Role of magill forcep in retrieval of foreign body coin

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Abstract Children swallow coins more than any other object. Many methods for removal of impacted coins at the upper end of the oesophagus are enumerated in literature, each having its own merits and demerits. This retrospective study in 100 consecutive paediatric patients presents a magill forcep technique for removal of coins under inhalational anaesthesia using Mc-Intosh laryngoscope. Intubation and rigid endoscopy both were avoided, thereby minimizing hospital stay and cost of treatment. This also decreases the chances of complications. Moreover the technique was found to be at par with rigid endoscopy in term of efficacy and safety. However interestingly statistical analyses of the data by ‘Chi Square Test’ (χ^2) revealed the technique to be more applicable in younger age group i.e. 0–6 years.

Keywords Magill forcep · Foreign body

Introduction

Coin ingestion is a common paediatric emergency [1]. Most of the times coins traverse the gastrointestinal tract (GIT), but can get impacted in the cervical oesophagus just below the cricopharynx [1]. They warrant removal, as long-term retention is associated with morbidity and even mortality. At present, review of literature suggests endoscopy, foley’s catheter, bougienage and penny pincher methods for removal of coins. The paradigm for the management of coin ingestion has undergone substantial changes over a period of time. Guided by new research, the thrust is to adopt a minimally invasive and morbid technique, which also incorporates the economics of healthcare financing. This evolution in thinking prompted us to report this simple and effective technique of “magill forceps” for impacted coins.

Materials and methods

A retrospective review of 100 consecutive patients in paediatric age group, at Institute of Medical Sciences & S.S Hospital, BHU, Varanasi for oesophageal coin ingestion from Jan 1999 to Dec 2006 was conducted.

All the patients were admitted and X-ray neck-posterior anterior and soft tissue lateral view was done to confirm the diagnosis of the foreign body (FB). Only patients with foreign body coin at the level of clavicles on x-ray were included in the study design. It was presumed that this indicated the level of cricopharyngeal muscle. Once the diagnosis was confirmed, all necessary investigations for general anaesthesia (GA) were done and subsequently after 4 hours, the patients were shifted to emergency operation theatre. Roentgenography was repeated prior to the procedure, to make sure that coin had not passed into stomach. Gas induction with oxygen, halothane and nitrous oxide using a mask and spontaneous breathing was given to these children (inhalation anaesthesia). A Mac-Intosh was

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then inserted into the pharynx and larynx elevated to expose the cricopharyngeal area. If the coin was visualized as such, it was grasped by magill forcep and removed, otherwise magill forcep was gently introduced in the cricopharyngeal area and its blades opened vertically. Now if the coin was seen the forcep was used to retrieve it.

The cases in which coin was not visualized either by Mac-Intosh laryngoscope or by assisted opening of magill forcep, the conventional method of rigid endoscopy after intubation was used for extraction.

Patients where coins were removed by magill forcep, were discharged from the emergency operation theatre recovery room after 4 hours, others were kept in ward for observation for a period of 24 hours and discharged subsequently.

Results

In our retrospective study of 100 consecutive patients with FB coin, a male preponderance was noted (male 71, female 29). As many as 76 children were seen in age group 0–6 years. Rest 24 children were seen in age group of 7–12 years. The minimum age of the child recorded was 8 months.

Out of a total of 100 patients, 2 patients underwent an external approach for removal of coins. In these patients coins were lodged at the upper end of oesophagus for more than a month. Of the remaining 98 patients, in 43 patients magill forcep technique (MFT) was used for extraction of coins. Here only two patient failed extraction and coin slipped in GI tract. In the rest 55 patients, a 100% success rate with rigid endoscopy technique under general anaesthesia was recorded. All these patients reported to our hospital within 24 hours of coin ingestion. Thus by incorporating the innovation of MFT prior to rigid endoscopy a minimal failure rate of 4.64% was recorded in our study.

The patients were further classified in specific age groups of 0–6 and 7–14 years to see any interrelationship between age and the said technique (Table 1). It is interesting to note that the chances of visualization of coin by Mac-Intosh was maximum in the age group of 0–6 years (36),

where at 1 degrees of freedom $P < 0.001$, which is highly significant as in the age group of 7–12 years only 7 children were seen. “Chi Square (χ^2)” test was used to interpret the result statistically so as to draw an inference whether this was a chance occurrence or indeed an age dependent phenomenon [2]. The value of P was found to be less than .001, which is highly significant. Thus the chance of visualization of coin by Mac-Intosh method and thereby application of MFT is greatest in younger age group.

It is interesting to note that we had only one patient with double coins. And only one child had mental retardation. No complication of either the technique or general anaesthesia was seen in our series of patients.

Discussion

Coin ingestion is the most common FB lodged in oesophagus. It usually lodges itself at the upper end of the oesophagus just below the cricopharynx. They are to be removed as soon as possible, as impacted coins can lead to perforation, mediastinitis, tracheo-oesophageal fistula and death if retained for long time [3–5]. At present, endoscopy, bougienage, catheter removal and penny pincher are the available techniques for removing the impacted coins [6, 7].

It has been a general policy of our institute to remove all FB coin by rigid endoscopy under GA. We believe that in flexible oesophagoscopy foreign body cannot be grasped firmly and mucosal folds obscure the view. A magill forcep innovation has been incorporated in this protocol of management over a period of time. In recent years, there has been an active debate on the merits and demerits of rigid endoscopy. FB removal with rigid endoscopy under GA has a 100% success rate, the airway is always protected, child is put to no discomfort and the whole procedure is always carried out under direct vision. But it is a costly technique, requires trained professionals and hospital stay. Moreover it also carries in hidden costs to parents of time off from work and time away from home. Sinister complications like oesophageal perforations are associated with it, which can be fatal at times. A study by Connors mentions a complication rate of 2.5% with endoscopic removal [8].

By incorporating the magill forcep technique innovation we recorded a mere failure in two cases only, i.e. a comparable success rate of 95.3% to the 100% success rate of rigid endoscopy. This minimal failure could well have been a chance occurrence probably due to over enthusiastic application of magill forcep, which accidentally pushed the coin in GIT.

It is interesting to note that the probability of visualizing coins with McIntosh and thereby their removal by MFT was seen more in the age group of 0–6 years (table 1). A plausible application for this could be [9]: initially epiglottis is in close relation to soft palate in a neonate. Differential growth in length of the human pharynx causes larynx to

Table 1 Relationship of age with magill forcep technique (MFT)

Age group	0–6 years	7–12 years
Total number of cases	76	24
Patients-coins visualized by McIntosh (MFT used for coin removal)	36	7

Application of Chi Square Test (χ^2):

$$\chi^2 = \frac{(36 - 21.5)^2 + (7 - 21.5)^2}{21.5} = 19.55$$

take up its low adult position and the epiglottis to loose contact with the soft palate. This does affect the physiology of swallowing and may be the cause for impaction and easy visualization of coins in this younger age group.

The technique of MFT eliminates the orotracheal intubation and rigid endoscopy thereby minimizing the complication rate. The hospital stay is not required as patients are discharged 4 hours postoperatively. No active cooperation is required from the child too. All this makes this technique highly cost effective. It is important to note that in this technique, the coin is always removed under visual control. One observation merits mention – MFT is a very simple and quick method. Most of the times our residents and anaesthetist too have been able to remove coins with ease without any formal training. The actual procedure also takes only about a minute. The only drawback of this technique is that it lacks uniform application; it can only be used in a select group of patients where coin is visible either by Mac-Intosh laryngoscope or by blades of magill forcep.

Magill forcep is usually used for nasotracheal intubation, endotracheal suctioning, and passing of gastric tubes and placement of tampons in the nasopharynx. Though magill forcep has been used to remove FB in pharynx and larynx with good results, but not much is reported on its use in FB coin removal [10–12]. There exists a paucity of literature on this subject. Contributing to the lack of knowledge, surrounding the benefits of this technique is the absence of its mention in standard texts. For the past several years, the technique has passed into oblivion. Gauderer et al. [6], makes a passing reference to this technique in his article on Penny Pincher technique. In a literature search using Medline services authors could find only one study by Mahfza from Jordan on use MFT for coin removal [13]. The study endorses our view and reports a success in 71 out of 75 cases.

As in all retrospective studies, the data from this study must be interpreted with caution. Although we recognize the limitations of small sample size, no control group and a possibility of selection bias and unadjusted confounding due to lack of randomization in our study design, yet this study demonstrates two points. First it confirms the use of magill forcep for impacted coins and second it evaluates the indication, outcome and complications of the said technique. Last but not the least it delineates the importance of this technique in paediatric age group of 0–6 years.

From the aforesaid discussion we conclude that magill forcep technique is a safe and time saving method for removal of impacted coins. However the technique finds greater applicability in younger age group. Thus all cases of coin impaction just below the cricopharynx can safely be given a try with magill forcep prior to intubation and removal with rigid endoscopy.

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