

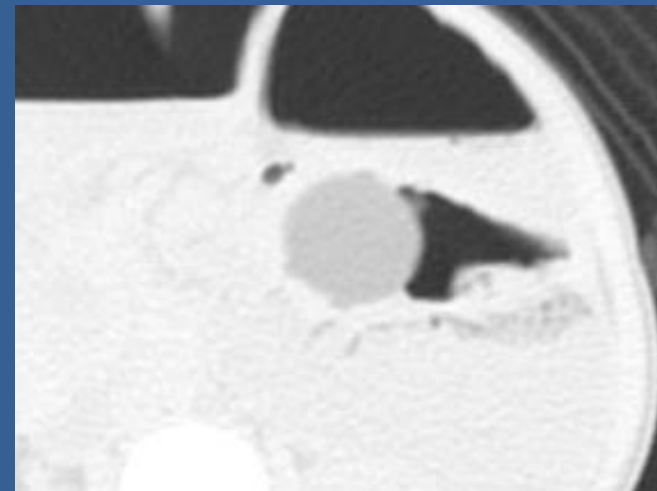
The 74th annual meeting of the Japan Radiological Society

Case 8: Answer

from Tokyo Teishin Hosp.

Summary: clinical & imaging findings

- A 2-year old boy with vomiting and fever (37.0°C).
- **WBC $10 \times 10^3 / \mu\text{l}$, Na 126.3 mEq/dl**
- abdominal fullness, loss of bowel sound
- **Xp/CT: small bowel obstruction (dynamic ileus)**
- **US: round-shaped hypoechoic mass without shadowing at the obstruction site, multiple tiny echogenicity in the mass. The bowel wall around it is slightly edematous.**
- **CT: no perforation, round mass of fat density (-150 H.U.), no intussusception, no ascites**



DDx of small bowel obstruction in pediatric population

Intussusception (lymphoid hyperplasia, **Meckel diverticulum**, tumor, **duplication cyst**)

Foreign body ingestion, bezoar

Appendicitis

Hernia

Adhesion

Complications of Meckel diverticulum

Midgut malrotation

Congenital obstruction

Tumor (rare in children: **lipoma**, polyposis, lymphoma, etc.)

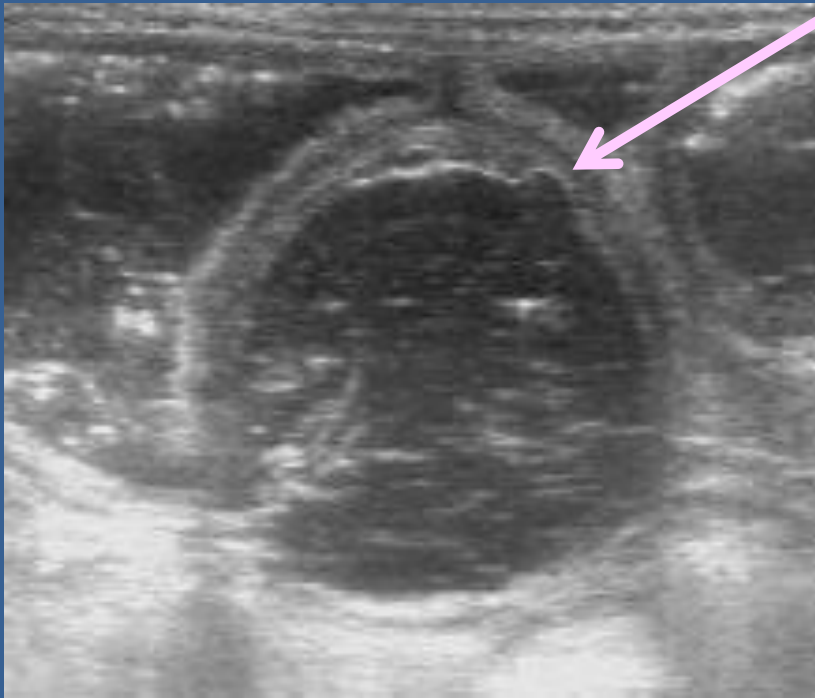
Cystic fibrosis, meconium

Caffey's Pediatric X-Ray Diagnosis 9th Ed
Hryorczuk, et al. AJR 2013;201:W1-8

Jayachandra, et al. Int J Pediatr Otorhinolaryngol 2013;77:311-7

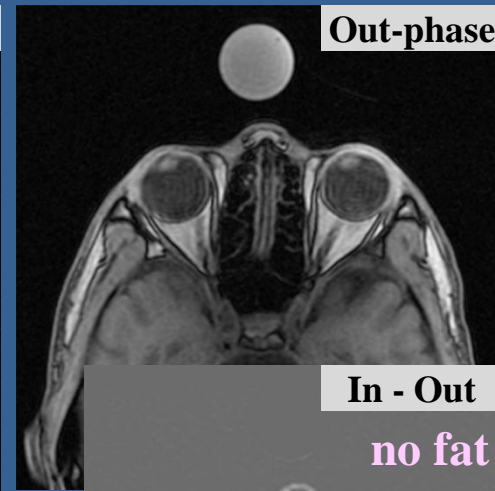
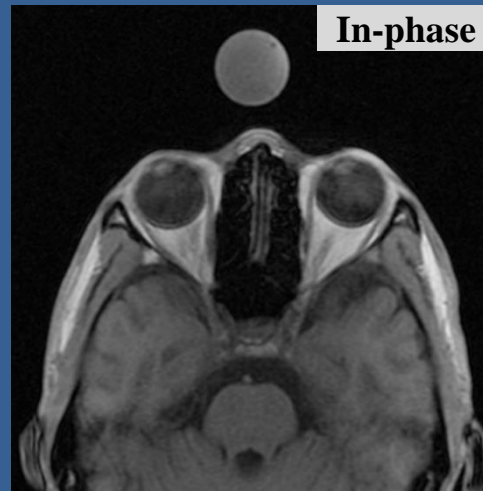
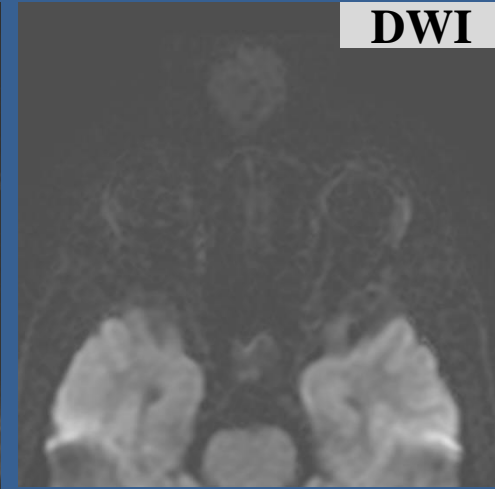
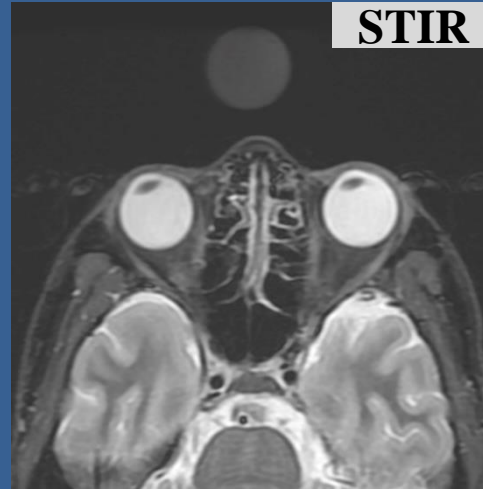
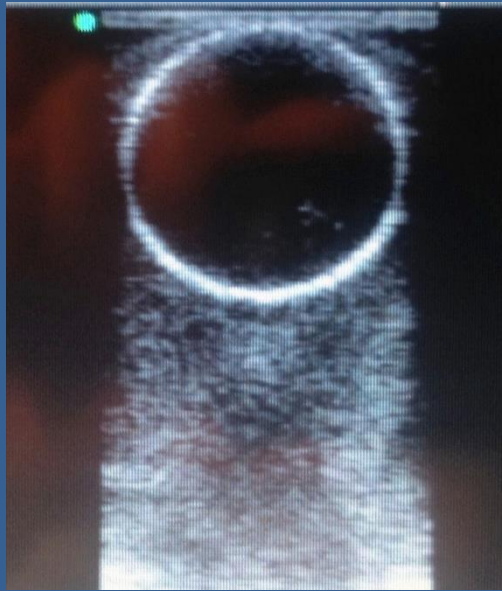
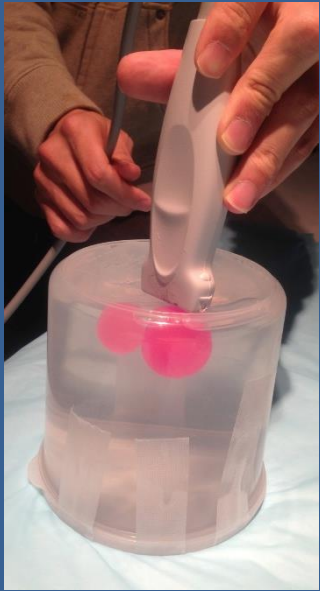
Clinical Course

Spiny projections



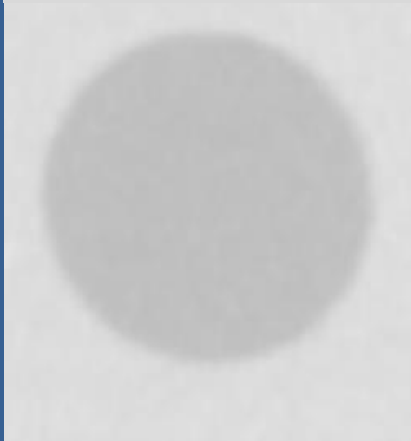
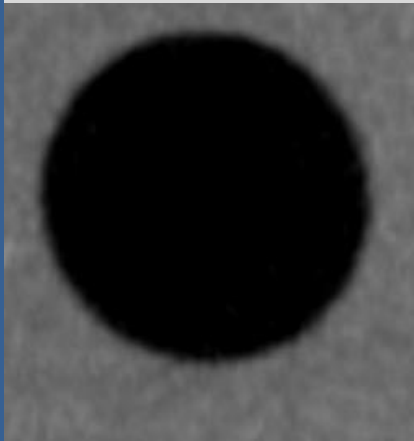
A super ball (bouncy ball) was evacuated next day, and the patient became asymptomatic.

US, CT, and MRI of super ball



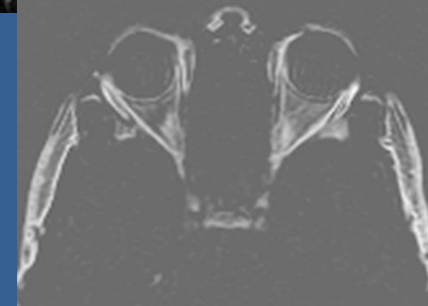
WL/WW=40/350

WL/WW=-500/1400



CT value: -150HU

In - Out
no fat



Final Diagnosis

Foreign body ingestion

(Super ball)

causing small bowel obstruction

Super Ball (bouncy/sky/power ball)

invented by a California chemist, Norman Stingley, in 1965. He spent his spare time experimenting with synthetic polybutadiene rubber compressed together under about 3500 pounds of pressure/inch² → a compressed rubber ball with an extreme resilience and high bounce (bouncy ball) . However, his company did not developed it. He introduced it to Wham-O company and the product became strikingly popular with product (super ball) of 170 thousands/day.

Safety

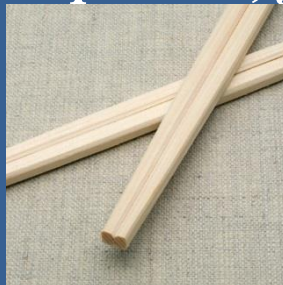
can be swallowed into the trachea/
esophagus by mistake, esp. by a child.
not so painful when it hits on the head.
can damage fluorescent light/pane,
or sometimes priceless antique vase,
because of its unanticipated bound.

from Wikipedia



Take Home Points

- **Accidental ingestion is a common cause of bowel obstruction in children.**
- **Radiologists should be familiar with image appearance of various kinds of materials.**
ex. medical devices, fruits & dry foods, drugs, bullets, etc.
- **Materials, which are buoyant in the water, show CT densities less than 0. The minus CT value does not always mean fat or air component.**
ex. wooden chopsticks, freeze-dried tofu, rice cake, etc.



References

1. Caffey's Pediatric X-Ray Diagnosis 9th Ed.
2. Hryhorczuk A, Lee EY, Eisenberg RL: Bowel obstructions in older children. AJR Am J Roentgenol. 2013;201(1):W1-8.
3. Jayachandra S, Eslick GD: A systematic review of paediatric foreign body ingestion: presentation, complications, and management. Int J Pediatr Otorhinolaryngol. 2013;77(3):311-7.