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Home Observation for Asymptomatic Coin Ingestion: Acceptance and Outcomes

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Abstract. Objectives: To obtain preliminary estimates of the acceptance rate and the frequency of adverse outcomes, and to identify issues related to acceptance, associated with management of asymptomatic pediatric coin ingestion by home observation, in preparation for a large-scale prospective study. **Methods:** Scripted telephone follow-up of callers who had reported asymptomatic pediatric coin ingestions to one of five poison control centers six to 36 months previously, which had been managed by home observation. **Results:** Of the 67 callers enrolled, 41 (67%) reported contacting a physician regarding the coin ingestion, despite home observation instruction by poison control center personnel. Those who did not recall being instructed in home observation were more likely to have contacted a physician than those who did. Nearly all, however, were satisfied with the advice they had been given. One child developed sub-

sequent symptoms; as per the instructions that had been given by poison control center personnel, his parent sought physician evaluation, revealing an esophageal coin, which was removed uneventfully. No other child developed complications. **Conclusions:** Although all of the 67 children managed by home observation did well, most of their caretakers had not accepted this management strategy. Acceptance, while unrelated to satisfaction, may be related to comprehension of the instructions caregivers are given. A prospective study of home observation for asymptomatic pediatric coin ingestion would be safe and would allow further examination of factors affecting acceptance. **Key words:** coin; foreign body; poison control center; pediatrics; home observation; safety. *ACADEMIC EMERGENCY MEDICINE* 1999; 6:213-217

COINS are among the most commonly ingested foreign bodies of childhood.¹⁻⁴ The

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large majority of ingested coins traverse the gastrointestinal (GI) tract without difficulty.^{4,5} Adverse sequelae of coin ingestion typically are a result of esophageal entrapment, which is usually associated with signs or symptoms suggestive of an esophageal foreign body.^{1,4,6-8} Asymptomatic esophageal entrapment, however, has been described.⁶⁻⁹ Because this is uncommon, some authors have suggested that a parent/guardian calling a physician or a poison control center to report asymptomatic coin ingestion in an otherwise healthy child may safely be reassured, and told to have the child medically evaluated, usually by radiography, only if signs or symptoms arise.⁹⁻¹⁴

Although home observation has been a widely-used management strategy, the likelihood of its acceptance by caregivers is unknown. Further, long-term outcomes of asymptomatic children who have been managed by home observation have not been described. Study of these issues by a randomized, prospective design would be ideal. In preparation for conducting such a study, we conducted a retrospective preliminary study of the response of caregivers and long-term outcomes of a group of

children managed by home observation. The goals of this study were to give a preliminary estimate of the acceptance rate, to identify issues related to acceptance, and to obtain a preliminary estimate of the frequency of adverse outcomes due to missed esophageal coins. Our hypotheses were that most caregivers would have willingly accepted this management strategy, and that complications due to missed esophageal coins would be unusual.

METHODS

Study Design. This was a follow-up study of children with a previously reported asymptomatic coin ingestion. This study was reviewed and approved by the institutional review board affiliated with each participating poison control center. As per these boards, written informed consent was not required from the study subjects.

Study Setting and Population. Five of the six poison control centers in New York State participated in the study. These five centers serve all but the westernmost portion of New York State, including Long Island, New York City, Albany, Syracuse, and Rochester, as well as the smaller towns, cities, and rural areas between them. Data pertaining to all calls to these centers are entered into a computerized database after detailed information is recorded on standard records. By searching the computerized database, all records regarding calls reporting coin ingestion in a child (aged <19 years) received between January 1994 and June 1996 were identified. All callers who had reported that the child was asymptomatic at the time of the call and had been managed by home observation were eligible for the study. We considered the child to have been managed by home observation when the record noted that the caller was instructed to observe the child at home, and to contact the child's usual physician or to bring the child to an ED for evaluation if specific symptoms (pain, drooling, dysphagia, etc.) developed.

Study Protocol. The data record for each eligible call was reviewed. Data, including the age of the child, type of coin ingested, and clinical history, were transcribed from poison control center records to a data collection form. Although each center has general guidelines for telephone management of coin ingestion, management advice may vary between individual personnel. Because this portion of the study was retrospective, the investigators made no attempt to standardize advice given to callers.

During the first half of 1997, each caller was then contacted by telephone, and a scripted interview of neutral questions was performed. Calls

were made by study personnel at the poison control center to which each original call had been placed; study personnel identified themselves as being "from the (specific) Poison Control Center." Study telephone calls were made at least six months after the child had swallowed the coin. If the original caller was not available, information was solicited from another family member of the child. These data were also recorded on the data collection form. All data were then entered into a secure computerized database.

Data Analysis. The chi-square test was used to determine the significance of differences between probabilities; Fisher's exact test was used for small numbers. A $p < 0.05$ was considered statistically significant. Other data analysis consists of counts and descriptive statistics. The 95% confidence intervals (CIs) for infrequent or zero occurrences were computed using the exact binomial distribution.¹⁵

RESULTS

Data regarding the outcomes of 67 asymptomatic coin ingestions were collected. The number of callers eligible for the study who either could not be contacted or refused to participate was not recorded at all study centers, and so is not reported. Demographic information of those enrolled is reported in Table 1. Center-specific results are reported in Table 2. None of the coin ingestions we studied resulted in a second call either to or from the poison control center involved, prior to the study.

Three callers had reported transient symptoms in the child who had swallowed the coin (one had a cough, two had mild abdominal pain); all were mild, and had resolved before the initial call to the poison control center. All of these children did well thereafter. One child (see below) developed symptoms following the initial call to the poison control center. According to their caregivers, none of the 67 children have had lasting sequelae as a result of the ingestion.

Eight caregivers we contacted either were not the original caller to the poison control center or did not recall the original advice they were given. Of the 59 original callers who reported remembering the advice initially given them, 45 (76%) reported being instructed in home observation, while 14 (24%) reported being told either to call the child's physician or to have the child examined by a physician. Of the 45 who recalled being instructed in home observation, 25 (56%) called or brought the child to a physician. Of these, 11 reported feeling uncomfortable with the advice they were given, while six were urged by friends or fam-

ily to contact the physician; only one child actually developed symptoms (see below). Of the 14 who did not remember being instructed in home observation, 13 (93%) called or brought the child to a physician. Those who recalled home observation instruction were less likely to have called or brought the child to a physician (p = 0.011). In total, nine children had a radiograph; none had the coin localized with a metal detector.

Of the 67 children in the study, one underwent a coin removal procedure, yielding an incidence of 1.5% (95% CI = 0.04% to 8.1%). This child, a 24-month-old previously healthy boy, had remained asymptomatic prior to his father's call to the poison control center. He later developed symptoms and was taken for medical evaluation, including a radiograph, which revealed an esophageal coin. The coin was removed by a physician; the child has since done well. The remaining 66 children remained asymptomatic and had no further complications of the coin ingestion (0%; 95% CI = 0% to 4.5%). Of these 66, 36 (55%) were noted to pass the coin in their stools. Two (3%) had radiographs that did not reveal a coin.

When questioned regarding satisfaction with the advice they were given by the poison control center, 62 of the 67 callers (93%) reported being completely satisfied, while four (6%) were partly satisfied. One caller was dissatisfied, and complained that the poison control center seemed uncertain of the appropriate management. Of note, the father of the child whose coin was later removed reported being completely satisfied with the advice he was given.

DISCUSSION

Management of asymptomatic coin ingestion has been controversial.⁴⁻¹⁴ Retained esophageal coins have been associated with local esophageal inflammation as well as foreign body migration, leading to mediastinitis, acquired tracheoesophageal or aortoesophageal fistula formation, or death.^{12,16-19} It is clear that all children with pre-existing esoph-

TABLE 1. Demographics of the Children Who Ingested Coins

Total	67
Age—mean (range)	46 months (2–192 months)
Sex	
Female	45%
Male	55%
Pre-existing gastrointestinal condition	1
Time since call to poison control center—mean (range)	16 months (6–35 months)
Coin ingested	
Penny	53
Nickel	1
Dime	7
Quarter	2
Unknown	2
>1 coin	2

ageal disorders should be referred for further evaluation. The large majority of children who have retained esophageal coins, however, are otherwise healthy.⁶ Several hospital-based authors, noting a significant portion of asymptomatic patients among even their previously healthy patients with esophageal coins, have recommended imaging studies for all, hoping to detect and remove esophageal coins, thereby avoiding these adverse sequelae.^{2,6-8} Others, noting that asymptomatic coin ingestion is rarely if ever associated with complications, believe that this recommendation is overly expensive and burdensome for otherwise healthy patients.⁹⁻¹⁴

Only a small fraction of ingested coins are reported to a poison control center.⁵ Because coin ingestion is so common,⁵ however, poison control centers receive a large number of calls regarding ingested coins each year; 3,590 such calls were made to centers participating in the American Association of Poison Control Centers Toxic Exposure Surveillance System in 1996 alone.³ In their 1989 poison control center-based study, Caravati et al.⁹

TABLE 2. Outcomes, by Center*

	Number Enrolled	Called or Brought to Physician (%)	Developed Symptoms	Pre-existing Gastrointestinal Condition	Coin Removed	Complications
Center 1	30	12 (40%)	1	1	0	0
Center 2	15	11 (73%)	1	0	1	0
Center 3	6	6 (100%)	0	0	0	0
Center 4	16	12 (75%)	0	0	0	0
Center 5	0	—	—	—	—	—
TOTAL	67	41 (61%)	1	1	1	0

*To preserve anonymity, participating poison control centers are numbered rather than listed by name.

described 162 coin ingestion calls made to a single center over a 28-month period; 118 (73%) of the patients were asymptomatic. All were referred for radiographs. Two of these patients had radiographs noting coins at the gastroesophageal junction, which passed after drinking fluids. All patients did well during a five-day observation period, leading the authors to suggest that radiographs were unnecessary for asymptomatic patients.⁹

Since delayed sequelae of esophageal foreign bodies are well-described,^{20,21} we studied children who had swallowed a coin at least six months before, with a mean of 16 months since their coin ingestions. All but one were otherwise healthy; the one with a pre-existing GI disorder had inflammatory bowel disease. Home observation proved successful for all; the one child who had an esophageal coin developed symptoms later, was taken for medical evaluation as per the home observation instructions given by the poison control center, and has done well since having the coin removed. Acceptance of this advice, however, was generally limited; well over half sought medical advice despite being instructed in home observation. This was not isolated to one or two centers; as Table 2 shows, similar behavior was seen among callers to each center. Of note, Caravati et al. reported only 41% compliance with their poison control center's recommendations that all children in their study undergo radiography.⁹ Clearly, callers to poison control centers often make their own management decisions. These decisions may negate much of the cost savings sought by those who believe that home observation is more cost-effective, and may be a surprise to those who contend that physician evaluation for asymptomatic coin ingestion is overly burdensome for patients and families.

Home observation was better accepted by those who later remembered it than by those who did not. It is possible that those who did not remember the advice did not understand it. If so, this suggests that clearer instructions may be associated with better acceptance. It is worth noting that a total of 24% of the original callers who reported that they remembered the advice they had been given remembered that advice incorrectly.

Interestingly, 93% of the callers were entirely satisfied with the advice they were given. In fact, when asked at the end of their interviews whether they had any additional comments, 42% of the callers expressed gratitude to the center. Wezorek et al., in their study of factors influencing noncompliance with poison control center recommendations, showed that dissatisfaction with the advice given is not usually the reason for noncompliance.²²

LIMITATIONS AND FUTURE QUESTIONS

The most important limitation of this study is its relatively small numbers. In particular, our outcomes results should be interpreted cautiously. We were surprised to find that, despite guidelines at each participating poison control center suggesting management of asymptomatic coin ingestion by home observation, relatively few children were initially managed with this strategy. One center had no eligible callers (Table 2). As this demonstrates, poison control centers, like physicians, vary in the advice they give to callers. Within individual centers, advice given by individual personnel varies as well.

A related limitation is the lack of an accurate denominator (total number of eligible patients). Although nearly all caregivers we contacted supplied the requested information, several eligible caregivers could not be contacted (exact numbers are unavailable). This could bias the results, since inability to make contact or refusal to participate could potentially be associated with certain outcomes or acceptance patterns.

The possibility of recall bias is another potential limitation. Caregivers were interviewed six to 35 months following the actual coin ingestion. Memories of clinical outcomes, the advice given, and their satisfaction may have faded during this time. Similarly, although research personnel used scripted, neutral queries, since they identified themselves as calling from the local poison control center, caregivers might have altered their responses, especially regarding satisfaction.

Despite these limitations, this study clearly demonstrates that poison control center management of asymptomatic coin ingestion by home observation is frequently not accepted by the caregiver. This may be due to disagreement with or poor understanding of the advice callers are given. Although we would not attempt to dissuade callers uncertain about the advice they are given from pursuing further medical evaluation, this phenomenon is worth studying in more detail. A prospective study with both early and extended follow-up would allow standardization of poison control center management, including easily-understood advice, and avoid the possible recall bias present in our study. Such a study would also allow collection of other specific information, including the effects of psychosocial and financial factors on acceptance. Having found no adverse outcomes or lasting sequelae, our data also suggest that such a prospective study would be safe.

CONCLUSIONS

Poison control center management of asymptomatic

matic pediatric coin ingestion by home observation is frequently not accepted by the child's caregiver. This may be associated with disagreement with or poor understanding of the instructions. Our data suggest, however, that home observation may be a safe and effective management strategy. Despite its limitations, this study suggests that a prospective study of home observation would be safe and worth undertaking.

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