

## Safety-pin Induced Hemopericardium and Cardiac Tamponade in an Infant

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**Background:** Safety-pin ingestion causing cardiovascular complications are very rare with high risk for mortality. **Case characteristics:** A 10-month-old child who presented with persistent irritability and intermittent fever of 1 month duration. The child had tachypnea and mild subcostal retractions. **Observation:** Investigations revealed open safety-pin in lower esophagus, and pericardial effusion that later progressed to cardiac tamponade during handling of the safety pin by endoscope. **Message:** It may be safer to drain pericardial collection before handling sharp foreign bodies in lower end of esophagus as it can worsen cardiac complications.

**Keywords:** *Complications, Esophagus, Foreign body.*

Foreign body ingestions are common in children, but ingestion of safety pin causing cardiac complications are very rare [1-3]. Delayed presentation and management increases the risk of complications. We report a case of unwitnessed open safety-pin ingestion in a 10-month-old infant who developed cardiac tamponade with pericardial bleed during handling of the safety-pin by endoscope.

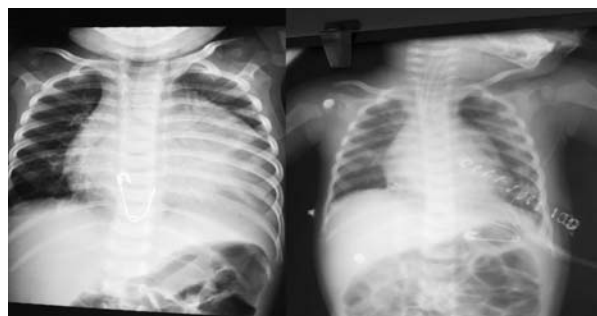
### CASE REPORT

A 10-month-old infant presented to us with complaints of intermittent fever and increased irritability for a month, requiring multiple emergency room visits. The child also had progressive feeding difficulty, and his physical activity had reduced significantly with less crawling and preference for stationary games.

At the time of hospitalization, child was febrile and irritable. Pulse rate was 140/minute and blood pressure was 90/60 mmHg. Liver was palpable 3 cm below the right costal margin and heart sounds were normal with no murmur. There were no adventitious sounds on auscultation over lung fields. Outpatient investigations revealed haemoglobin of 8.6 g/dL, and total leukocyte count of  $20 \times 10^9/L$  with 68% polymorphonuclear leucocytes. C reactive protein was 20 mg/L. Focussed examination in the ward revealed mild tachypnea with minimal intercostal retractions and decreased air entry on the left side. A chest X-ray revealed cardiomegaly with an open safety-pin in the lower esophagus (**Fig. 1**). Echocardiography revealed 15 mm wide pericardial effusion.

Pediatric surgery and Cardiothoracic surgery

opinions were sought. The options were either to retrieve the foreign body endoscopically or push it into the stomach with the anticipation of spontaneous passage per rectum. Retrieval of the safety pin endoscopically was considered to be difficult as the open end was facing upwards. Hence the safety pin was pushed into stomach using an endoscope. It was decided to monitor the child radiographically and surgical intervention was planned if the child becomes symptomatic or the foreign body remains stationary in a place for three days or more. Post-procedure the child became more tachypneic, respiratory rate increased to 60/minute and pulse rate increased to 170/minute. Heart sounds were distant with gallop, and liver size increased to 6 cm below the right costal margin. Emergency echocardiography revealed massive pericardial effusion with right ventricular collapse in diastole. Emergency left anterolateral thoracotomy revealed a small rent in the lower esophagus that was repaired. Pericardium was thickened, and around 150 mL of blood stained pericardial fluid was drained. Post-operatively,



**FIG. 1** Chest X-ray showing open safety pin (a) in lower esophagus, and (b) in stomach after endoscopy and thoracotomy.

the infant improved dramatically, and a rusted safety pin was passed per rectum after 4 days. Pericardial biopsy was suggestive of acute inflammation and pericardial fluid culture was sterile. The child was asymptomatic with normal cardiac function at follow-up after 6 months.

## DISCUSSION

Sharp foreign bodies at the lower end of esophagus can cause cardiac complications due to its close proximity with the heart [3]. Optimal management and outcome of an ingested sharp foreign body depends on the location and type of foreign body, experience level of endoscopist and device choice [4,5]. Removal of foreign bodies in the lower end of esophagus can cause esophageal perforation and cardiac injury due to close proximity to heart. In our case, worsening of the child's condition following endoscopic procedure may be due to creation of an esophageal rent and fresh bleeding into the pericardial space leading to cardiac tamponade. Spitz, *et al.* [6] reported a case of perforation of the heart by a swallowed open safety-pin in an infant causing hemopericardium. In two previous reported cases of safety pin ingestion causing cardiac complications, one was removed endoscopically [7], and in the other it was removed during a second surgery by laparotomy and gastrotomy [8].

The average transit time for ingested foreign object in children has been described at 3.6 days [9]. Esophageal safety-pins require emergency intervention, but once the foreign body reaches the stomach, patients may be observed for spontaneous passage with serial X-rays, if endoscopic retrieval is difficult [5]. Surgical or endoscopic intervention must be done if the child becomes symptomatic or if the safety pin displays a fixed position for more than three days [10]. In our case the pin had reached the small intestine by 48 hours and was passed per rectum on the 4th post-operative day without any further complications or intervention. In a case series of 49 children with witnessed safety-pin ingestion, 41% children passed safety pins spontaneously, 28.5% required endoscopic removal and 30.5% underwent surgery [10].

In our case, in hindsight, we should have anticipated worsening of the pericardial collection due to bleeding

during handling of the safety-pin. When a child with a sharp foreign body in the lower end of esophagus presents with a pericardial collection, it may be safer to attempt manipulation of the foreign body only after putting a pericardial drain.

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