ORIGINAL ARTICLE

Role of conservative (Non-Pharmacological/ Pharmacological) management in acute esophageal food bolus impaction

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Abstract:

Background: Acute food bolus impaction is an emergency causing absolute dysphagia and is managed surgically by endoscopic removal. However certain conservative measures have been reported to serve the purpose and relieve the impaction.

Objective: To assess the efficacy of conservative (non pharmacological/pharmacological) management of acute esophageal food bolus impaction before proceeding to definitive endoscopic treatment.

Study design: Hospital based cross sectional

Place and duration of study: Departments of Otorhinolaryngology Nishtar Medical University, Multan and Bahawal Victoria Hospital, Bahawalpur, from 1st January, 2022 to 30th June, 2022.

Material and Methods: A total of 45 patients with confirmed food bolus impaction were included in the study after informed verbal consent of the participants. Conservative management was initiated before endoscopy. Endoscopy was performed in all the patients who were fit for general anesthesia. Age, gender, effects of non-pharmacological (carbonated beverages), pharmacological (calcium channel blockers, nitrates) agents and endoscopic procedure with associated pathology were documented. Data was put in SPSS 23 and analyzed. Mean, standard deviation and range were calculated for age. Percentages were calculated for gender, pharmacological and non-pharmacological agents, endoscopic procedure and underlying pathology.

Results: Carbonated beverages (Cola drink), Calcium channel blocker (Nifedipine) and nitrate (Isosorbide dinitrate) could be given to 37.8%, 17.8%, 20% patients respectively with success rate in 35.2% (12) patients. With endoscopy food bolus was pulled with polypectomy snares, dormia basket, retrieval forceps and roth net in 18.1% (6), 24.2% (8), 27.2% (9), 9% (3) patients respectively. Food bolus was pushed intact into the stomach in 6% (2) patients and pushed after the fragmentation in 15.1% (5) patients. Schatzki ring, esophageal stricture, achalasia and hiatal hernia were present in 8.9% (4), 28.9% (13), 15.5% (7) and 20% (9) patients respectively.

Conclusion: Acute food bolus impaction can be treated conservatively with non pharmacological/pharmacological agents in certain cases before doing definitive endoscopic relieve of the obstruction.

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Introduction:

Impaction of foreign body in the esophagus is a common emergency and its incidence increases with age.[1] Foreign body can be described as either true foreign body such as pointed, sharp or blunt objects or as food bolus impacted in the esophagus. Flexible or rigid endoscopy is used either to remove or break and push the impacted food bolus.[2] However, it was seen in a survey that most of the practitioners in the UK do not

use rigid endoscopy as first line to remove the impacted food bolus, rather anti-spasmodic drug especially hyoscine butylbromide was preferred by almost 83% of the practitioners.[3] Attempts to remove the impacted food bolus with the endoscope is the conventional method but can be harmful for the patients if performed by less trained endoscopist.[4] Long endoscopic time and post-endoscopic esophageal ulceration along with odynophagia are associated with more than 24 hours delay. Impaction of the food bolus is usually associated with some underlying causes, such as poorly masticated food in elderly patients, herpes simplex infection, eosinophilic esophagitis and paraesophageal hernia. Heartburn, chest pain and dysphagia are the common presenting complaints among the adult patients, and in children drooling of saliva is suggestive of esophageal obstruction.[5] Other agents used for food bolus spontaneous dislodgement are papvertum, benzodiazepam, calcium channel blockers, nitrates and other non pharmacological agents such as papan water and effer vescent agents. Other gas forming agents have also been used to treat food bolus impaction. These agents release carbon dioxide in oesophagus which raises intraluminal pressure against a closed upper sphincter, forcing the bolus into the stomach e.g. simethicone, carbonated beverages and cocktail of tartaric acid and bicarbonate. Success has been reported.[6]

Endoscopic management should be very carefully done as it can cause esophageal perforations. Many endoscopic instruments are used either to remove the impacted food bolus or to break and push the bolus into the stomach, which include Roth net, Dormia basket, polypectomy snares and retrieval forceps. However, endoscopy is a very sensitive procedure and it can cause much serious complication if performed by inexperienced personnel. The serious most complication of endoscopy is esophageal perforation. Initial symptoms of esophageal perforation include increased temperature and heart rate, fall in blood pressure, rapid breathing and vomiting. Earliest signs, although non-specific, can be seen on plain radiograph of chest. These signs include widening of mediastinum, pneumomediastinum, pneumothorax, pleural effusion and abnormal cardiomediastinal contour.[7-9]

A great diversity in the management plans of the impacted food bolus in the esophagus has been observed. Of the available treatment options, randomized clinical trials have not proved the superiority of any one over the other.[10,11] The rationale of this study is to observe and assess the effectiveness of different non pharmacological / pharmacological agents before doing final endoscopic management for the relief of acute food bolus impaction in the esophagus.

Material and Methods:

This cross sectional prospective study includes 45 patients who presented with the complaint of food bolus impaction causing sudden absolute dysphagia. The study was conducted in the departments of Otorhinolaryngology, Nishtar Medical University Multan and Bahawal Victoria Teaching Hospital Bahawalpur. After approval from the Hospital ethical review committee 45 consecutive patients were included in the study with informed consent who presented with acute food bolus impaction from January 01 to June 30, 2022. Patients of all age groups and gender who had complaint of foreign body impaction of isolated food bolus were included in the study. Diagnosed cases of acute tonsillitis and post cricoid /esophageal growth were excluded from the study. Other exclusion criteria included the presence of contraindications to non pharmacological and pharmacological agents to be used for the conservative management in the patients of food bolus impaction. Contraindications included children, poorly controlled diabetes mellitus, hypotension, early myocardial infarction, heart failure, valvular heart disease, anemia and skeletal muscular disease. All those patients who had bony fragments (chips) along with food bolus evident in the history and confirmed by radiological tests were also excluded for the conservative trial. Clinical examination of all the patients was done and it was made sure that the airway was patent. Anteroposterior and lateral views of x-ray soft tissue neck were obtained along with posteroanterior

Table 1: Demographic details and conservative trials given

Variable	Mean±S.D	Range
Age (years)	25.93 ± 17.78	20 - 35
BMI (kg/m^2)	25.95±6.48	*18 - 38*
Gender	Number	Percentage
Male	26	*57.8*
Female	19	*42.2*
Pharmacological/Non pharmacological agents		
Calcium channel blockers	8	17.8
Nitrates	9	20
Carbonated beverages	17	37.8
No trial given	11	24.4

view of x-ray chest. All the baseline investigations including complete blood examination, random blood glucose, complete urine examination, renal parameters and liver function tests were acquired and opinion regarding anesthesia fitness was taken. Non probability consecutive sampling technique was used. Sample size was calculated by using openepi.com and online sample size calculator. All those patients who did not have any contraindication to any non pharmacological or pharmacological agent used in the study were given conservative treatment and then endoscopy was performed for every patient having general anesthesia fitness either to remove the food bolus impaction in case of failure of conservative trial or in case of successful conservative trial to confirm the relieve of esophageal obstruction by food bolus and to find any underlying pathology. If some patient possessed any contraindication to non pharmacological or any one pharmacological agent the conservative trial continued for the remaining agent. These patients were given at first the sips of 250ml of carbonated beverage in the form of cola drink and awaited for an hour to see the results. In case the non pharmacological trial failed to relieve the obstruction, the pharmacological trial initiated. Firstly single dose of 10 mg of sublingual nifedipine (calcium channel blocker) was given to these patients and result was awaited for the next two hours. In case this drug failed to relieve the impaction the trial was repeated with the second pharmacological agent. 5 mg of sublingual isosorbid dinitrate (nitrate) was given as a single stat dose and result was awaited for the next two hours. All the patients with failed conservative trial were planned for rigid endoscopy in general anesthesia after 24 hours where as patients with successful conservative management were also prepared for examination under endoscopy to rule out underlying/associated pathology.

Rigid endoscopy under general anesthesia was then performed for all the patients, either to confirm the passage of the bolus into the stomach or to remove the bolus. Food boluses which were impossible to extract, were broken down into small fragments and pushed into the stomach with insufflation and tip of the rigid endoscope according to latest guidelines of American Society of Gastrointestinal Endoscopy (ASGE).[12] The tools used to either extract or push the food boluses included Dormia basket, Roth net, polypectomy snares and retrieval forceps. Endoscopic findings for the underlying pathology were also documented. Complications arising during endoscopy were recorded and dealt with accordingly.

Age, gender, Body mass index (BMI), pharmacological and non-pharmacological agents used for conservative trial, endoscopic procedures for relieving the obstruction and associated pathology were documented for each patient. Endoscopic procedures included retrieval with Dormia basket, retrieval with Roth net, pull with retrieval forceps, pull with polypectomy snares, push into the stomach and push into the stomach after fragmentation.

All the data was entered in SPSS version 23 and analyzed. Mean, standard deviation and range were calculated for age and BMI. Percentages were calculated for gender, non pharmacological and pharmacological agents.

Results:

Mean age of 45 patients was 25.93±17.78 years and ranged from 7 to 63 years. BMI of all the patients ranged from 18 kg/m^2 to 38 kg/m^2 with a mean of 25.95±6.48 kg/m^2. Of all the patients 57.8% (26) were males while 42.2% (19) were female patients. Carbonated beverages were giv-

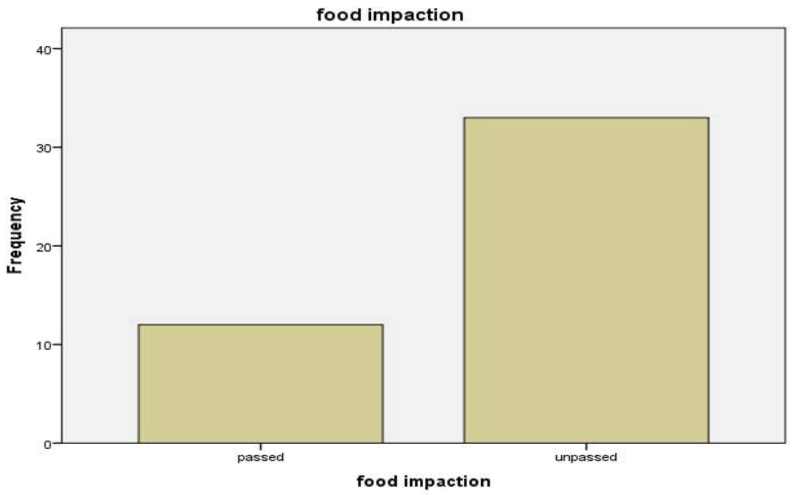

Figure 1: Success rate of Conservative management in food bolus impaction

Table 2: Endoscopic examination/procedures performed

Endoscopic procedures	Number	Percentage
Examination only	12	26.7
Pull with polypectomy snare	6 (out of 33)	18.1
Pull with Dormia basket	8 (out of 33)	24.2
Pull with retrieval forceps	9 (out of 33)	27.2
Pull with Roth net	3 (out of 33)	9
Push into stomach	2 (out of 33)	6
Push plus fragmentation	5 (out of 33)	15.1

Table 3: Underlying pathology seen during endoscopy

Associated pathology	Number of patients	% age
Schatzki ring	4	8.9
Esophageal stricture	13	*28.9*
Achalasia	7	15.5
Hiatal hernia	9	*20*
No pathology seen	12	*26.7*

en to 37.8% (17) patients and food bolus successfully passed into the stomach in 7 (41.17%) of these patients. Calcium channel blocker trial was given to 17.8% (8) patients and 3(37.5%) of these patients passed the food bolus spontaneously. Nitrates were given to 20% (9) patients and food bolus passed into stomach in 2(22.2%) of these patients. Hence conservative trial(non pharmacological and pharmacological) could be given to total 34 patients and out of these 34 patients 12 patients got their food bolus passed down and relieved the impaction with the success rate of 35.2% (Figure 1). Highest success rate observed to be 41% and it was among the patients who were given carbonated drinks. No conservative trial was given to 24.4%(11) patients due to some contraindications as shown in table1.

Rigid endoscopy was done for all the patients. 12 patients 26.7% had already passed the food bolus with conservative management, therefore endoscopy was done among these patients only to confirm the relief of impaction and to find the underlying pathology. Among remaining 33 patients who could not get their food bolus passed down by conservative trial, the rigid endoscopy was performed and food bolus was pulled back with polypectomy snares in 6 patients 18.1%, with Dormia basket in 8 patients 24.2%, with retrieval forceps in 9 patients 27.2% and with Roth net in 3 patients 9%. Food bolus could not be retrieved and, therefore, pushed intact into the stomach in 2 patients 6% and pushed after the fragmentation in 5 patients(15.1%) as shown in table 2.

After clearing the esophageal obstruction, endoscopic findings were noted. Schatzki ring were present in 4 patients (8.9%), esophageal stricture was seen in 13 patients (28.9%), achalasia was seen in 7 patients (15.5%) and hiatal hernia was present in 9 patients (20%). However, no underlying pathology was seen in 12 patients 26.7% and it was only the poorly masticated food bolus that got impacted as shown in table 3.

Discussion:

Esophageal foreign body impaction is considered to be a medical emergency. It can either be a food bolus or some other material object like coins and other plastic objects. There are many risk factors that are associated with impaction of food bolus in the esophagus. These risk factors include psychiatric disorders, mental retardation and alcohol ingestion. Food bolus impaction is a common complication in the edentulous adults because they are unable to chew their food well, resulting in obstruction of esophagus.

Katsinelos et al, conducted a study to evaluate

endoscopic efficacy in management of esophageal food bolus impaction and reported that endoscopy is a better treatment option having greater efficacy than other options.[13] Endoscopic removal of the foreign body is a very effective and eventually definitive method and various accessories are used for this purpose. These include Dormia basket, Roth net, polypectomy snares and retrieval forceps.

Basavaraj et al, conducted a study on conservative management of food bolus and reported that Hyoscine, nitrates, calcium channel blockers, glucagon and papaveretum are among the pharmacological agents available. Hyoscine butylbromide is anticholinergic and antimuscarinic agent and it relaxes the lower end of esophagus, thus helping the foreign body to pass into the stomach. It relieved boluses in 68% of cases and 63% cases in non hyoscine group.[14]

Those food boluses which are nearly impossible to be extracted are usually broken down with the help of the tip of endoscope and then pushed into the stomach. However, there are some serious concerns related to the endoscopic procedures. The endoscopist needs to be well trained and he should have the expertise related to the management options for the complications which may arise during endoscopy such as esophageal perforation.[15]

Straumann et al described that there are some pharmacological options available which can be used for relieving the esophageal obstruction if there are no sharp or pointed objects present in the food bolus. There a great risk of esophageal perforation or tear if sharp object are not removed carefully under vision.[16]

A study by Sodeman et al, concluded that amplitude of the contractions is decreased in lower two third of esophagus with intravenous administration of glucagon, but no effect of glucagon has been observed on the esophageal strictures and rings in the distal part. Similar effects have been observed with nitrates but these are not used for acute management on regular basis.[17] Koumi and Pans documented in their study that carbonated drinks have also been used for dislodging the food bolus impacted in esophagus. These drinks release carbon dioxide gas and create pressure which pushes the bolus into the stomach, thus relieving the obstruction.[6]

Similarly David and colleagues in their retrospective study conducted at two different hospitals with the duration of almost five and a half years assessing the efficacy and effectiveness of non pharmacological and pharmacological agents in acute esophageal food bolus impaction found and documented that effervescent agents were effective, cost saving and safe monotherapy as an initial and starting management strategy as compared to other pharmacological agents.[18] Ramchandani and colleagues however in their study found that nifedipine and other calcium channel blockers had a relaxing effect on the smooth muscles and, therefore, were used for the management in the patients with achalasia and nut cracker esophagus . Similar effects had been observed with nitrates but these should not be used for acute management on regular basis.[19] In a case report documented by Marano et al, spontaneous passage of impacted food bolus was found with the effect of nitrate and nasogastric intubation called as blind nitro-push technique.[20] In a retrospective case series regarding the use of cola therapy to treat esophageal obstruction by food bolus, Eva and colleagues found 59% success in relieving the esophageal food bolus obstruction by using cola without any adverse effects.[21] This study resembles with ours in the selection of cola as carbonated drink for the non pharmacological trial but here we found 41.7% success rate. Glucagon use has also been reported as pharmacological agent in the literature to relieve acute food bolus impaction but in our study we did not select this agent and in a systemic review and meta analysis done by Peksa and colleagues have found its use with limited efficacy and increased rates of adverse effects.[22]

Benjamin, Willenbring and colleagues documented two case reports in which oral nitroglycerine solution therapy was found quick and effective in relieving esophageal food bolus im-

paction but further studies were recommended to be done on this agent.[23]

Reviewing the local literature, an observational descriptive study was done in 2010-2011 and published in 2018 conducted by Sajjad et al, regarding the evaluation of conservative management of impacted food bolus in esophagus. It was found that the impacted food bolus in esophagus passed down into the stomach in 78.8% of the patients with conservative management.[24] In another cross sectional analytical study done by Maroof et al, on the management of esophageal foreign bodies it was found that rigid endoscopy remained successful in 97% of the patients and second commonest esophageal foreign body after coins was food (meat) bolus.[25]

Food bolus can dislodge spontaneously during the first 24 hours, also called observation period but active management can be required if the bolus remains impacted for too long. The longer the duration of impaction, the more chances are there for esophageal perforation. Initial symptoms of esophageal perforation include increased temperature and heart rate, fall in blood pressure, rapid breathing and vomiting.[9] Earliest signs, although non-specific, can be seen on plain radiograph of chest including widening of mediastinum, pneumomediastinum, pneumothorax, pleural effusion and abnormal change in cardiomediastinal contour.[15] In the patients who have recurrent presentation with foreign body impaction, there is need to perform a thorough examination along with necessary investigations including rigid or flexible endoscopy. The underlying pathology needs to be addressed promptly to avoid any further complications.

Limitations of our study are its small sample size and shorter study duration. Moreover certain other pharmacological agents like Hyoscine and Glucagon were not studied. Additionally only one carbonated drink (Cola) has been studied whereas use lemonade has also been reported in the literature. This study is an observational cross sectional type and not a true analytical comparative study.

Large multi-centric experimental studies are required to be conducted comparing the efficacy and safety of one pharmacological / non pharmacological agent with the other having the values of significance.

Conclusion:
Acute food bolus impaction is a common emergency that can cause complete esophageal obstruction in the adult and older patients. Conservative management by using non pharmacological or pharmacological agents is found to be efficacious in relieving acute impaction among certain cases hence should be practiced before proceeding to the definitive endoscopic management.

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Role and contribution of authors:
Mohammad Amer Nadeem, play a role in concept, data and reference collections and did the initial writeup.

Muhammad Asim Shafique, collected the data, references and helped in introduction and discussion writing.

Muhammad Tahir Shah, did the literature review, Data Interpretation and critically reviwe the article and made final changes.

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