



ORIGINAL ARTICLE

Esophageal food impaction during cultural holidays and national athletic events

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Abstract

Background: Although intrinsic risk factors contributing to esophageal food impaction are well established, whether social behavior affects its occurrence has not yet been examined.

Methods: We conducted a retrospective review of the gastroenterology endoscopy procedural documentation software for the period of 2001–2012 to identify all patients who presented to our emergency department for esophageal foreign-body removal at the time of national athletic events and holidays associated with dietary indiscretions.

Results: We found that adults undergoing emergent esophagogastroduodenoscopy during periods celebrating cultural holidays and national athletic events were more likely to experience esophageal food impaction compared with those undergoing emergent endoscopy during periods not associated with these events (36.8% vs 3.6%; $P < 0.001$): a 10-fold increase. During a national holiday/athletic event period, the most common impacted food item was turkey (50%) followed by chicken (29%) and beef (21%).

Conclusions: Esophageal food impaction is more likely to occur on American holidays and national athletic events and is associated with large meals. Patients with intrinsic risk factors should be advised to modify their diet during cultural events associated with tachyphagia and large meals to prevent esophageal food impaction.

Key words: esophagus; foreign body; food impaction; holiday; athletic event

Introduction

Esophageal food impaction is a medical emergency requiring timely endoscopic intervention. Patients presenting with food bolus impaction frequently have predisposing esophageal pathology directly causing the impaction. Underlying risk factors include peptic stricture, eosinophilic esophagitis, Schatzki ring,

achalasia and malignancy [1,2]. While these contributing intrinsic risk factors are well-established, it is unknown whether social behavior affects the occurrence of esophageal food impaction.

Studies in Europe have examined the association between major sport events and cardiac events. In one study, viewing a

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stressful match more than doubled the risk of an acute cardiovascular event. The study was performed to examine the relationship between emotional stress and the incidence of cardiovascular events during the Soccer World Cup in 2006 [3]. Current data on the rate of food bolus impaction in relation to sports and cultural events are scant. The purpose of our retrospective cross-sectional study was to assess the characteristics of patients presenting to a tertiary care center with esophageal food impaction and to evaluate whether there is a temporal relationship with these events. We hypothesized that cultural holidays and national athletic events were associated with dietary indiscretions, which would lead to increased rates of esophageal food impaction.

Methods

We queried the gastroenterology endoscopy procedural documentation software (ProVation® Medical, Minneapolis, MN) at St. Elizabeth's Medical Center to identify adults who presented for emergent esophagogastroduodenoscopy between 2001 and 2012. Patients undergoing endoscopic removal of an esophageal foreign body were identified using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code 935.1 (foreign body in esophagus). Cases of esophageal food impaction were included, and those of other ingested foreign bodies were excluded. We defined an index period (national holiday/athletic event) of three days starting on the day of a holiday event (Thanksgiving, Christmas and New Year's day) or national athletic event (Super Bowl and last game of the World Series), and two control periods (subsequently grouped into a combined control period) each of a three-day duration starting 14 days before and 14 days after the listed cultural and athletic events (Figure 1). The three-day timeline was created to account for potential late presentation of esophageal food impaction. Demographic, clinical and endoscopic characteristics were extracted from medical records including age, sex, ethnicity, impacted food type, comorbid conditions, endoscopy type and intervention, procedural complications and biopsy findings. Esophageal food impaction rates were calculated for each observation period. Comparisons were conducted using the t test for continuous variables and the chi-square or Fisher's exact test for categorical variables, using the SPSS statistical package. A P value < 0.05 was considered statistically significant.

Results

Over a period of 11 years, 38 patients underwent emergent esophagogastroduodenoscopy during the index period (national holiday/athletic event) and 81 patients during the control period.

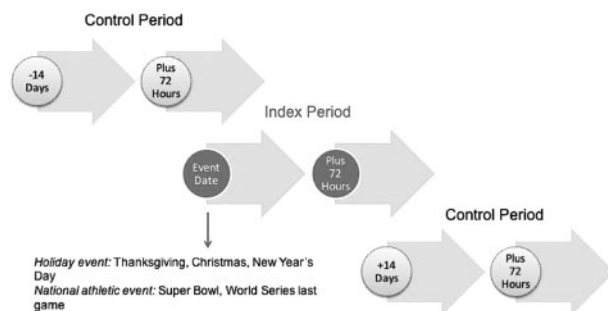


Figure 1. Definition of index period and two control observation periods.

Patients presenting during the index period were more likely to be men and appeared to be younger and have a higher prevalence of hiatal hernia compared with those presenting during the control period (Table 1). The period prevalence of esophageal food impaction was significantly higher during the index period compared with the control period (36.8% vs. 3.6%; $P < 0.001$; Figure 2).

During the index period, 10 (71%) of the 14 patients presenting with esophageal food impaction were men with a mean age of 58 years. Six cases were observed on Thanksgiving, five on Christmas, two on New Year's day and only one on the last game of the World Series. During the index period, the most common impacted food item was turkey (50%), followed by chicken (29%) and beef (21%), compared with beef (67%) followed by chicken (33%) during the control period. The most common site of food impaction was the lower third of the esophagus. All 14 patients received intravenous glucagon, which was unsuccessful in clearing the food bolus prior to endoscopy. Food disimpaction was successfully achieved by flexible esophagogastroduodenoscopy in 11 (79%) patients. The remaining three (21%) patients required rigid esophagogastroduodenoscopy in the operating room under general anesthesia as one patient developed bradycardia, one patient had an animal bone adherent to the esophageal wall, and one patient had extrinsic esophageal compression that prevented passage of the flexible endoscope. The push (seven patients), pull (three patients) or combined push-pull (four patients) technique was used to disimpact the food bolus. None of the patients required esophageal dilation. An overtube was used in two cases, whereas a banding device, air insufflation and a snare were used in one case each for food extraction. One patient experienced bradycardia, and one patient had linear erosions that were likely secondary to the procedure. There was no perforation, aspiration, significant bleeding or death related to either the endoscopic intervention or the impacted food bolus. Two biopsies were performed, with one revealing eosinophilic esophagitis. One patient had a prior history of esophageal food impaction. The average hospital length of stay was 1.5 days, and most patients were discharged on the same day.

During the control period, three women presented with esophageal food impaction; one episode occurred in a patient who ate steak tips in our emergency department after having presented for acute exacerbation of chronic obstructive pulmonary disease; one patient had known esophageal stricture requiring frequent balloon dilation, and one patient had a Schatzki ring and large hiatal hernia. No complications were reported.

Discussion

Esophageal food impaction is a not infrequent emergency that requires timely intervention. The pathophysiology of impaction is often attributed to predisposing esophageal pathology, the nature of ingested food or both [1]. Our retrospective study explored the effect of the latter variable by hypothesizing that the incidence of food impaction increased during such events where larger-than-typical meals are likely to be consumed. Over an 11-year period, we found that patients undergoing emergency esophagogastroduodenoscopy during periods celebrating cultural holidays and national athletic events were more likely to experience esophageal food impaction (a 10-fold increase compared with periods not associated with these events). Over the past decade, the prevalence of esophageal food impaction has steadily increased by more than 6-fold [2], affecting younger individuals [4]. This might be due in part to an increasing prevalence rate of eosinophilic esophagitis, a condition which poses a

Table 1. Characteristics of patients undergoing emergent esophagogastroduodenoscopy during the index and control observation periods

Variable	Control period (n = 84)	Index period (n = 38)	P value
Age, years	64 ± 2	62 ± 3	0.06
Men	42 (50.0%)	25 (65.8%)	0.06
White ethnicity	77 (91.7%)	34 (89.5%)	0.40
Comorbid condition			
Hiatal hernia	11 (13.1%)	10 (26.3%)	0.07
Esophagitis	5 (6.0%)	5 (13.2%)	0.18
Barrett's esophagus	5 (6.0%)	1 (2.6%)	0.43
Esophageal stricture	3 (3.6%)	1 (2.6%)	0.79
Schatzki esophageal ring	6 (7.1%)	5 (13.2%)	0.41
Esophageal food impaction	3 (3.6%)	4 (36.8%)	< 0.001

Values for categorical variables are shown as frequency (percentage) and for continuous variables as mean ± standard error.

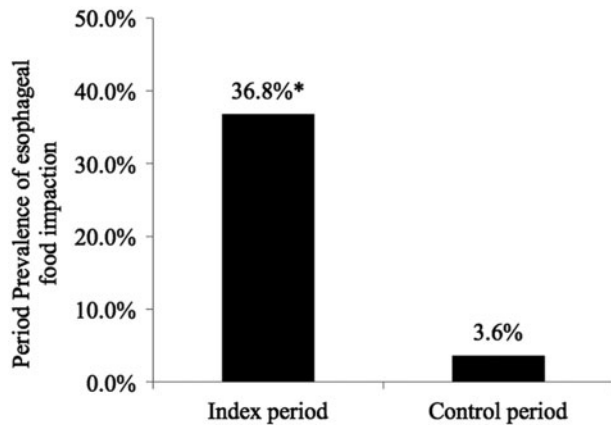


Figure 2. Period prevalence of esophageal food impaction during the index and control observation periods. * $P < 0.001$ vs control period.

risk for food impaction and is more common in younger patients [5,6]. Most patients presenting with esophageal food impaction in our series were men, as previously shown [1,4]. Benign peptic strictures and eosinophilic esophagitis are more common in men [7].

While the most commonly involved food item tends to be meat [8], this observation varies according to the cuisine of the geographic area. In our series, 50% of the cases during the index period had turkey meat as the impacted food bolus, which was likely related to the Thanksgiving celebration. The size or volume of the meal and the speed of food ingestion or tachyphagia increase substantially at the time of cultural holidays and national athletic events, which might be contributing factors. Additional possible risk factors include higher alcohol consumption. Competitive speed eating, such as participation in hot dog-eating contests, represents an extreme human behavior where competitive eaters ingest large volumes of food [9]. While this activity might contribute to food impaction, short-term radiological studies demonstrate that successful speed eaters expand their stomach to form an enormous flaccid sac capable of accommodating large amounts of food [10]. However, there are no published studies on the long-term effects of speed eating on its competitors.

The American Society for Gastrointestinal Endoscopy recommends emergent removal of an esophageal-impacted food item leading to complete obstruction. The recommended management includes flexible esophagogastroduodenoscopy with en-bloc or piecemeal removal or gentle advancement [11].

The push technique is the initial treatment of choice and is considered to be safe and highly successful [12].

Our study has several strengths. It spans more than 11 years and to our knowledge is the first report of its kind comparing rates of food impaction in relation to cultural holidays and national athletic events. Caution must be exercised by the general public—especially among those who have had previous esophageal food impaction or those at risk—to eat judiciously and in small boluses to prevent occurrence of this emergency. Among patients with intrinsic risk factors for esophageal food impaction, these occasional dietary indiscretions might trigger food impaction and should prompt appropriate dietary education for at-risk patients.

Limitations of our single-center study include its retrospective nature with a relatively small sample size. A larger sampling across multiple geographic areas would validate our preliminary observations. Only two of the 14 patients underwent a biopsy, which limited our ability to assess for eosinophilic esophagitis.

In conclusion, we have demonstrated a 10-fold increase in the rate of esophageal food impaction during cultural holidays and national athletic events compared with periods not associated with these events. Patients with known intrinsic risk factors should be advised to modify their diet during such events to minimize their risk of esophageal food impaction.

Author contributions

Asim Shuja: study concept and design; acquisition of data; interpretation of data; drafting of the manuscript; administrative, technical or material support.

Diana M. Winston: analysis and interpretation of data; critical revision of the manuscript for important intellectual content.

Asad Rahman: drafting of the manuscript; administrative, technical, or material support.

Roger D. Mitty: critical revision of the manuscript for important intellectual content; administrative, technical or material support; study supervision.

Bertrand L. Jaber: study concept and design; analysis and interpretation of data; drafting of the manuscript; critical revision of the manuscript for important intellectual content; statistical analysis; technical support; study supervision.

Thormika Keo: study concept and design; critical revision of the manuscript for important intellectual content; statistical analysis; technical support; study supervision.

Conflict of interest statement: none declared.

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