacuumed up.
- KUB reveals mercury in appendix. Appendectomy performed with appendix opened in OR to visualize mercury.

What do you do?

What you find out with more history (5 days after ingestion)...

- Patient had stolen flask of mercury from chemistry class one year ago. Uncovered flask was stored in his closet since obtained.
- Mother states that he has developed behavioral problems over the year and has not been able to hold a job. Is worried that he may have schizophrenia.
- Patient states that he drank the mercury in his mother's home (kitchen).
- Patient lives at home with his mother, sister and her two children (aged 3 years and 9 months)

What do you do?

What happens next....

- EPA and ATSDR notified of incident in home.
- Mercury beads found around the baseboards and along the coils of the refrigerator.
- Levels found in kitchen, living area, and patient's room well above reference levels.
- Carpet removed, upholstered furniture removed, clothing removed and home “heated and vented” over several days to decrease levels.

What are other
concerns?

Unintended consequences

- By the time it was realized where the ingestion took place, over 5 days had passed since the ingestion.
- All family members asked to collect urine for mercury.
 - All adults with negative mercury in urine
 - 3 year old with urine mercury of 45 mcg/L
 - 9 month old with urine mercury of 60 mcg/L

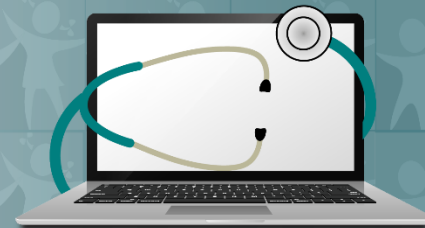
Questions?





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