

Table 1

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
UK National External Quality Assessment Scheme for Immunochemistry Working Group, 2003, UK	Review of current recommendations for clinical biochemists in the UK	Review article	Time for formation of bilirubin in CSF. Selection of bilirubin as key determinant	This occurs 9–15 hours after a bleed. Bilirubin is the only product of red cell lysis that occurs solely in vivo	Not systematic review. Basic data on which recommendation not given.

UK National External Quality Assessment Scheme for Immunochemistry Working Group. National guidelines for analysis of cerebrospinal fluid for bilirubin in suspected subarachnoid haemorrhage. *Ann Clin Biochem* 2003;40:481–8.

Proteolytic enzymes for oesophageal meat impaction

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Abstract

A short cut review was carried out to establish whether proteolytic enzymes are effective at resolving oesophageal meat impaction. Altogether 98 papers were found using the reported search, of which three presented the best evidence to answer the clinical question. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of these best papers are tabulated. A clinical bottom line is stated.

Clinical scenario

A 35 year old man attends the emergency department with a history of oesophageal obstruction after an attempt at the 20 ounce house-special at the local steak house restaurant. The ENT doctor on-call will be in theatre for some time and suggests sips of fresh pineapple juice, which he informs you contains a proteolytic enzyme, bromelain. You recall the vet prescribing papain for your cat's furball last year and decide to look for fresh pineapple juice in the department. Finding

none, you admit the patient but wonder if it would have been effective.

Three part question

In [a patient with oesophageal meat impaction] are [proteolytic enzymes effective] at [inducing resolution and minimising complications]?

Search strategy

Medline 1966–10/04 and Embase 1980–10/04 using the OVID interface. Medline: [(pineapple\$.mp OR bromelain.mp OR exp papain OR papain.mp OR trypsin.mp OR chymotrypsin.mp OR enzyme\$.mp OR proteolytic.mp OR Adolph's meat tenderizer\$.mp OR caroid.mp) AND (exp esophagus OR oesophag\$.mp OR esophag\$.mp) AND (food.mp OR bolus.mp OR exp foreign bodies OR foreign bod\$.mp OR exp meat OR meat.mp OR impact\$.mp OR obstruct\$.mp OR dysphagia.mp OR steak\$.mp)] LIMIT to human AND English language. Embase: [(pineapple\$.mp OR bromelain.mp OR exp papain OR papain.mp OR trypsin.mp OR chymotrypsin.mp OR enzyme\$.mp OR proteolytic.mp OR Adolph's meat tenderizer\$.mp OR caroid.mp) AND [exp esophagus obstruction OR {(oesophag\$.mp OR esophag\$.mp) AND (food.mp OR bolus.mp OR exp foreign body OR foreign bod\$.mp OR exp meat OR meat.mp OR impact\$.mp OR obstruct\$.mp OR dysphagia.mp OR steak\$.mp)}] LIMIT to human AND English language.

Search outcome

Altogether 98 papers were found in Medline and 80 in Embase, three of which were relevant to the question posed (table 2).

Table 2

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Cavo JW Jr <i>et al</i> , 1977, US	90 patients with oesophageal meat impaction: 44 patients received caroid solution (papain) 37 patients received papain 8 patients received various enzymes 1 patient received Adolph's meat tenderiser (papain)	Case review	Passage of the impacted meat Complications	Bolus successfully passed in 89 cases Bolus not passed in 1 case 2 patients died (oesophageal perforation, mediastinitis, and great vessel perforation)	Most cases given barium before enzymes. Dose of enzyme given varied between studies Some studies retrospective. Not all studies treated consecutive patients. One of the patients who died from perforation had meat impaction for 10 days before presentation.
Hall ML and Huseby JS, 1988, USA	1 patient with oesophageal meat impaction Adolph's meat tenderiser (papain)	Case report	Passage of the impacted meat Complications	Meat bolus not passed Haemorrhagic pulmonary oedema	Given barium before enzymes Given meperidine, glucagon and diazepam after enzyme, then intubated
Maini S <i>et al</i> , 2001, UK	1 patient with oesophageal meat impaction Papain	Case report	Passage of the impacted meat Complications	Successfully passed Aspiration pneumonitis	

Comment(s)

Papers evaluating the effectiveness of proteolytic enzymes consist of case reports or case series only. Almost all used sips of a solution containing papain. Published cases up to 1977 report successful passage of the bolus in 89 of 90 cases treated with enzymes but with two fatalities. Since 1977, only two case reports of proteolytic enzyme use for meat oesophageal impaction have been published. One reported haemorrhagic pulmonary oedema (Hall) while the most recent (Maini) reported aspiration pneumonitis from papain use in a patient at a UK hospital in 2000. No reference to pineapple juice use was found in the literature.

► CLINICAL BOTTOM LINE

There is no evidence to support the effectiveness of fresh pineapple juice in resolving meat impaction in the oesophagus. Proteolytic enzymes have been successful but afford an unacceptable risk of serious complications. Their use should be avoided by doctors in the emergency department.

Cavo JW Jr, Koops HJ, Gryboski RA. Use of enzymes for meat impactions in the esophagus. *Laryngoscope* 1977;**87**:630-4.

Hall ML, Huseby JS. Hemorrhagic pulmonary edema associated with meat tenderizer treatment for esophageal meat impaction. *Chest* 1988;**94**:640-2.

Maini S, Rudralingam M, Zeitoun H, et al. Aspiration pneumonitis following papain enzyme treatment for oesophageal meat impaction. *J Laryngol Otol* 2001;**115**:585-6.

Effervescent agents for oesophageal food bolus impaction

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Abstract

A short cut review was carried out to establish whether fizzy drinks alone are effective at resolving food bolus impaction. Altogether 46 papers were found using the reported search, of which six presented the best evidence to answer the clinical question. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of these best papers are tabulated. A clinical bottom line is stated

Clinical scenario

It is Christmas day when a 70 year old woman is brought to the emergency department by her family with a history of oesophageal obstruction after eating her turkey dinner. You wonder if a fizzy drink might resolve the obstruction.

Table 3

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Rice BT <i>et al</i> , 1983, USA	8 patients with oesophageal meat impaction Tartaric acid and sodium bicarbonate	Case series	Passage of the impacted food bolus Complications	Successfully passed in all cases No complications	Patients given barium before the effervescent agent
Campbell N and Sykes P, 1986, UK	2 patients with oesophageal food impaction Carbex	Case reports	Passage of the impacted food bolus Complications	Successfully passed in both cases No complications	Patients given barium before the effervescent agent
Mohammed SH and Hegedus V, 1986, Denmark	28 patients with impacted oesophageal foreign body	Case series	Passage of the impacted food bolus Complications	8 resolved by barium alone, 16 resolved by barium and soda 4 not resolved Laryngeal aspiration of barium in 1 patient	Patients given barium before the effervescent agent Retrospective
Zimmers TE <i>et al</i> , 1988, USA	Carbonated soda water All episodes (26) of oesophageal food impaction treated with effervescent agents over a 4 year period Tartaric acid and sodium bicarbonate	Case series	Passage of the impacted food bolus Complications	Successfully passed in 17 cases. Unsuccessful in 9 cases "Most vomited" Oesophageal tear in 1 patient	Patients given barium before the effervescent agent Retrospective
Karanjia ND and Rees M, 1993, UK	13 episodes (8 patients) requiring endoscopy for oesophageal food impaction	Case series	Presence or absence impacted food in oesophagus at endoscopy	No foreign body seen in 8 of 8 patient events receiving prior treatment with Coca-Cola. Foreign body seen in 5 of 5 patient events receiving no prior treatment	1 patient given 3 days of Coca-Cola before resolution occurred (after extensive bolus noted at endoscopy) ?Selection bias
Spinou E <i>et al</i> , 2003, UK	Coca-Cola or nothing 1 patient with oesophageal meat impaction Carbex (= sodium bicarbonate, simethicone and citric acid)	Case report	Passage of the impacted food bolus Complications	Successfully passed No complications	Patient given barium before the effervescent agent Buscopan given to the patient 24 hours earlier with no success