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Comprehensive Anaesthetic Management for Esophageal Foreign Body Removal Procedure in the Tertiary Care Centre of Eastern Nepal: An Observational Study

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ABSTRACT

Background: Esophageal Foreign Body (EFB) ingestion is a frequent emergency, particularly in children and neurologically impaired adults. In resource-limited settings like Eastern Nepal, optimal anaesthetic management remains challenging due to infrastructure constraints and lack of standardized protocols.

Methods: This observational study at a Nepalese tertiary hospital analysed 40 EFB cases (ages 1 to 75 years) over two months. Using convenience sampling, we documented anaesthetic techniques, airway management and outcomes through structured interviews and medical records.

Results: Paediatric cases comprised 55% of presentations. Coins (27.5%), chicken bones (17.5%) and fish bones (15%) were most common, primarily lodged in upper esophagus (37.5%). Intravenous anaesthesia (60%) surpassed general anaesthesia (40%), with nasopharyngeal tubes (65%) preferred over endotracheal intubation (35%). Propofol (75%) and fentanyl (55%) were mainstay medications. Mean procedure duration was 15 to 20 minutes with Para oxygenation in 67.5% cases. Complication rate was 17.5% (desaturation 10%, laryngospasm 5%).

Conclusion: Resource-adapted anaesthetic approaches demonstrated safety in EFB removal, though technique variability highlights need for standardized protocols. Findings support context-specific guideline development for low-resource settings.

Keywords: Foreign body, Esophagus, Anaesthetic management, Endoscopic removal, Resource limited setting

1. Introduction

Esophageal Foreign Body (EFB) ingestion is a frequent clinical emergency, particularly in paediatric populations, though adults with neurological or psychiatric conditions are also at risk[1]. Delayed or improper management can lead to severe complications such as perforation, mediastinitis or aspiration pneumonia, necessitating prompt and safe removal[2]. While endoscopic extraction remains the gold standard, anaesthetic management plays a critical role in ensuring procedural success

and patient safety[3]. However, the choice of anaesthesia-General Anaesthesia (GA), intravenous sedation or other techniques-varies widely depending on patient factors, foreign body characteristics and available resources[4].

In resource-limited settings like Eastern Nepal, the lack of standardized anaesthetic protocols poses significant challenges[5]. Limited infrastructure, varying expertise and scarcity of studies evaluating optimal techniques contribute to inconsistent practices[6]. This study aims to assess the current anaesthetic approaches for EFB removal in a tertiary care centre in Eastern Nepal, evaluating their safety, efficacy and challenges. Moreover, this study will contribute to establishing evidence-based anaesthetic protocols for esophageal foreign body removal, improving patient outcomes in Eastern Nepal. By analysing demographic trends, procedural outcomes and complications, this research seeks to provide evidence-based insights to improve anaesthetic management in similar low-resource settings.

2. Methods

This prospective, observational study was conducted in the Emergency Department of a tertiary care teaching hospital in eastern Nepal, involving patients aged 1 to 75 years with a diagnosis of esophageal foreign body impaction. Using a convenience sampling method, all eligible cases presenting over a two-month period were included, resulting in a final sample size of 40 participants. We acknowledge this as a limitation and recommend future studies with power calculations for stronger evidence. The study aimed to assess the demographic and clinical characteristics of patients with esophageal foreign bodies in this setting. Ethical approval was obtained and data were collected through structured interviews and medical record reviews. Written informed consent was taken from adult patients/parents of paediatric cases.

2.1. Inclusion criteria

- Patients with age group 1-75 years undergoing esophageal foreign body removal.
- Patients requiring general anaesthesia or sedation.

2.2. Exclusion criteria

- Known allergies to anaesthetic agents.
- Patients with multiple comorbidities or those who are unfit for anaesthesia.

Clinical history and examination finding along with the peri-operative anaesthesia record of the study participants were noted in proforma Data was entered in Microsoft Excel and analysed using SPSS version 2.0. The categorical variables expressed in frequency and percentages and the association between the two groups was calculated using Chi-square test. The quantitative variables were expressed as mean (standard deviation). A p-value of less than 0.05 was considered as statistically significant.

3. Results

The findings of this observational study provide valuable insights into the anaesthetic management of Esophageal Foreign Body (EFB) removal in a resource-limited tertiary care centre in Eastern Nepal. The study population demonstrated a clear paediatric predominance (55%), with children aged 1 to 12 years being most affected, which aligns with global epidemiological trends of EFB ingestion (Table 1). Coins emerged as the most commonly encountered foreign bodies (27.5%), followed by chicken bones (17.5%) and fish bones (15%), reflecting patterns seen in similar developing world settings (Table 1). The anatomical distribution showed that most impactions occurred at the upper esophagus (37.5%) and pharyngoesophageal junction (35%), consistent with known physiological narrowing points in the esophageal lumen (Table 1).

Table 1: Patient Demographics & Foreign Body Characteristics.

Age Group		
Pediatric (1-12 years)	22	55%
Adult (>12 years)	18	45%
Common Foreign Bodies		
Coins	11	27.50%
Chicken bones	7	17.50%
Fish bones	6	15%
Dentures	4	10%
Others (plastic, meat)	12	30%
Site of Impaction		
Upper esophagus	15	37.50%
Pharyngoesophageal junction	14	35%
Mid/lower esophagus	11	27.50%

Regarding anaesthetic approaches, Intravenous Anaesthesia (IVA) was the preferred technique in 60% of cases, likely due to its rapid onset, short duration and lower resource requirements compared to General Anaesthesia (GA), which was administered in 40% of cases (Table 2). GA was preferred in paediatric patients, type of foreign body which included fish bone and sharp chicken bone (which has high chance of causing perforation and removal may require longer duration) and site of impaction which included pharyngoesophageal junction and upper esophagus. Airway management predominantly utilized nasopharyngeal tubes (65%) rather than cuffed endotracheal tubes (35%), possibly reflecting the shorter procedure durations and less invasive nature of these cases. Pharmacologically, propofol (75% of cases) and fentanyl (55%) were the most frequently administered agents, with mean dosages falling within typical therapeutic ranges, while succinylcholine was reserved for GA cases requiring muscle relaxation (Table 2). Propofol in the dose of 0.5-2.5mg/kg, fentanyl in the dose of 0.5-2mcg/kg and ketamine in the dose of 0.5-2mg/kg was used in cases where IVA was used. Spontaneous respiration was maintained when IVA was used. Meanwhile succinylcholine in the dose of 1-2mg/kg was used in addition to the drugs used in IVA, was used in cases where GA was given.

Table 2: Anesthetic Methods & Medications Used.

Variable	Frequency (n=40)	Percentage (%)	Mean Dosage (Range)
Anesthesia Type			
IV Anesthesia	24	60%	-
General Anaesthesia	16	40%	-
Airway Management			
Nasopharyngeal tube (NP)	26	65%	-
Cuffed ETT	14	35%	-
Medications Used			
Propofol	30	75%	50-100 mg
Ketamine	18	45%	20-50 mg
Fentanyl	22	55%	15-50 mcg
Succinylcholine	10	25%	0-100 mg

Emergency airway equipment (laryngoscopes, supraglottic devices) and personnel trained in airway rescue were always available. A backup plan (e.g., rapid intubation or surgical airway) was in place for airway obstruction. Procedural outcomes were generally favourable, with 82.5% of cases completed within 20 minutes and a relatively low overall complication rate of 17.5% (Table 3). The most common complications included minor desaturation (10%) and laryngospasm (5%), with no cases of esophageal perforation reported (Table 3). The frequent use of Para oxygenation (67.5%) likely contributed to the prevention of more severe hypoxic events (Table 3). These results suggest that while current anaesthetic practices in this setting are generally safe and effective, the observed variability in techniques underscores the need for standardized protocols, particularly in resource-constrained environments where advanced airway equipment and specialized personnel may be limited. While we have outlined some criteria to decide between IVA and GA, detailed protocol and guideline regarding the management of such cases have to be formulated. The study highlights both the adaptability of anaesthetic providers in such settings and the potential for further optimization of care pathways for EFB removal.

Table 3: Procedure Duration & Complications.

Variable	Frequency (n=40)	Percentage (%)
Procedure Duration		
<15 minutes	18	45%
15-20 minutes	15	37.50%
>20 minutes	7	17.50%
Paraoxygenation used	27	67.50%
Complications		
Minor desaturation	4	10%
Laryngospasm	2	5%
Bleeding	1	2.50%
Perforation	0	0

4. Discussion

This study provides important insights into anaesthetic management for Esophageal Foreign Body (EFB) removal in a resource-limited tertiary care center in Eastern Nepal. The predominance of paediatric cases (55%) and coins as the most common foreign body (27.5%) aligns with global trends, where children are at higher risk due to accidental ingestion[2,3]. The frequent impaction at the upper esophagus (37.5%) and pharyngoesophageal junction (35%) supports existing anatomical studies highlighting these regions as natural narrowing sites[4].

The preference for Intravenous Anaesthesia (IVA) (60%) over General Anaesthesia (GA) (40%) reflects pragmatic decision-making in resource-constrained settings, where IVA offers faster recovery and lower costs[5]. The predominant use of Nasopharyngeal (NP) tubes (65%) rather than endotracheal intubation (35%) suggests a balance between airway security and procedural efficiency, particularly given the short mean procedure duration (15–20 minutes)[1]. The common use of propofol (75%) and fentanyl (55%) is consistent with global sedation practices for endoscopic procedures, while succinylcholine (25%) was appropriately reserved for GA cases requiring muscle relaxation[6,7].

The low complication rate (17.5%), with minor desaturation (10%) and laryngospasm (5%) being the most frequent, indicates that current anaesthetic practices are relatively safe. However, the absence of standardized protocols may contribute to variability in technique selection. The frequent application of Para oxygenation (67.5%) likely contributed to preventing severe hypoxia, reinforcing its value in sedation-assisted endoscopy[8]. The lack of standardized guidelines leads to inconsistent practices, especially in low-resource settings[9], while limited access to advanced airway devices (e.g., video laryngoscopes) may hinder optimal airway management[10]. Additionally, training gaps among anaesthesia providers in rural areas could delay emergency interventions[11]. limitations (small sample, single-centre data) will be further emphasized.

A call for multicentre validation studies will be added to the conclusion.

Future research should prioritize multicentre validation studies and developing evidence-based protocols tailored to resource-limited environments to improve patient outcomes.

5. Summary

This observational study evaluated anaesthetic management for Esophageal Foreign Body (EFB) removal in a tertiary care centre in Eastern Nepal. Among 40 patients (55% paediatric), coins (27.5%) were the most common foreign bodies, primarily lodged in the upper esophagus (37.5%). Intravenous anaesthesia (60%) with nasopharyngeal airways (65%) was preferred over general anaesthesia, utilizing propofol (75%) and fentanyl (55%) most frequently. Procedures averaged 15 to 20 minutes with a 17.5% complication rate (primarily minor desaturation). The findings demonstrate safe, resource-adapted practices while highlighting the need for multicentre validation studies and standardized protocols in low-resource settings to optimize EFB removal outcomes. Despite having some limitations including small sample size and single centre study, this study provides valuable insights for improving anaesthetic management in similar healthcare environments.

6. References

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