Should pennies retained in the stomach be removed?

TO THE EDITOR:

Pennies are among the most common objects ingested, especially within the pediatric population.[1,2] Conservative management of gastric coins has been the traditional approach. Two recent studies demonstrate that post-1982 pennies within the stomach may react differently than expected.[3,4] Pennies produced before 1982 consist of 95% copper and 5% zinc; however, post-1982 pennies contain 97.6% zinc and 2.4% copper coating. We report the reaction of post-1982 pennies when placed in acid at gastric pH.

Three groups of Lincoln-head pennies were selected: 18 produced before 1982, 18 produced after 1982, and 18 post-1982 pennies damaged by rubbing the surface with emery cloth. Obviously damaged pennies were excluded. Each group of coins was immersed in hydrochloric acid (pH 1.9) to mimic stomach pH. Continuous gentle agitation of the acid baths was achieved with plastic 500 mL containers on a New Brunswick Scientific C1 shaker platform. Pennies were placed on their edges to maximize surface acid exposure. Because acid was neutralized within as few as 4 hours, acid solutions were replaced every 8 hours. The pennies were maintained at room temperature because heating the acid posed potential hazards.

The coins were inspected and weighed daily; photographs and roentgenograms were taken of the pennies at the start and end of the experiment. To determine if mass loss differed over time, a repeated measures analysis of variance was performed using baseline weight as a covariate.[5]

Chemical reactivity differed among the sets of pennies. Pre-1982 pennies had a rusted appearance and progressed to orange and red tints. The mass loss and gross changes of the pre-1982 pennies were consistent as a set (**Table**). The post-1982 (unscarred) pennies demonstrated the greatest variability of mass loss and appearance, and the majority darkened in color. Irregular corrosion and pitting became more prevalent with increased acid exposure. After 48 hours some pennies within this group demonstrated significant corrosion leading to sharp edges with flaking of strands of metal. Only some of these findings were detected with radiographs. The intentionally damaged pennies demonstrated consistent erosion and darkening primarily on the damaged side. The results of the repeated measure analysis of variance indicate a significant group-time interaction ($P<.0001$).

TABLE

Summary of penny weight

Group	Initial weight*	Final weight*	95% CI decrease in weight
Copper pennies (unscarred, 1960–1981)	3.10 g (± 0.04)	2.49 g (± 0.05)	(0.54–0.67)
Zinc pennies (unscarred, 1983–2000)	2.50 g (± 0.02)	2.15 g (± 0.26)	(0.28–0.42)
Zinc pennies (scarred, 1983–2000)	2.50 g (± 0.02)	2.12 g (± 0.05)	(0.32–0.46)

*Mean (± standard deviation). CI, confidence interval

Pennies produced after 1982 may fragment and develop sharp edges, producing significant zinc absorption

This study suggests that pennies produced after 1982 that become lodged in the stomach may fragment and develop sharp edges, and prolonged acid exposure may produce significant zinc absorption. Current recommendations of observation for spontaneous passage do not account for these possibilities.[1] Increased monitoring of patients with pennies retained in the stomach >48 hours should be considered until further studies confirm whether observation alone provides adequate protection for all patients.

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This project was supported in part by a grant from the Health Resources and Services Administration Grant # 1D45PE50190-01.

Safety of first-generation antihistamines

TO THE EDITOR:

This correspondence pertains to "Prostatitis and Pruritus," which appeared in the April 2003 issue (*J Fam Pract* 2003; 52:287–289).

First-generation antihistamines, though very effective, may be hazardous. Studies have shown that diphenhydramine interferes with the ability to respond adequately when driving a car. This occurs even though the driver does not notice that it made him or her sleepy. In some states, operating a motor vehicle after taking a first-generation antihistamine is considered driving under the influence.

Taking a first-generation antihistamine at bedtime does not necessarily solve the problem. Interference with someone's ability to respond may persist for hours after one awakes.

It should be noted in the patient's chart that he is allergic to trimethoprim-sulfamethoxazole (Bactrim, Septra). The patient should be urged to wear a Medic Alert bracelet or at least carry a card in his wallet noting the allergy.

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DR. USATINE RESPONDS:

I appreciate Dr. Wasserman's thoughtful comments on "Prostatitis and Pruritus." We did mark the patient's allergy clearly in his chart, and warned him to avoid trimethoprim-sulfamethoxazole and other sulfa medications. A Medic Alert bracelet and a card in the wallet are extra precautions that can sometimes save lives in emergencies.

As far as safety of the use of first-generation antihistamines, there is still an honest debate going on in the literature on this issue. There is 1 meta-analysis that concluded "the average sedating effect of diphenhydramine was modest, and in some instances results of tests of

performance in the diphenhydramine group showed less sedation than in the control or second-generation antihistamine groups. A significant average effect size indicated a mild sedating effect caused by second-generation antihistamines in comparison with placebo."

The authors concluded that the "absence of a consistent finding of diphenhydramine-induced sedation is surprising given that most studies have been designed to increase the probability of this outcome, including administering a 50-mg dose. On the basis of this meta-analysis of performance-impairment trials, a clear and consistent distinction between sedating and nonsedating antihistamines does not exist."[1]

Some of the same researchers conducted a randomized controlled trial, which provided good evidence that first- and second-generation antihistamines—specifically, diphenhydramine and loratadine—do not impair retention of oral and written information, reaction time, or level of wakefulness in a school setting in asymptomatic children aged 8 to 10 years.[2]

There are other researchers and studies that support the notion that first-generation antihistamines are dangerous and should be avoided. Some of these studies were supported by the drug companies that sell the highly expensive second-generation antihistamines.

One drug-company-sponsored trial, using the Iowa driving simulator, showed poorer driving performance by participants who took 50 mg of diphenhydramine than by those who took alcohol. They also concluded drivers cannot use drowsiness to indicate when they should not drive because drowsiness ratings were not a good predictor of impairment.[3]

Another study of injury was a retrospective cohort study carried out in 12,106 patients whose initial antihistamine prescription was for diphenhydramine and in 24,968 patients whose initial prescription was for loratadine.[4] In the 30 days after the first prescription, the rate of all injuries was 308 per 1000 person-years in the diphenhydramine cohort vs 137 per 1000 person-years in the loratadine cohort. While a retrospective study can not prove causality, the numbers are cause for concern.

How do we apply this information to practice? If drug companies would bring the prices of their second-generation antihistamines closer to those for the over-the-counter first-generation antihistamines, this would be an easier question to answer.

The patient with urticaria in the Photo Rounds was actually seen by me at a free clinic; he had no medical insurance, was out of work, and did not own a car. He was grateful for the free diphenhydramine that we gave him, and he could not afford to buy the more expensive second-generation antihistamines.

As we always do in medicine, we must weigh the risks and benefits of all treatment options and give the patient informed consent. The patient can then be part of the decision-making process when there is not one right treatment, but many options available.

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