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Removal of open safety pins from the stomach and duodenum of infants without enterotomy

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Abstract Twelve infants aged 6–18 months with ingested open safety pins (OSPs) were operated upon between 1984 and 1993. The OSPs were wide-open in 4 and the retention time was more than 3 days in 8. At laparotomy, the stomach and duodenum were explored and the OSP and a Levin tube inserted previously from mouth to stomach were identified by palpation. The pin was inserted through the holes of the tube and locked intraluminally without opening the stomach and the tube was then withdrawn from the mouth with the OSP at its tip. When the OSP was located in the duodenum, it was squeezed back into stomach for removal. If the OSP could not be squeezed back into the stomach due to an unfavorable position, it was locked intraluminally and milked distally for spontaneous discharge. No complications related to the procedure were encountered. In conclusion, if non-operative methods fail and/or endoscopic systems are not available for the removal of retained OSPs, the proposed technique, which avoids enterotomy and related complications, is recommended.

Key words Foreign body ingestion · Open safety pin · Enterotomy

Introduction

Foreign bodies are usually ingested by young children during play. Safety pins are commonly used for clothes and bibs of small babies. Once in the stomach, most ingested foreign bodies pass through the gastrointestinal (GI) tract uneventfully [2]. If spontaneous passage does not occur, endoscopic and operative removal is recommended [1–8]. The purpose of this report is to present our cases of swallowed open safety pins (OSPs) and introduce a new method to remove them without performing an enterotomy.

Patients and methods

Twelve consecutive infants operated upon for retained OSPs within the stomach and duodenum between 1984 and 1993 were reviewed. All the patients were evaluated by clinical and radiological examinations (PA and lateral X-ray films). The indication for laparotomy was retention of the OSP for more than 3 days at a fixed location in 8 patients (Fig. 1). The size of the OSPs ranged from 2 to 5 cm. Four patients were operated upon earlier because the OSPs were wide-open. The age and sex of the patients and the size, retention time, and location of swallowed OSPs, symptoms, and method of removal are depicted in Table 1.

The removal technique begins with insertion of a Levin tube from mouth to stomach. The tube should have a tip-hole as well as side holes. A standard laparotomy is performed with the patient under general anesthesia with a supra/circumbilical incision. The stomach, duodenum, and intestine are explored; the pin and Levin tube are identified by palpation. An intragastric OSP is held

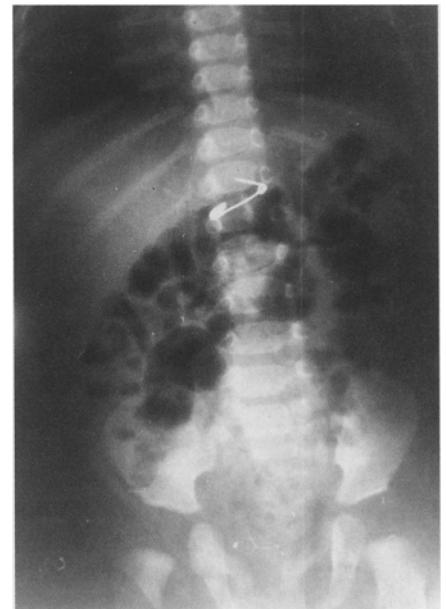


Fig. 1 AP radiograph of patient 11 shows wide-open safety pin puncturing posterior wall of duodenum

between the thumb and index finger of the left hand with the sharp tip pointing proximally while holding the tip of the tube with the right hand. The pin is inserted through the side or tip hole of the tube and locked intraluminally without opening the stomach; the tube is then withdrawn from the mouth together with the locked safety pin (Fig. 2). An OSP within the duodenum is also held by three fingers of the left hand, whereby the Kocher maneuver may be helpful. If the OSP points distally, it is milked into the stomach and then removed as described above. For OSPs pointing proximally, a silk loop tied at the tip of the Levin tube is used to lock, dislodge, and carry the pin into the stomach, after which the tube is removed with the locked safety pin. For OSPs that cannot be passed into the stomach due to an unfavorable

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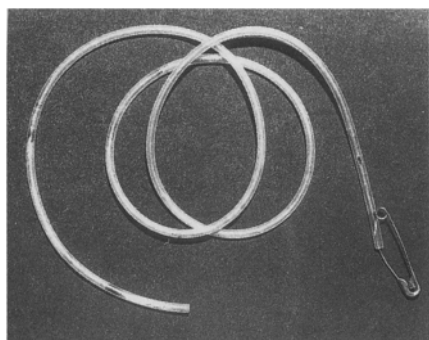


Fig. 2 Open safety pin after withdrawal via Levin tube

position, locking and squeezing them within the intestine down to the colon is an alternative. The patient is then followed for spontaneous discharge.

Results

In 4 patients (Table 1) OSPs had punctured the posterior wall of the duodenum, but there were no open perforations. Eventually, all the OSPs were removed by either the locking or the locking and squeezing technique. The average postoperative hospital stay was 3.4 days (range 1–9 days). Oral feedings were started on the 1st postoperative day in all patients. No complications were encountered related to the procedure.

Discussion

There are certain areas where the progress of foreign objects may be impeded and they may puncture or perforate the bowel wall. These include the pyloric ring, C-loop of the duodenum, Ligament of Treitz, ileocecal valve, hepatic and splenic flexures, rectosigmoid junction, surgical diverticulae, and webs or stenoses [1, 2, 3, 6]. Retention of elongated, pointed, and even blunt objects, particularly in an infant's duodenal loop, is very risky [2, 3, 6]. In 4 of our patients, the pins had punctured the posterior wall of the duodenum.

Table 1 Summary of cases with ingested open safety pins (OSPs)

No.	Name Age (months) Sex	Retention time (days)	Length of OSP	Location	Symptoms	Method of removal
1	CB 8 F	17	4 cm	Duodenum 2nd portion (punctured)	Retching and vomiting	Locked into Levin tube
2	MD 18 M	1	5 cm wide-open (3 cm)	Duodenum 3rd portion	–	Locked within silk loop
3	NK 9 F	6	3 cm	Duodenum 3rd portion	Vomiting and diarrhea	Locked into Levin tube
4	DS 12 M	1	4 cm wide-open (2.5 cm)	Stomach	Vomiting	Locked into Levin tube
5	YM 5 F	7	3 cm	Stomach	–	Locked within silk loop
6	MB 7 M	6	3 cm	Stomach	–	Locked and forwarded distally into intestine
7	EK 8 F	13	4 cm	Duodenum 2nd portion (punctured)	Retching and vomiting	Locked and forwarded distally into intestine
8	KK 9 M	6	3 cm	Duodenum 2nd portion	–	Locked into Levin tube
9	MD 3 M	6	2.5 cm	Stomach	–	Locked within silk loop
10	BD 9 F	3	3 cm	Stomach	–	Locked into Levin tube
11	YS 12 F	7	2.5 cm wide-open (1 cm)	Duodenum 1st portion (punctured)	Vomiting	Locked into Levin tube
12	BK 9 F	1	2 cm wide-open (1 cm)	Duodenum 3rd portion (punctured)	Vomiting	Locked into Levin tube

Operative removal by enterotomy and/or endoscopic removal are commonly used methods for extracting foreign bodies of the GI tract. However, endoscopy is not available in every institution, and removal by enterotomy is not without risks [1–8]. Alternatively, the locking technique described here can be applied without difficulty. Operative removal is recommended for objects longer than 5–6 cm if they are retained longer than 3 days within the duodenum [2, 3, 8]. However, in this age group the length of each portion of the duodenum is rarely longer than 3 cm. Since the lengths of the OSPs ranged from 2 to 5 cm, spontaneous passage was unlikely and also would bear the risk of retention and perforation. Moreover, when the OSP is wide-open the risk of retention is much higher due to the increased size. In 4 of our patients

spontaneous discharge was not expected, and removal was performed earlier because the OSPs were open.

In conclusion, if non-operative methods fail and/or an endoscopic system is not available, the locking technique described here is suggested as an alternative method for the removal of the OSPs from the stomach and duodenum of infants.

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