

Spontaneous closure of acquired tracheo-oesophageal fistula

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Abstract

Acquired tracheo-oesophageal fistulae are uncommon in the paediatric age group. A case of such a fistula secondary to impaction of a button battery is reported below. Prompt management is essential to reduce morbidity and mortality in these cases.

Key words: Tracheo-oesophageal fistula; Foreign body

Introduction

With the advent of new electronic toys, children have an easy access to miniature size batteries such as disc batteries or button batteries. However, as opposed to the traditional foreign bodies in children such as coins, these button batteries are notorious for producing serious complications which can at times be fatal (Blatnik *et al.*, 1977). The following is a report of a five-month-old boy who had ingested a button battery.

Case report

A five-month-old male child was brought to the Emergency Room with difficulty in breathing and choking for 12 days. He had been attending another hospital for recurrent chest infection for more than 10 days prior to presenting to us. On clinical examination, the child was febrile and had symptoms and signs of chest infection. A chest X-ray showed a round metallic foreign body measuring approximately 22 mm in diameter impacted in the oesophagus at the level of the second thoracic vertebra (Figure 1). It had an unusual radiolucent border not typical of a coin. The lungs showed patchy pneumonia. He subsequently underwent an oesophagoscopy and removal of a foreign body four hours after admission. During surgery it was found that there was plenty of food debris engulfing the foreign body. There was intense inflammatory reaction at the site of the foreign body impaction and the foreign body was found to be a button battery used in an electronic toy. On retrospective questioning the mother confirmed that the patient's elder brother was playing with one such toy with his younger brother. However, post-operatively the child had a persistent cough and brought up all the milk he was drinking. He was clearly aspirating. The patient had a nasogastric tube inserted at this stage. He had an omnipaque swallow which showed a tracheo-oesophageal fistula at the level of the T2-T3 interspace (Figure 2). The dye filled the trachea and bronchi instantaneously. However there was no leak into the mediastinum. The patient was kept nil by mouth and had a

central line inserted in his left femoral vein. Parenteral nutrition was given through this line for three weeks. There were problems in retaining the central line and it was removed. The nasogastric tube was removed and instead a nasojejunoscopy tube was put in under radiological guidance and feeding was given through this nasojejunoscopy tube. A repeat omnipaque swallow was done four weeks after the oesophagoscopy and it was noted to the surprise of everyone that the tracheo-oesophageal fistula was healing. There was definite narrowing of the fistula with only a very thin leak into the trachea. Two weeks after that (i.e. six weeks after the oesophagoscopy and removal of FB) when the omnipaque swallow was repeated, it was found that the acquired

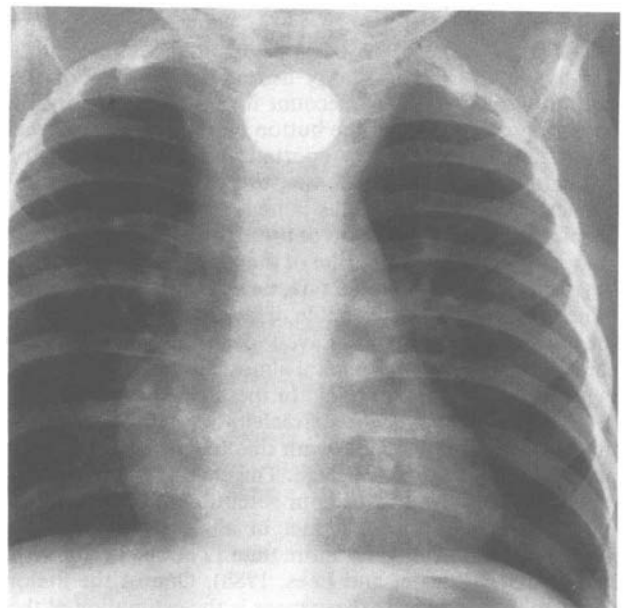


FIG. 1
Showing FB impacted at T₂ level in oesophagus.

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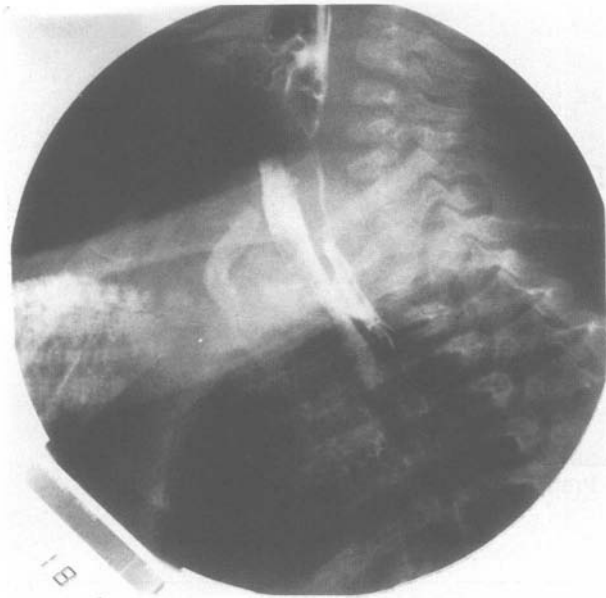


FIG. 2

Omnipaque swallow showing tracheo-oesophageal fistula.



FIG. 3

Omnipaque swallow showing healed tracheo-oesophageal fistula.

tracheo-oesophageal fistula had totally healed (Figure 3). There was no leak at all. The nasojunostomy tube was pulled out and the child started on liquids, then semi-solids and solids and was observed for one week after without any problems. He was subsequently discharged and remains well after eight months follow-up.

Discussion

Foreign bodies are not uncommon in paediatric age groups. Button battery ingestion has become an increasingly common problem in children below five years of age (Litovitz, 1983; Rumack and Rumack, 1983). Overall, it is believed that 90 per cent of batteries ingested will cause no problems (Sigalet and Lees, 1988). However, if the disc battery gets stuck in the oesophagus, then the morbidity and eventually the mortality increases. The size of the button battery may also account for its impaction in the oesophagus. The size of the button battery in our case was about 22 mm. It has been reported that if the diameter of the battery is about 21–23 mm, the chances of it getting impacted in the oesophagus is high (Litovitz, 1983). The problem in the management of these foreign bodies is their delayed presentation. In spite of the fact that these patients have dysphagia, inability to talk, tachypnoea, signs of chest infection, there is considerable delay in presentation from four hours to four weeks (Lavelle-Jones *et al.*, 1992). Our child presented to our hospital almost two weeks after the ingestion of the foreign body. In these cases the incidence of complications such as tracheo-oesophageal fistula, mediastinitis and at times death due to exsanguination by perforation of the aortic is high. The chance of perforation is very high after an eight hour retention at a specific site (Votteler *et al.*, 1983). In fact in all reported cases of oesophageal impaction for more than 12 hours, perforation has occurred (Sigalet and Lees, 1988). One of the major problems confronted in these cases is the estimation of the depth of injury. In our case, when the oesophagoscopy was performed to remove the battery, marked peri-oesophagitis was seen at the site of impaction. It was difficult to assess the depth of injury as there was also extensive food debris (thick, sticky milk residue) around the foreign body. Most of the time the tracheo-oesophageal fistula can only

be detected post-operatively by a contrast study. The button batteries cause perforation due to various mechanisms. Most of the time this is due to direct corrosive action, low voltage burns and pressure necrosis (Temple and McNeese, 1983; Szold *et al.*, 1991). The direct corrosive action is due to the amount of electrolyte base, usually sodium or potassium hydroxide, in these batteries. The batteries contain a 40 to 45 per cent solution of potassium hydroxide which approximates an 8N solution that is strong enough to cause necrosis of a rabbit's oesophagus after application of only 10 minutes. Moreover, these disc batteries are not always sealed, hence the contents leak and cause early corrosion of the oesophagus (Temple and McNeese, 1983). Moreover, if the battery is impacted its chance of passing is low because the oesophagus is rather passive and is a non-adaptable organ with weak peristalsis (Shabino and Feinberg, 1979).

As far as the management of these button batteries in the oesophagus is concerned, it is mandatory that they be removed immediately. Delayed removal only increases the morbidity and mortality. Various methods such as the use of forced emesis or the balloon catheter technique have been advocated, as well as oesophagoscopy and removal. We do not feel that the use of forced emesis should be a method of retrieving these button batteries. The management of button batteries that have passed the oesophagus seems to differ among various authors. Votteler *et al.* (1983) believe the consequences are less severe in the stomach because of protective mucus, acidity and fluid volume. Also the button battery that passes the stomach may be passed without any problem (Vaishnav and Spitz, 1989).

Various modalities of treatment have been advocated for the closure of these acquired tracheo-oesophageal fistula. The treatment seems to be difficult because of associated problems and may involve multiple staged procedures. Defunctioning cervical oesophagostomy may be needed before attempting a closure of the fistula. However, on reviewing the literature, it is seen that conservative treatments has never been tried by any authors in cases of button batteries in the oesophagus. Conservative treatment has been attempted only when the button batteries have been found in the stomach or

intestines, when seen first, and never tried if they are found in the oesophagus. On reviewing the literature again, it is noted that there has been no documented case of spontaneous closure of acquired tracheo-oesophageal fistula secondary to button battery impaction. In our case it took about six weeks for the tracheo-oesophageal fistula to heal spontaneously.

We believe that if the oesophagus is given total rest and the peri-oesophagitis settles down quickly, there is a fair chance that the fistula may heal and, because of this, we advocate waiting for a period of four to six weeks before attempting closure of these fistulae.

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