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Relevant Disclosure

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Detergent Pod Exposure: Is Endoscopy Really Needed?



Avantika Singh, MD
Fellow, Pediatric Gastroenterology

Disclosure

- I have no relevant financial relationships or affiliations with commercial interests to disclose

Objectives

- Recognize the health hazards and health care burden associated with concentrated detergent pods (CDPs) in pediatric population
- Learn the clinical symptoms, signs and complications associated with CDP exposure
- Learn the endoscopic findings in children with CDP exposure and discuss the need for endoscopic evaluation

Background

- Caustic ingestion with detergents is a common problem encountered in Pediatric population
- Concentrated detergent pods (CDPs) or single use detergent pouches have been in existence in European market since early 2001 and were 1st introduced in the US markets in 2010

CDP Exposure

Centers for Disease Control and Prevention

MMWR

Morbidity and Mortality Weekly Report

Weekly / Vol. 61 / No. 41

ARTICLE

Health Hazards Associated with Laundry Detergent Pods

Pediatric Exposures to Laundry and Dishwasher Detergents in the United States: 2013–2014

Authors: Amanda L. Valdez, BS,^{1,2} Marcel J. Casavant, MD,^{1,2} Henry A. Spiller, MS, DABAT,^{1,2} Thiphalak Chounthirath, MD,^{1,2} Gary A. Smith, MD, DrPH,^{1,2} and Mallory G. Davis, MPH,^{1,2}

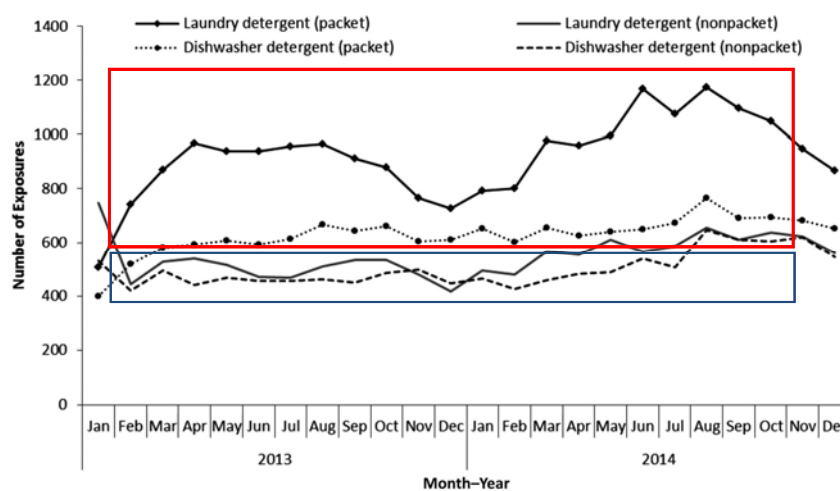
What's Known on This Subject: Case studies, abstracts, and small-sample research studies have shown that laundry detergent pods pose important poisoning risks to young children.

What This Study Adds: From 2012 through 2013, 17 230 children exposed to laundry detergent pods were reported to US poison control centers. Among children exposed, 44% were hospitalized and 7.5% experienced a moderate or major medical outcome, including 1 confirmed death.

Pediatric Exposures to Laundry and Dishwasher Detergents in the United States: 2013–2014

Mallory G. Davis, MPH,^{1,2} Marcel J. Casavant, MD,^{1,2} Henry A. Spiller, MS, DABAT,^{1,2} Thiphalak Chounthirath, MS,² Gary A. Smith, MD, DrPH,^{1,2}

Increased CDP Exposure Incidence



Davis, M.G., et al., *Pediatric Exposures to Laundry and Dishwasher Detergents in the United States: 2013–2014*. *Pediatrics*, 2016. **137**(5).

Healthcare Burden

PEDIATRIC LAUNDRY DETERGENT POD EXPOSURE REPORTED TO POISON CENTERS

March 2012 to April 2013

Pod exposures in children <6 years	17,230	
Emergency department/doctor's visits	6,855	1 out of 2.5 children are seen in the emergency department
Total hospital admissions	749	1 out of 23 children are admitted to the hospital
Critical care admissions	420	1 out of 41 are admitted to the ICU
Pod ingestion/aspiration requiring intubation	102	1 out of 170 are placed on a ventilator
Cases resulting in death	2	1 out of 8,600 children exposed

2 Laundry Pods: A Home Safety Threat to Children | JPC

Pediatric Exposure to Laundry Detergent Pods, Journal of Pediatrics, 2014

Children and CDPs

- Significant health hazard especially for children less than 5 years of age.
- Infants and Toddlers are developmentally primed to place objects of interest in their mouths.



CDPs and Candies

- Bright colorful packing and close resemblance to candies.



CDPs and Candies

PODS	CANDIES
	
	
	

One of these is candy.
One is poison.



Think it's hard to tell the difference?

So do our kids.



CDPs vs Traditional Detergents

- Higher odds of being symptomatic
- Higher odds of hospitalization
- Higher odds of serious medical outcome

Comparison of Pediatric Exposures to Concentrated Pack and Traditional Laundry Detergents

Forrester, Mathias B. BS

Pediatric Emergency Care: April 2013 - Volume 29 - Issue 4 - p 482-486

doi: 10.1097/PEC.0b013e31828a3262

Original Articles

- Compared 452 traditional laundry detergent exposures and 187 detergent pod exposures
- A significantly higher proportion of laundry detergent pack (LDP) patients had serious outcomes
- 12.3 % LDP vs 2.4 % traditional detergent

CDPs: Mechanism of Toxicity

- Unit dose detergent products
- Concentrated products packed under pressure in a water soluble membrane
- Composition
 - pH 7.5 to 11
 - Surfactants : Ethoxylated alcohols: GI tract irritants
 - Propylene glycols- Lactic acidosis, Altered mental status



Symptoms

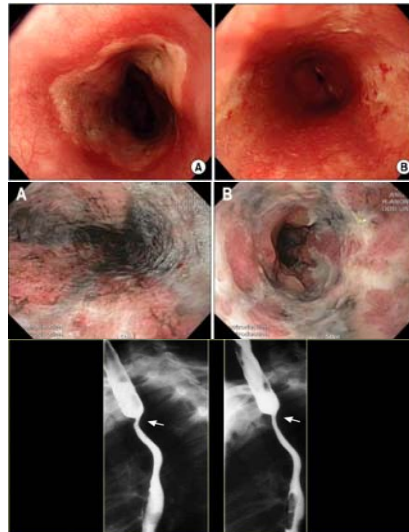
SYMPTOMS EXPERIENCED AFTER LAUNDRY DETERGENT POD EXPOSURE, MARCH 2012 TO APRIL 2013

MOST COMMON SYMPTOMS		SEVERE SYMPTOMS	
Nausea/Vomiting	52.3 %	Difficulty Breathing or Wheezing	2.0 %
Coughing/Choking	13.3 %	Respiratory Depression/Inflammation	0.6 %
Drowsiness	7.0 %	Eye Burns	0.4 %
Eye Pain & Redness	17.6 %	Coma	0.2 %
Throat/Mouth Irritation	7.6 %	Throat/Mouth Burns	0.2 %

Valdez, A.L., et al., *Pediatric exposure to laundry detergent pods*. *Pediatrics*, 2014. **134**(6): p. 1127-35.

Gastrointestinal Tract Injury

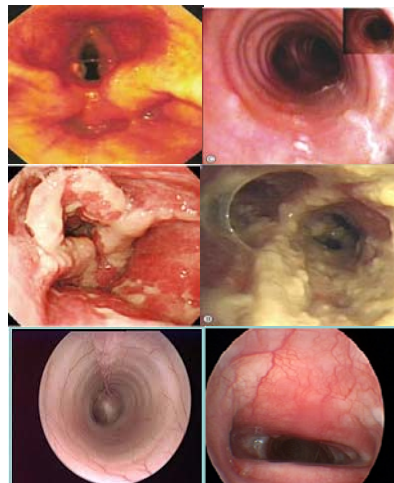
- Mucosal edema and erythema
- Ulcers : superficial erosions, deep, focal or circumferential
- Focal necrosis or extensive necrosis with frank perforation
- Strictures



Zargar et al: Classification of Caustic Ingestion (Grade 0-4): Gastrointestinal Endoscopy 1991;37:165-9

Airway Injury

- Laryngeal or Tracheal edema
- Ulcerations and exudates
- Tracheal collapse or compression



Current limitations

- Very limited literature documenting the endoscopic findings in children with CDP exposure
- No current consensus or guidelines regarding the need of endoscopic evaluation in these patients

“Endoscopy Findings in Children
with Accidental Exposure to
Concentrated Detergent Pods
(CDPs)”

Aim

To review gastrointestinal (GI) and respiratory findings in children with exposure to CDPs and determine the need for endoscopic and bronchoscopic evaluation in all patients with CDP exposure

Research Design and Methods

- Study approved by IRB: #6470
- Single center retrospective study
- Study period : January 2010 to June 2016
- Medical records at Children's hospital at OU reviewed from patients with caustic ingestion identified and then further identified the ones exposed to CDPs in particular

Methods

Inclusion Criteria:

- Children ages 0-18 years
- Exposure to all types of caustic agents
- Exposure to all types CDPs

Exclusion Criteria:

- Pre-existing conditions leading to esophagitis (Gastroesophageal Reflux Disease, Eosinophilic Esophagitis)

Data collection

- Age at presentation
- Gender
- Type of caustic agent/ CDP
- Type of exposure (ingestion, inhalation, aspiration, ocular, dermal)

Clinical symptoms

Gastrointestinal: Nausea, vomiting, drooling , dysphagia

Neurological: Altered mental status, lethargy

Respiratory: Coughing, choking respiratory distress, hypoxia

Ocular: Blurry vision, excessive tearing, ocular pain

Dermal: Burns, blisters, rashes

Metabolic: Lactic acidosis

Data Collection

Exam findings:

- Physical Exam: oropharyngeal erythema, edema, erosions and ulcerations, skin rashes, blisters, conjunctivitis, corneal ulcerations

Endoscopic interventions:

- Esophagogastroduodenoscopy (EGD) findings
(edema, erythema, ulcerations, stricture)

- Direct Laryngoscopy-Bronchoscopy(DLB) findings
(tracheal edema, secretions, ulcerations, collapse or compression)

Other data collected

Emergency department (ED) or Hospital course including:

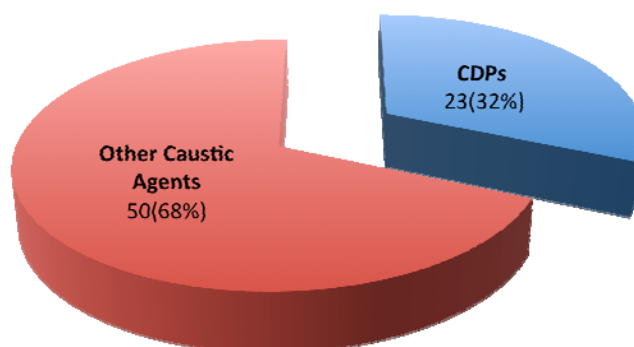
1. Length of stay
2. Laboratory and radiology data
3. Complications secondary to CDP exposure:
 - Intubation
 - Seizures
 - Strictures

Statistical Analysis

- Continuous variables: Shapiro-Wilk test
- Associations were tested using Fisher's exact test

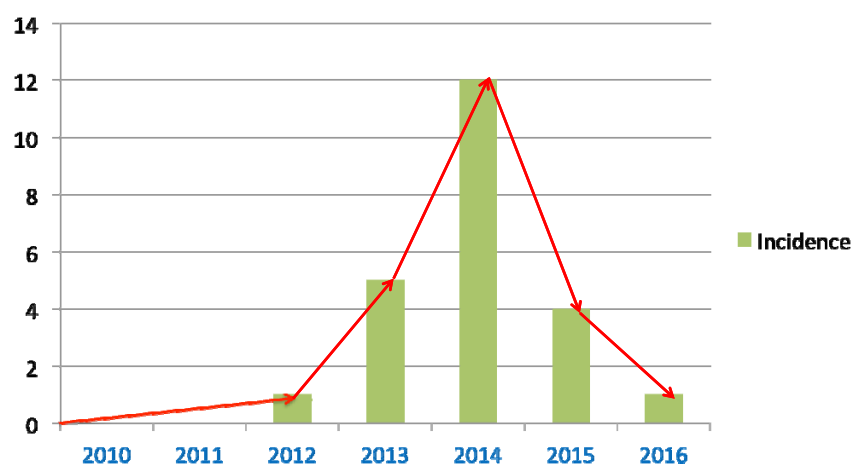
Results

Caustic Agent Type



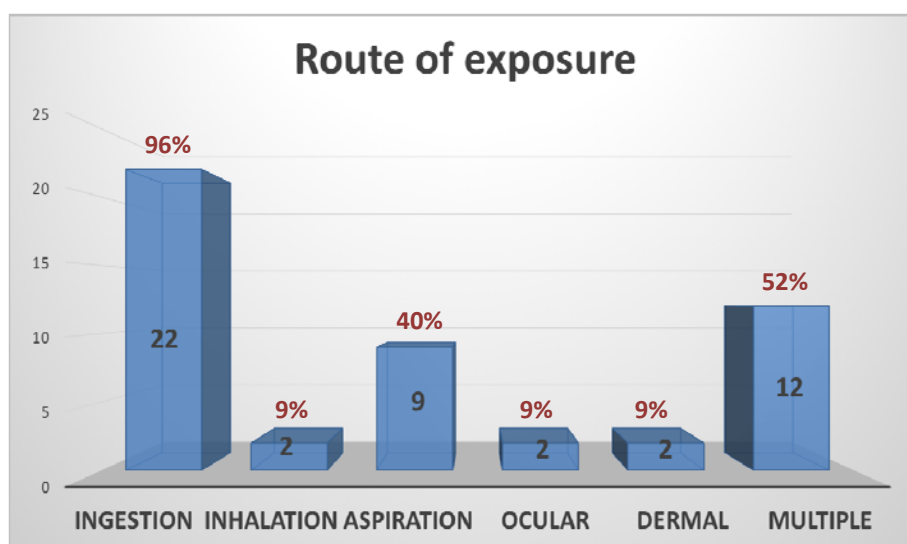
Total = 83

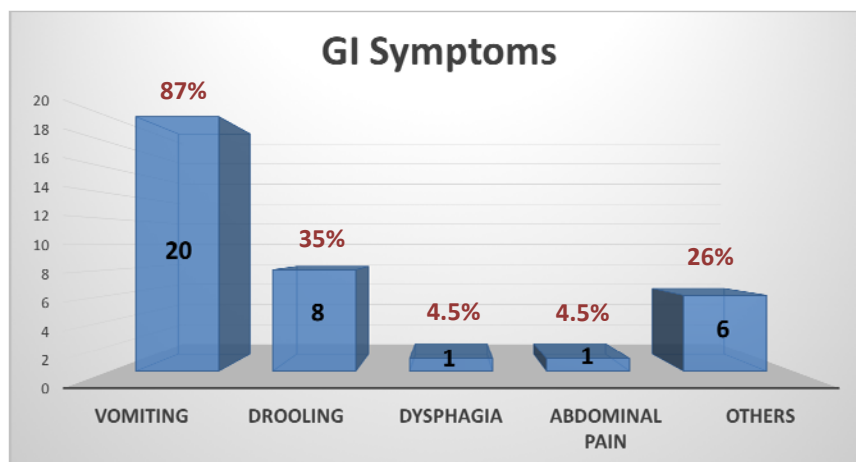
Annual Incidence of CDP exposure



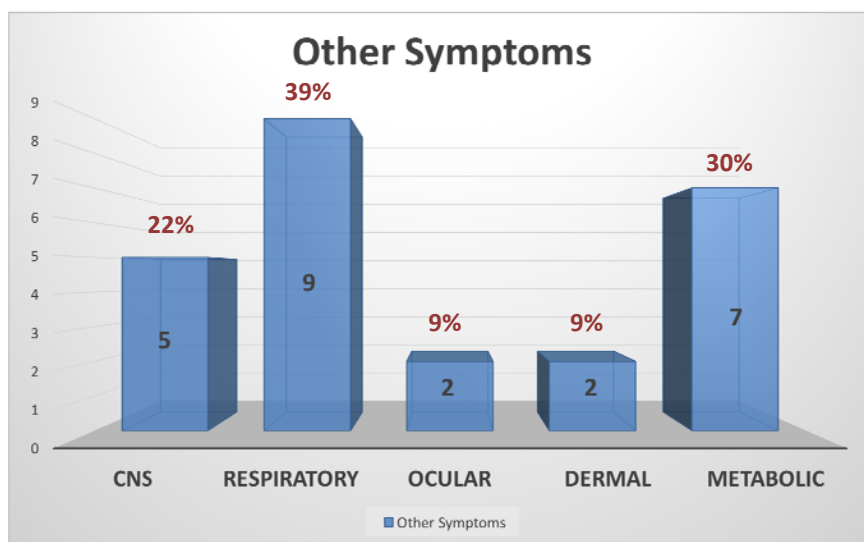
Patient Characteristics

- A male predominance was seen with 14 males (61%) and 9 females (39%)
- Median age was 16 months (12-36)(25%-75%)
- The Median ED or Hospital stay was 1 (1-2) (25%-75%) days



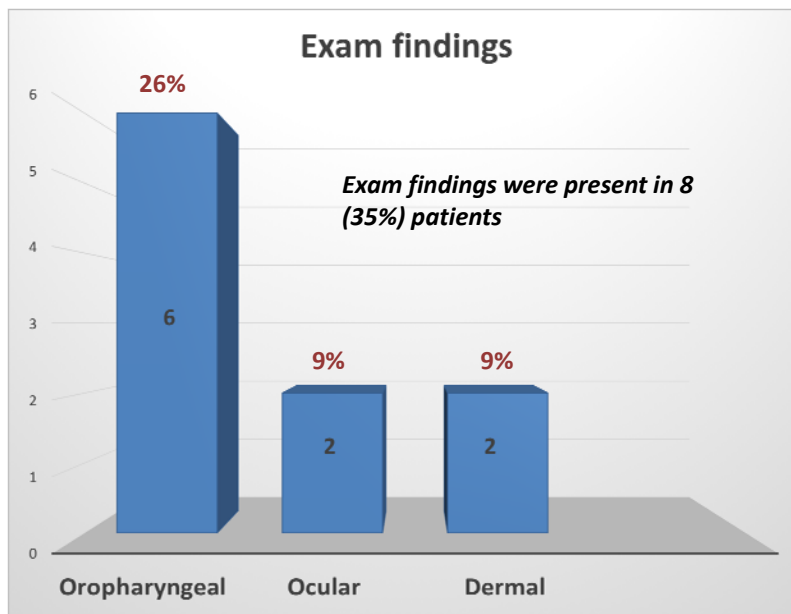


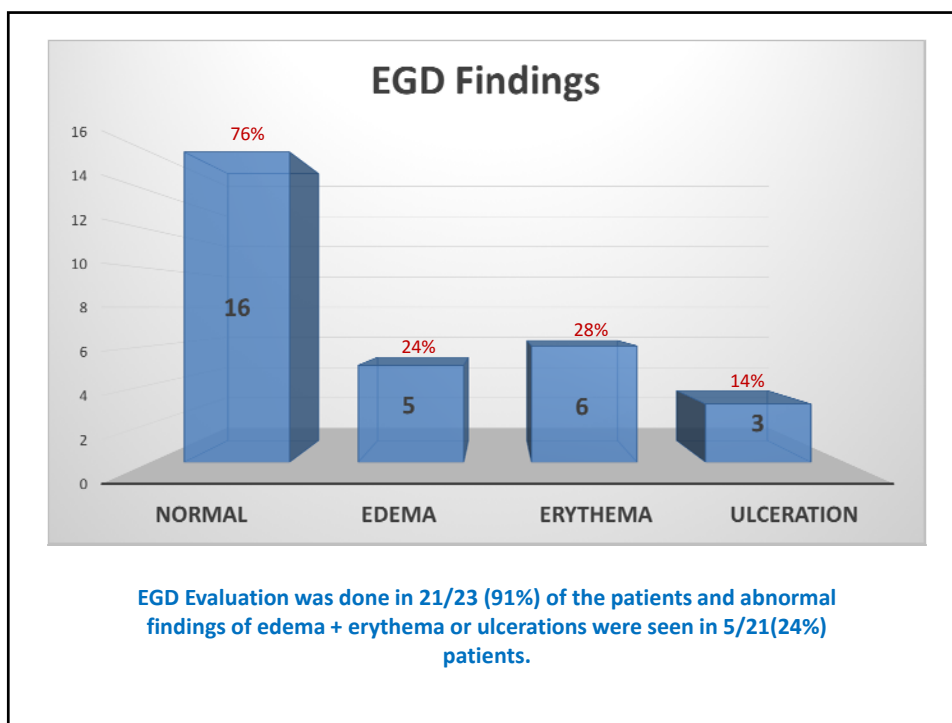
GI symptoms were present in 21 (92%) patients



Patient Characteristics

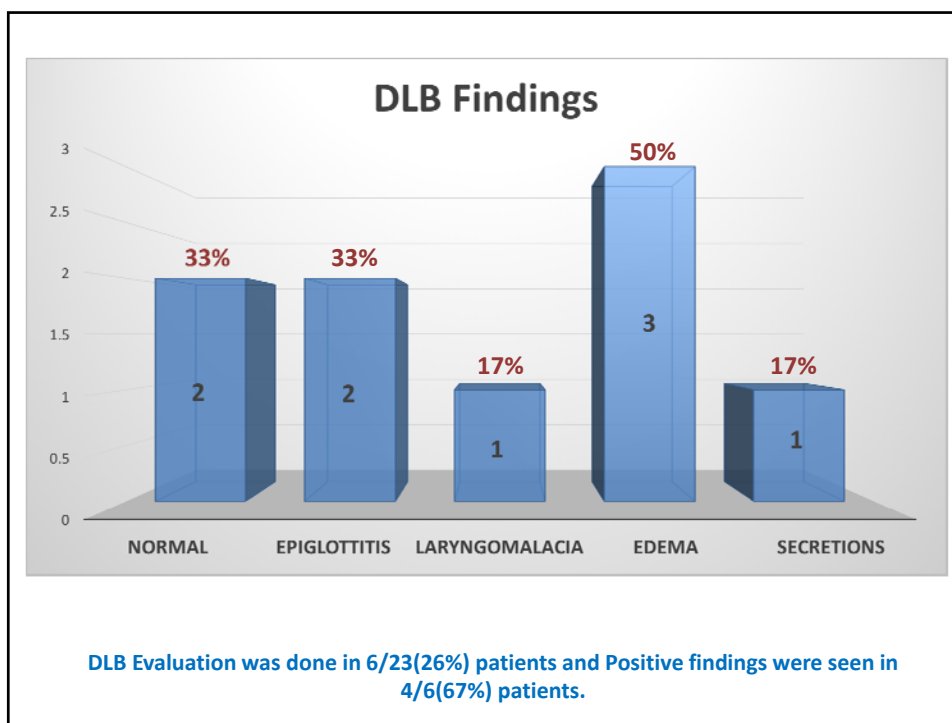
- **Complications** : respiratory failure was seen in 3 (13.04%) patients requiring intubation and mechanical ventilation
- None of the patients were found to have other complications like esophageal strictures, seizures etc





EGD Association with Symptoms and Exam Findings

- Positive exam findings correlated with 80% likelihood of having positive findings on EGD vs only 20% likelihood of positive findings on EGD if exam findings were negative ($p = 0.0139$)
- A definite correlation between symptoms and endoscopy findings was not observed



DLB Association with Symptoms and Exam findings

- The association between respiratory symptoms and bronchoscopy positive findings was marginally significant ($p=0.0667$)
- The proportion of subjects with abnormal DLB findings that were intubated was significantly higher than those without. (66.67% vs 5%; $p=0.0344$)

Discussion

- This is the 1st and the largest study that covers the aspect of gastrointestinal symptoms & injury, EGD and DLB findings in children with CDP exposure in a comprehensive manner
- Our findings corroborate with earlier studies in regards to epidemiology, demographics and clinical presentation

Our study did see a positive correlation between exam findings and EGD findings

Discussion

- A definite correlation between symptoms and endoscopy findings was not observed
- Our study is limited by the fact that it was a single center, small sample size, retrospective design and lack of long term follow up in patients
- Further larger studies are definitely needed to help develop a protocol guiding endoscopic evaluation in patients with CDP exposure

To Scope or Not To Scope??



"Yep, you've got oesophagitis".

Conclusion

- Since positive exam findings increase the likelihood of positive endoscopy findings, we recommend endoscopic evaluation of all patients who have exam findings secondary to exposure to CDPs
- In other patients, it will be reasonable to evaluate the need of endoscopy on a case-by-case basis

Summary

- Serious health hazard < Age 5 years
- Need for continued awareness
- Lack of evidence based guidelines guiding endoscopic evaluation
- Larger studies needed to develop management protocol
- Recommend endoscopic evaluation with exam findings

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*Thank
you*



Hide Your Detergent Pods!!!

