Management of Foreign Body Safety Pin (Closed and Open) in Bronchus and Oesophagus – A Technical Note

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ABSTRACT:

Safety pin as a foreign body in upper aero digestive tract is not a common occurrence and accounts for less than 3% of all trachea bronchial foreign bodies, yet it is of great concern to all ENT surgeons. This is because of its sharp end, which can result in impaction in aerodigestive tract resulting in lethal intra operative and post operative complications. This study highlights the potential risk of accidental ingestion and aspiration of safety pin which is a common household object and various techniques we follow to remove a safety pin via bronchoscopy and esophagoscopy.

Key words: Bronchoscopy, Esophagoscopy, Foreign Body Safety Pin, Open safety pin

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INTRODUCTION

Foreign body in upper aero digestive tract is a very serious, often a life threatening condition. According to survey it is the 5th leading cause of death in the United States for all age groups[1]. First successful bronchoscopic removal of a foreign body was performed by Gustav Killian in 1897[2].

Rigid esophagoscopy was first attempted by a German surgeon, Adolf Kussmaul, in the 1860s then popularized by the eminent otolaryngologist, Chevalier Jackson, during the early part of the twentieth century. Since then, improvements in endoscopic techniques, such as, introduction of rod lens telescope, which has greatly improved visualization and illumination for removal of foreign bodies, and advances in anaesthetic agents and techniques, have made the

management of tracheobronchial and esophageal foreign bodies easier[3].

Foreign body safety pin in upper aerodigestive tract is of great significance in developing countries like India, because of its common use in children's clothing and diapers and the lack of awareness of its potential risk of life threatening complications[4]. Such cases are not commonly reported and various techniques used to remove this foreign body endoscopically are unclear in literature.

CASE REPORT-1

A 3 year old girl came with an alleged history of aspiration of a safety pin, while she was playing. There was history of choking and cough which subsided in few minutes. Patient was taken to nearby hospital and a chest x ray was taken which showed a safety pin (closed) in her left main bronchus with the spring of the pin facing upwards. Patient came to our hospital the next day. X ray was repeated which showed the foreign body in the same level. Patient was haemodynamically stable with normal SpO2 with no respiratory distress, chest pain, hemoptysis or wheeze.

The child underwent a rigid bronchoscopy under general anesthesia, wherein a 4.0 sized Karl storz pediatric bronchoscope was negotiated into the left main bronchus which revealed a closed safety pin with the spring end facing above. The spring of the pin was held and engaged using a toothed bronchoscopy forceps and the pin was drawn into the scope along the long axis of the pin. The safety pin is then removed through the bronchoscope without any tissue trauma. Post-operatively patient recovered smoothly and was discharged after 48 hours.

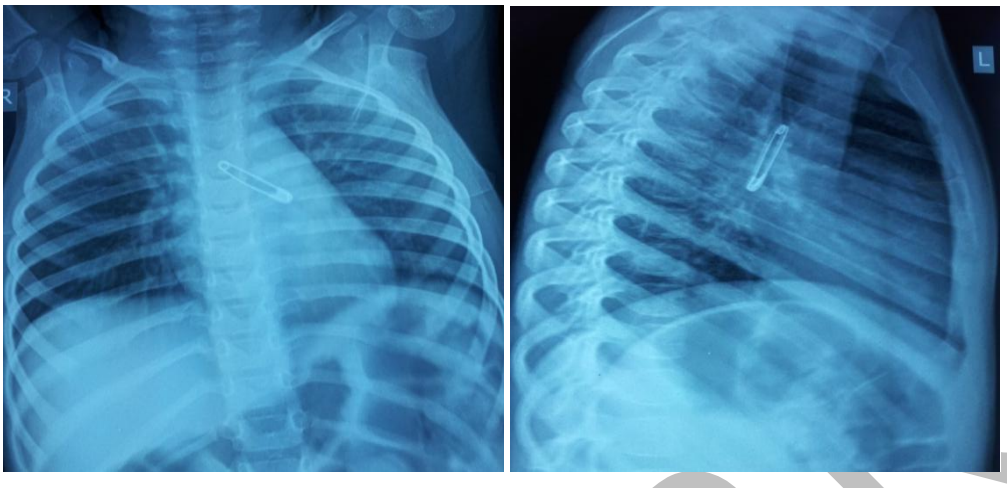

Figure1: Chest X ray AP and Lateral view showing Radio opaque foreign body (closed safety pin) located in the left main bronchus

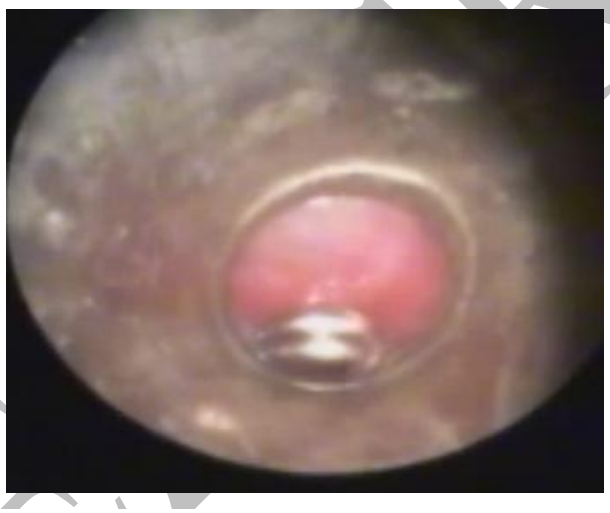

Figure 2: Bronchoscopic view of the foreign body (safety pin) with its spring end facing upwards

CASE REPORT-2

A 6 ½ year old male child accidentally swallowed an open safety pin at his residence. He suddenly developed pain in his throat which aggravated every time he swallows. No history of choking, respiratory distress, hemoptysis. Patient was immediately brought to our hospital and his chest X-ray was taken which revealed an open safety pin in the mid oesophagus level with its pointed end facing upwards. Patient was haemodynamically stable.

Rigid oesophagoscopy was done under general anesthesia which revealed an open safety pin in the mid oesophagus

with pointed end impacted in the oesophageal wall and facing upwards. The pointed end of safety pin was held first by grasping forceps and was carefully disimpacted by gently pushing it inwards along with the scope without leaving the hold of the pin. Then The sharp end of the pin was shealthed into the scope and was drawn out very slowly along with the oesophagoscope. The procedure of safety pin removal was completed successfully without any tissue injury. Ryles tube feeding was given for 48 hours and patient was discharged on the third day post-operation.

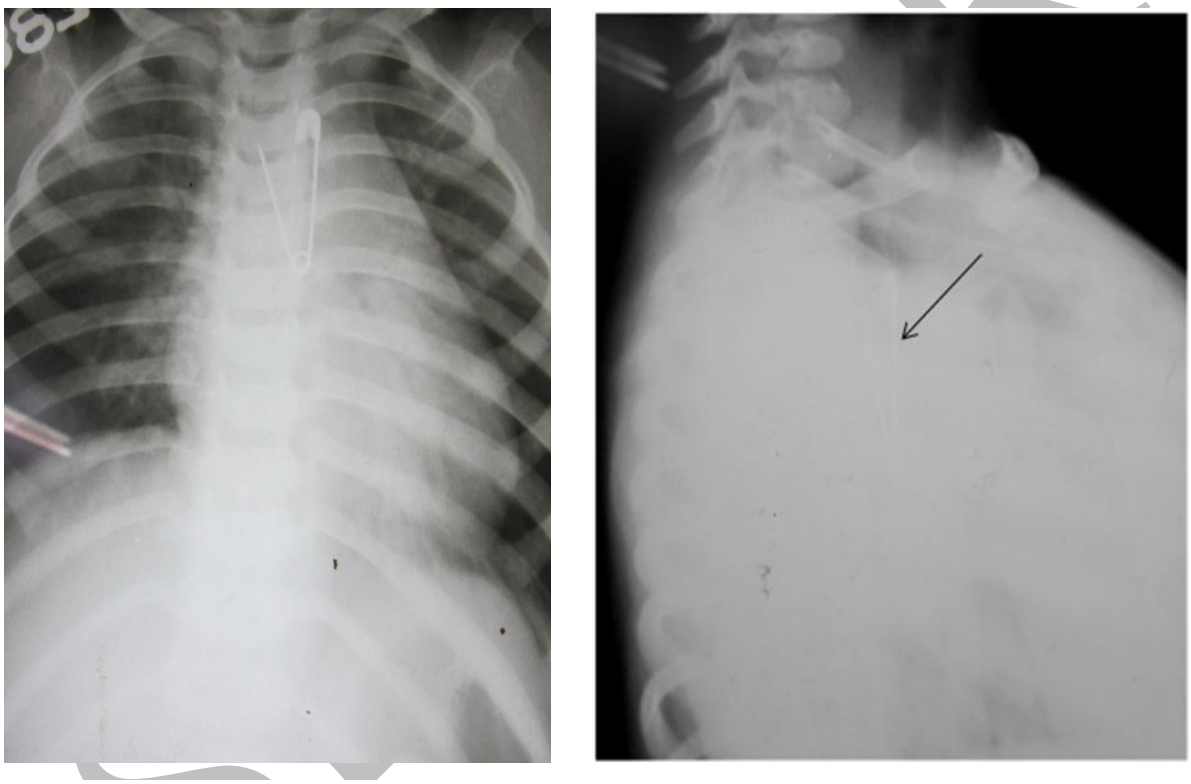

Figure 3: Chest X ray AP and lateral view showing a radio opaque foreign body (open safety pin) located in the mid oesophageal region

DISCUSSION

Most victims of accidental foreign body aspiration and ingestion are older infants, toddlers and children. Diagnostic workup of foreign body aspiration includes a definitive history and comprehensive radiological investigations. Treatment mostly aims at removal of foreign body and avoidance of life threatening complications[3].Foreign body safety pin still remains a diagnostic and therapeutic

challenge despite significant advances in endoscopic techniques.

Closed safety pin in bronchus:

Before the advent of bronchoscopy, the mortality rate from aspiration of foreign body was approximately 50%[4]. Among children younger than 15 years, toddlers seem to be the most vulnerable for foreign body aspiration with peak age of 1-3 years[5]. Safety pins are not commonly aspirated objects and account for less than 3% of all foreign bodies found in tracheobronchial tree[6].

In these cases, clinically there may be equal air entry in both the lung fields, because the safety does not occlude the airway partially or completely. Most of the safety pins can be removed using a bronchoscope, with low morbidity and mortality.

Recently, use of wire with a magnetic tip fitting into the working channel of a rigid bronchoscope has been successfully used for removal of metallic (safety pins, needles) or ferromagnetic foreign bodies from tracheobronchial tree[8].

In our case, the spring end of the pin was facing upwards. Hence we advocate the use of a toothed forceps which can engage this spring end and makes the removal easy without slippage. This method can be used in any endoscopic procedures.

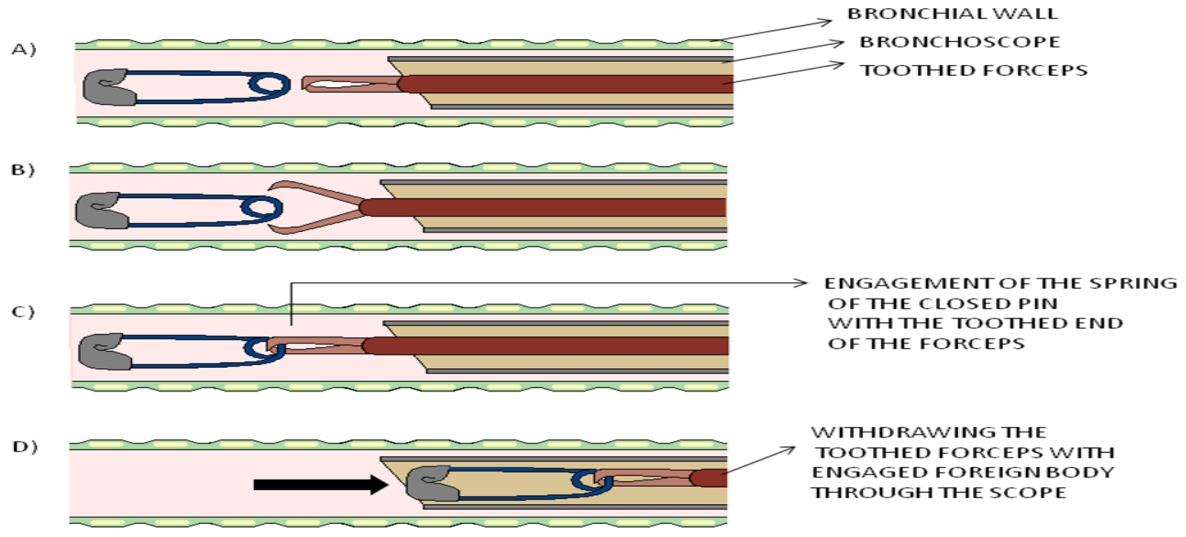

Figure 4: schematic diagram showing removal of foreign body using toothed forceps (closed safety pin)

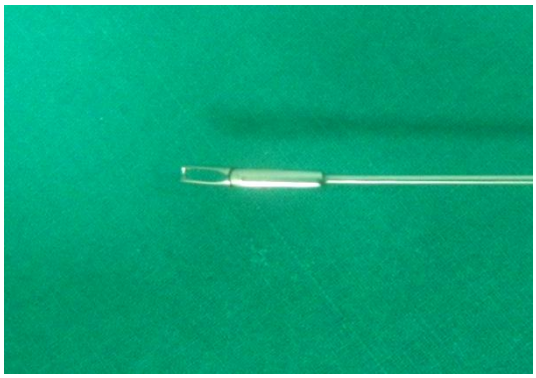

Figure 5: showing toothed alligator grasping bronchoscopic forceps

Figure 6: showing engaging the toothed forceps with the spring end of the safety pin

Open safety pin in oesophagus:

Several methods have been explained in literature about removal of open safety pin from oesophagus. The standard method described is the use of Clerf-Arrowsmith safety pin closing forceps[3]. One of the most important factors that determine the method of removal is the direction of the sharp end of the safety pin. A pin with sharp end facing upwards is relatively less complicated with lesser risk for oesophageal perforation and injury to mediastinal structures[4]. The method that we advocate is to release or disimpact the sharp end, then engage it into the scope and remove it along the scope.

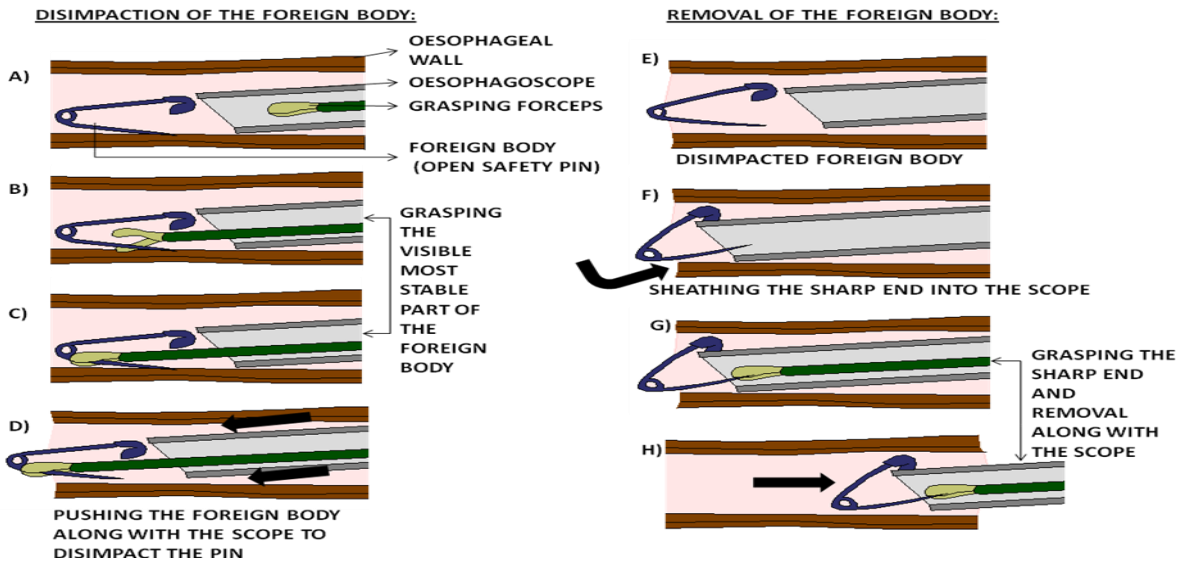

Figure 7: schematic diagram showing the method of removal of impacted sharp foreign body oesophagus (open safety pin) using a grasping forceps. Figures A-D shows how to dis-impact the foreign body and figure E-H shows the method of removal.

In case of sharp end pointing downwards, the risk is of the sharp end having already perforated the lumen is imminent. These cases pose danger of severe haemorrhage if the sharp end has perforated through heart or the great vessels[4]. A detailed CT scan study must be done for such cases, followed by endoscopic assessment to see the degree of impaction of the sharp end into the luminal wall. These cases must be explored and not treated endoscopically. But in cases where the sharp end could be completely seen inside the oesophageal lumen, shealthing the safety pin inside the scope by holding the spring end and removal can be done.

CONCLUSION:

Foreign body in upper aerodigestive tract is a very common problem encountered by ENT surgeons, yet it is not without high risk of lethal complications, especially in case of sharp metallic foreign body like safety pin.

Hence, a careful evaluation and appropriate technique for retrieval is needed, because the slightest slip can cause complications that varies from immediate life threatening hemorrage to long term sequelae of a stricture. Awareness about the hazards of safety pin aspiration or ingestion and avoidance of usage of safety pin within children's reach must be provided to all mothers.

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