

## Removal of coin from upper esophageal tract in children with Magill's forceps under propofol sedation

BK Baral,<sup>1</sup> RR Joshi,<sup>2</sup> BK Bhattarai<sup>3</sup> and RB Sewal<sup>2</sup>

<sup>1</sup>Department of Anaesthesiology, Nepal Orthopaedic Hospital, Jorpati, Kathmandu, <sup>2</sup>Department of ENT, <sup>3</sup>Department of Anaesthesiology and critical care, BP Koirala Institute of Health Sciences (BPKIHS), Dharan-18, Sunsari, Nepal

**Corresponding author:** Dr. Bidur Kumar Baral, Anaesthesiologist, Department of Anaesthesiology, Nepal Orthopaedic Hospital, Jorpati, Kathmandu, Nepal; e-mail: bidur\_baral@yahoo.com

### ABSTRACT

Foreign body ingestion is a common emergency problem in children. Coins are the most common foreign bodies lodged in the esophagus. This is a retrospective study where we reviewed 21 consecutive paediatric cases of coins impacted in the upper esophagus. These children were attended at the BP Koirala Institute of Health Sciences, Dharan, from March 2007 to March 2008. In this study, Mc-Intosh laryngoscopes were inserted into the pharynx to elevate the larynx and to expose the esophageal entrance. Then Magill's forceps were advanced into the esophagus and opened in order to see and extract the coin from the esophagus under propofol sedation. Coins were successfully removed by Magill forceps without any complications from all 21 children. Amongst these children, 14 (66.7%) were male and 7 (33.3%) were female. The mean age of the children was 3.79 ( $\pm$ 3.02) years. The coin was grasped and extracted on the first attempt in all 21 patients. The mean time for the removal of the coin (i.e. initiation of laryngoscope to removal of coin) was 51.48 ( $\pm$ 24.17) seconds. During direct laryngoscopy, 15 (71.4%) coins were visualized clearly, whereas 6 (28.6%) were not. However all coins were successfully removed. The most commonly ingested coin is a one rupee Nepali coin (42.9 %) followed by a two rupee coin (19.0%) and an Indian one rupee coin. Thus it can be seen that the coin impacted at the cricopharynx and upper oesophagus can be safely, easily and quickly removed by direct laryngoscopy and Magill's forceps under propofol sedation.

**Keywords:** Esophagus; coins; direct laryngoscopy, magill forceps.

### INTRODUCTION

The ingestion of foreign bodies is a common problem in the pediatric age group. Various types of foreign body are swallowed by children and are commonly impacted in the upper oesophagus, mostly at the cricopharynx. Most of them are usually coins; less common are buttons, chocolate, toffees, bone pieces, pins and other food related foreign bodies.<sup>1</sup> The coins that traverse from the esophagus almost always pass spontaneously via the gastrointestinal tract. It rarely causes complications,<sup>2,3</sup> because the cricopharynx is the narrowest part of the pediatric gastrointestinal tract and is the site where a significant number of ingested foreign bodies lodge. Those that lodge in the esophageal tract typically require removal. Coins that reach the lower esophagus often pass spontaneously into the stomach, but coins in the upper esophagus are less likely to do so.<sup>4-9</sup>

Removal of coins impacted in the upper esophagus is necessary because retained esophageal coins are associated with many complications. It may be associated with mucosal ulceration or esophageal obstruction, extraluminal coin migration, pneumomediastinum, tracheoesophageal fistula and fatal aorto-esophageal fistula and can potentially lead to

significant morbidity and even mortality.<sup>10-12</sup> So removal of foreign body is generally recommended as early as possible. Therefore coins impacted in the upper esophagus is most alarming, apprehensive and an urgent medical situation but not life threatening.<sup>13,14</sup>

Several approaches have been described in the literature for the management of impacted upper esophageal coins. These include the use of Magill forceps,<sup>6,10</sup> the use of a Foley (balloon) catheter,<sup>7,15</sup> flexible esophagoscopy,<sup>16</sup> rigid esophagoscopy<sup>17</sup> and the use of a bougie to advance the coin into the stomach.<sup>18</sup>

This study assesses the use of a Magill forceps technique for the removal of coins impacted in the upper esophagus at or just below the cricopharynx under propofol sedation. The aim of this study is to present our experience of extraction of foreign body from cricopharynx and upper oesophagus by utilizing the Magill's forceps under propofol sedation.

### MATERIALS AND METHODS

This is a retrospective study where we reviewed 21 consecutive paediatric cases of coins impacted in the cricopharynx and upper esophagus. The children were attended at BP Koirala Institute of Health Sciences,

Table-1: Types of removed coin

Types of coin	Frequency	(%)
Nepalese coin Rs 1	9	42.9
Nepalese coin Rs 2	4	19.0
Indian coin Rs 1	4	19.0
Indian coin Rs 2	3	14.3
Indian coin Rs 5	1	4.8
Total	21	100.0

Dharan, a tertiary care Hospital, from March 2007 to March 2008. The inclusion criteria for this technique were (1) the coin was confirmed lodged in the upper esophagus at or immediately below the cricopharynx by posterior-anterior and lateral view of x-rays of neck (2) there was no clinical evidence of esophageal perforation (3) no previous history of esophageal surgery, (4) no history of respiratory distress. The diagnosis was confirmed by Radiograph of neck (both posterior-anterior and lateral view). The instruments used were Mc-Intosh laryngoscope and Magill's forceps.

The written informed consent was obtained from parents before the procedure. The child was kept nil per oral for 8 hours prior to the procedure. An IV canula was opened on the dorsum of hand. The usual monitoring devices were attached including an electrocardiogram, non invasive blood pressure monitoring and pulse oxymetry. Then the patient was sedated with injection atropine 20mcg/kg, injection pethedine 1 mg/kg, injection propofol 2mg/kg intravenously. One hundred percent oxygen was given via face mask, after loss of eyelash reflex. The child was kept in Sniff's position and direct laryngoscopy was carried out. Tip of the laryngoscope was put in the valleculae. The base of the tongue was moved to the left side and the epiglottis and larynx was lifted. The coin was searched at the orifice of cricopharyngeal junction. After visualization of the coin, a Magill's forceps was inserted gently into the orifice of the esophagus. The Magill forceps was always oriented so that the forceps opened vertically. The coin was grasped and removed with the help of the Magill's forceps. If the orifice was closed and the coin was not visualized, the closed Magill's forceps was inserted gently into the oesophageal orifice. The forceps was opened to spread the cricopharyngeal opening. Once the coin was visualized it was grasped and removed. If the coin was not removed on the first attempt, the procedure was repeated once. If it failed again, the patient was intubated and a rigid esophagoscopy was carried out. Once the coin was removed, the patient was kept in head down and lateral position. Oxygen was given via face mask. The patient was kept in the recovery room till full consciousness was regained, and then shifted to

emergency observation room. Then the patient was sent home after fulfillment of discharge criteria.

Details of the patients including age, sex, time of presentation at hospital, time required for the removal of coin, duration of the hospital stay and complications were analyzed and presented for discussion.

## RESULTS

The upper oesophageal coins were successfully removed from all 21 children by this Magill's forceps technique. Among them 14 (66.7%) were male and 7 (33.3%) were female. Most of them had been referred from other hospitals. The mean age of children was 3.79 ( $\pm 3.02$ ) years with minimum age was 1 years and maximum age was 13 years. The coin was grasped and extracted on the first attempt in all 21 patients. The mean time for the removal of the coin (i.e. initiation of laryngoscope to removal of coin) was 51.48 ( $\pm 24.17$ ) seconds, ranging from 30 to 120 seconds. During direct laryngoscopy, out of 21 children, in 15 (71.4%) children coins were visualized clearly, whereas in 6 (28.6%) children were not. However all coins were successfully removed. The most commonly ingested coin is a one rupee Nepali coin (42.9%) followed by a two rupee coin (19.0%) and a one rupee Indian coin (19.0%) (Table-1) (Fig. 1). In one case the child had ingested Indian coin of rupees five. 15 patients (71.4%) were presented with in 6-24 hours after ingestion of coin, 3 patients (14.6%) were present before 6 hours and after 24 hours respectively. Mean postoperative stay in the hospital was 6 hours and ranged from 4 hours to 10 hours. There were no complications arising out of the procedure in the entire series.

## DISCUSSION

Foreign body ingestion is a common emergency problem in children. Coins are the most common foreign bodies lodged in the esophagus.<sup>2</sup> The incidence of ingestion of foreign body in children is high. It could be due to their



Fig. 1. Removed coins and instruments

natural propensity to gain the knowledge by putting things in the mouth, inability to masticate well and inadequate control of deglutition. The majority of the paediatric patient had foreign body lodge at the level of cricopharynx because the cricopharynx is the narrowest part of the pediatric gastrointestinal tract and is the site where a significant number of ingested foreign bodies lodge. Those that lodge in the esophageal tract typically require removal. Coins that reach the lower esophagus often pass spontaneously into the stomach, but coins in the upper esophagus are less likely to do so.<sup>4-9</sup>

Early recognition and treatment of impacted coin of esophagus is imperative because the complications are serious and life threatening: mucosal ulceration, inflammation and infection can result in serious complications like oesophageal abscess, mediastinitis, perforations or fistulae.<sup>10-14</sup>

Several methods have been described in the literature for the removal of impacted upper esophageal coins. The best modalities of removal of foreign body have been a subject of controversy. The choice of treatment is influenced by many factors such as age of patient, size and shape of ingested foreign body, anatomical location, and skill of the physician.

The methods are use of Magills forceps,<sup>6,10</sup> the use of a Foley (balloon) catheter,<sup>7,15</sup> flexible esophagoscopy,<sup>16</sup> rigid esophagoscopy<sup>17</sup> and the use of a bougie to advance the coin into the stomach.<sup>18</sup> Among them the most popular technique of removal of impacted upper esophageal coins is rigid oesophagoscopy. This method required general anaesthesia with muscle relaxation. Both rigid and flexible oesophagoscopy have been associated with 2.0-10.0% risk of perforation during foreign body removal. Authors have studied a new way to manage coins impacted at the upper end of the oesophagus and above by direct laryngoscopy and using Magill's forcep under propofol sedation. We could extract all the coins and had 100.0% success rate. We were able to extract five rupee Indian coins as well. Propofol is most commonly used intravenous anaesthetic agent for induction, sedation and maintenance of anesthesia. It blunts the upper airway reflexes, so direct laryngoscopy becomes easier and removal of coin from the upper oesophagus is facilitated.

The technique of using Magill's forceps to remove upper esophageal coins has been described by Janik and Janik, pediatric surgeons who removed coins from 36 endotracheally intubated children<sup>10</sup> and by Mahafza, an otolaryngologist who removed upper esophageal coins from children who were under inhalational anesthesia but not intubated.<sup>6</sup> No complications were reported in either case series, but in this study we did not intubate,

just sedated with propofol and our experience is similarly positive.

A notable difference in our study is that the Anaesthesiologist managed the entire case. This technique converted major Endoscopic procedure of upper G I tract into a minor procedure. As the procedure relieved symptoms of foreign body impaction immediately, muscle relaxation was not required in any of our patients. There was no immediate or late complication observed with the procedure. Results were remarkably good as there was no mortality or morbidity. It caused less apprehension to the surgeon. It decreased the duration of hospital stay; therefore the cost of hospitalization was reduced. Overall cost of the treatment was reduced, as the instruments are cheaper and easily available.<sup>19,20</sup> The minimally invasive Magill's forceps technique described in this study is a safe and efficient alternative to flexible and rigid esophagoscopy for removal of impacted upper esophageal coins. This technique is also useful in rural hospitals of Nepal where specialist facilities are not available. Although promising, our study has limitations, most importantly its small sample size. A larger study would more accurately estimate the frequency of uncommon but clinically important complications.

The coin impacted at the cricopharynx and upper oesophagus can be safely, easily and quickly removed under direct vision with direct laryngoscopy and the Magill's forceps under propofol sedations. Thus it is a safe, short, and cost effective method of management and has advantages over other conventional techniques. Further study involving a larger number of patients is needed before this procedure can be generally recommended.

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