

## Acute food bolus impaction: aetiology and management

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### Abstract

A prospective study into the aetiology of acute food bolus obstruction (AFBO) was carried out on 17 consecutive patients who presented with this complaint. There were nine males and eight females. Twelve patients (71 per cent) had symptoms of oesophageal disease and 10 patients (59 per cent) had prior food bolus obstruction. Investigations included endoscopy, barium swallow, oesophageal pH and manometry studies. Evidence of oesophageal pathology was found in 12/14 (86 per cent) of patients investigated. No patients had malignancy and the most common abnormality, gastrooesophageal reflux (GOR) was found in eight out of 14 (57 per cent) of cases. Oesophageal dysmotility was seen in five out of 12 (42 per cent) patients who had manometric studies.

With such a high incidence of recurrence of AFBO, we suggest that patients with this condition be investigated to exclude malignancy and to identify benign oesophageal pathology using techniques such as oesophageal pH and manometry. Appropriate treatment of oesophageal disease may help prevent recurrence of this distressing condition.

**Key words:** Deglutition disorders; Oesophagus

### Introduction

Acute food bolus impaction in the oesophagus is a common emergency in otolaryngology. Overall, between 2.6 per cent and 10 per cent of all swallowed foreign bodies are meat boluses (Phillipps and Patel, 1988; Jones *et al.*, 1991). The nature of the obstructing mass has prompted the use of terms such as the 'Steakhouse syndrome' (Norton and King, 1963) and the 'Backyard barbecue syndrome' (Palmer, 1976). Most interest in this condition has centred on the acute management of patients with AFBO (Jones, 1978; Bell and Eibling, 1988; Saeed *et al.*, 1990; Kaszar-Seibert *et al.*, 1990; Karanjia and Rees, 1993), with few studies investigating underlying aetiological factors. A review of these publications suggests an incidence of underlying oesophageal problems varying between 23 per cent and 90 per cent for these patients (Stadler *et al.*, 1989; Saeed *et al.*, 1990; Tibbling and Stenquist, 1991). While it is important to relieve AFBO in the oesophagus, it is equally important to thoroughly investigate these patients and where appropriate, treat underlying causes to prevent recurrence. The purpose of this study was to prospectively investigate patients presenting with AFBO for possible oesophageal pathology.

### Materials and methods

Patients presenting to the Otolaryngological department of our hospital with AFBO between September 1991 and January 1994 were included in the study. A detailed history was taken with particular reference to upper gastrointestinal symptoms, neurological or systemic illnesses and the state of dentition. Routine chest X-ray and haematological tests were obtained.

Following initial management of the acute bolus, patients were further evaluated using barium swallow examination, 24 hour ambulatory pH monitoring and oesophageal motility studies. A standard 250 per cent weight/volume barium swallow was performed on patients between 1–12 days after presentation.

Ambulatory pH monitoring was performed using a Synectics system (dual channel Digitrapper: Synectic Medical, Stockholm, Sweden) and a standard dual site pH probe with sensors spaced 15 cm apart and a digital data recorder worn in a pocket or the patient's belt (Synectic Medical). The patients had event time markers on the devices to record meal times and their posture (whether they were erect or supine). The distal sensor was located precisely five cm above the proximal border of the lower oesophageal sphincter. Sampling was carried out at four second intervals and the De Meester scoring system (De Meester *et al.*, 1980) used to identify

patients with distal gastro-oesophageal reflux. This system measures intra-oesophageal pH and by weighting the number and length of periods of intra-oesophageal pH less than 4, an overall De Meester score is obtained. In our laboratory, a De Meester score of greater than 15 (more than two standard deviations outside the mean) is considered to represent a patient with distal gastro-oesophageal reflux. No formal criteria for the identification or classification of patients with proximal gastro-oesophageal reflux has been published. In this study, patients were considered to have proximal GOR if the proximal pH sensor registered a pH < 4 for more than two per cent (29 minutes) of the 24-hour study period.

Stationary oesophageal manometry was performed using a four-lumen single-catheter assembly, with radially arranged holes at five cm intervals. Each channel was perfused with distilled water at a rate of 0.6 ml/min using a low-compliance pneumohydraulic infusion system (Arndorfer Medical Specialties Inc., Greendale, Wisconsin, USA). The lower oesophageal sphincter was identified using a station pull-through technique. Oesophageal function was assessed by measuring the mean amplitude and propagation of the pressure wave in response to 10 wet swallows of a five ml bolus of water. Primary oesophageal motility disorders e.g. achalasia, nutcracker oesophagus are the most striking examples of abnormality. However, non-specific disorders are more common. There are essentially two problems observed which can account for all the motility abnormalities seen: firstly, failure of propagation of peristalsis and secondly, low amplitude of the propagated waves. Patients were deemed to have abnormal motility patterns if there was less than 100 per cent propagation of peristaltic waves or if the amplitude of these waves was less than 30 mmHg.

## Results

Seventeen consecutive patients presenting with AFBO were included in the study (nine males and eight females). The mean age was 54.7 years with a range of 36–78 years. One patient had been visiting this country on holiday and returned home, to the United Kingdom, immediately after discharge without any further investigation.

A history of food bolus obstruction necessitating hospital attendance was obtained from 10 (59 per cent) patients. Symptoms suggestive of oesophageal disease, such as heartburn, dysphagia or odynophagia, were elicited in 12 (71 per cent) of the group. In two patients (12 per cent) a prior diagnosis of oesophageal disease had been made: one patient had had a hiatus hernia repair 14 years previously and developed a post-operative stricture requiring at least three dilatations in the four years post-surgery. The other patient had a sliding hiatus hernia which had been diagnosed by barium swallow six years previously but no specific treatment given.

TABLE I  
OESOPHAGEAL PATHOLOGY FOUND AT ENDOSCOPY

Findings at endoscopy	Number of patients
Impacted food bolus	13/14
Distal oesophagitis	3/14*
Benign stricture	1/14
Hiatus hernia	1/14*

\*Dual pathology in one patient.

Ten patients (59 per cent) were edentulous and wore dentures. Chest X-ray and routine haematological investigations were within normal limits in all patients.

### Endoscopy findings

Three patients spontaneously disimpacted while awaiting endoscopic removal of the food bolus. The remaining 14 underwent rigid oesophagoscopy under general anaesthesia and all but one were found to have an impacted food bolus. The bolus was located in the upper oesophagus in six patients (43 per cent), in the mid-oesophagus in five patients (36 per cent) and in the lower oesophagus in two patients (14 per cent). Flexible endoscopy was carried out on one of the patients who had spontaneously disimpacted, the other two refusing to undergo this investigation. Table I shows the oesophageal pathology found at endoscopy. There were four patients in whom underlying disease was identified. There were no complications as a result of endoscopy.

### Barium swallow

Barium swallow was performed on 14 patients, three patients refusing this investigation. As can be seen in Table II, radiological evaluation of the oesophagus revealed evidence of oesophageal pathology in eight out of 14 cases (57 per cent).

### pH and manometric studies

Consent for these investigations was given by 13 patients and carried out as outpatients within six weeks of their initial presentation. Three other patients refused investigation. GOR was found in seven patients (58 per cent). Six of these patients were 'distal' refluxers, with only one patient showing proximal GOR. Evidence of oesophageal dysmotility was established in five cases (42 per cent). Table III shows an overall summary of the individual patients in our study.

TABLE II  
RADIOLOGICAL EVALUATION OF OESOPHAGUS

Barium swallow findings	Number of patients
Normal examination	6/14
Gastro-oesophageal reflux	4/14*
Hiatus hernia	3/14*
Oesophageal web	2/14
Stricture	1/14
Peptic ulcer disease	1/14*

\*Dual pathology in three cases. One had reflux and peptic ulcer disease and two had reflux with hiatus hernia.

TABLE III  
OVERALL CLINICAL SUMMARY OF PATIENTS IN STUDY

Patient	Endoscopy findings	Ba swallow	pH studies	Manometry	Comment
1.	upper stricture	upper web	N	N	long Hx of dysphagia
2.	—	N	GOR	abnormal motility	bolus passed spontaneously
3.	N	N	GOR	N	previous Hx of bolus obstruction
4.	N	N	N	N	bolus filling most of oesophagus
5.	N	HH	N	abnormal motility	Hx of untreated hiatus hernia
6.	HH	N	GOR	abnormal motility	flexible endoscopy
7.	N	N	N	N	previous Hx of bolus obstruction
8.	GOR	HH and GOR	N	abnormal motility	previous Hx of bolus obstruction
9.	GOR	N	GOR	abnormal motility	previous Hx of bolus obstruction
10.	—	GOR	GOR	N	bolus passed spontaneously
11.	N	HH and GOR	—	—	refused pH & manometry
12.	upper stricture	—	—	—	refused investigation
13.	N	cervical osteophyte	GOR	N	—
14.	N	lower stricture	proximal GOR	N	previous Hx of bolus obstruction
15.	N	—	—	—	refused investigation
16.	N	upper web	—	—	previous Hx of bolus obstruction
17.	N	—	—	—	Returned to UK

N = Normal, HH = Hiatus hernia, GOR = Gastro oesophageal reflux, Hx = history.

## Discussion

The most commonly ingested foreign bodies in the adult population are food boluses, accounting for nearly three quarters of cases (Taylor, 1987). Although it seems obvious that an oesophageal disorder may underlie the obstruction, many patients tend to be discharged after endoscopy for disimpaction and possibly a barium swallow to outrule any sinister pathology. Oesophageal disease in this group of patients is underdiagnosed and therefore undertreated. Consequently, AFBO would seem likely to recur after initial presentation. Indeed, in this study 59 per cent of the patients had previous episodes of significant oesophageal obstruction.

Dentures have been implicated in the aetiology of AFBO (Taylor, 1987). Loss of palatal sensation and an inability to chew food adequately are thought to be important factors. However, other reports have found no association between swallowed foreign bodies and the wearing of dentures (Palmer, 1976). The findings from our study would support the latter view of no association as the prevalence of denture-wearing in our group of patients was no greater than age-matched controls.

The overall incidence of oesophageal pathology in those who had further investigation after bolus disimpaction was 86 per cent. This is not surprising as 71 per cent had previous symptoms suggestive of oesophageal disease. This very high incidence is similar to that found by Stadler *et al.* (Stadler *et al.*, 1989).

All oesophageal pathology in this series was benign but it should be stressed that underlying malignant conditions may be the cause of AFBO. Others have reported incidences of malignancy between 10 per cent and 38 per cent (Taylor, 1987; Jones *et al.*, 1991; Tibbling and Stenquist, 1991). Endoscopy and/or barium swallow are therefore essential to exclude a malignant process.

The most common abnormality in the study group was gastro-oesophageal reflux (58 per cent of those who had pH monitoring). Oesophageal mucosa is sensitive to abnormally low pH and reflux of acidic

material often results in oesophagitis. The exact mechanism of how this may cause AFBO without the presence of a definite stricture is unclear. It has been shown that episodes of dysphagia may occur in up to 50 per cent of patients with moderate to severe oesophagitis (Triadafilopoulos, 1989). A possible explanation is that reflux produces oesophageal motor abnormalities. Abnormal oesophageal motility was found in six of the 13 patients of the group studied (46 per cent) and was associated with reflux in 66 per cent of cases. It is probable that the oesophageal webs described by the radiologists on barium swallow but not seen at endoscopy also represent a form of oesophageal dysmotility.

Treatment options in this group of patients are varied and are listed. (1) No treatment: for those patients where no risk factor for recurrence was identified, no specific treatment was given. (2) Behaviour modification was used where appropriate: specifically for: dietary advice regarding avoidance of certain foodstuffs and weight-reducing diet from our resident dietitians; exercise as part of a weight-reducing regime; position therapy to prevent gastro-oesophageal reflux. (3) Dental: edentulous patients and those with poorly fitting dentures were referred for dental evaluation and denture fitting. (4) Medical: Omeprazole (Losec, Astra AB, Sweden) for those with GOR, cisapride (Prepulsid, Janssen Pharmaceutical Ltd, Oxon, U.K.) for the two patients with motility disorders. (5) Surgical: two patients have required subsequent oesophageal dilatation for their strictures (one patient twice) but as yet none have required any definitive anti-reflux procedure.

All patients are presently being followed up to study their long-term outcome and assess if treatment will prevent AFBO recurrence. Although numbers are small, this pilot study shows a very high incidence (86 per cent) of newly diagnosed pathology in patients presenting with AFBO who were investigated with the triad of tests: barium swallow, 24 hour pH and oesophageal manometry. Because of this finding we are continuing to

investigate such patients. It is hoped that with increased numbers and continued follow-up, it can be determined if such investigation can prevent recurrence of AFBO or complications of upper gastrointestinal disease after appropriate treatment. Should follow-up show that this is the case, we will recommend that all patients be investigated with the battery of tests described above. With such a high incidence of gastroesophageal reflux it may be appropriate to treat the majority of bolus obstruction patients with anti-reflux medication.

### Conclusion

Acute obstruction of the oesophagus by a food bolus is an abnormal event and in a high proportion of patients indicates underlying oesophageal pathology. When the obstruction has been relieved and an underlying malignancy excluded, we suggest that further investigations including pH studies and oesophageal manometry are most useful in identifying benign oesophageal disease. If such conditions are appropriately managed, AFBO recurrence may be prevented.

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