

Palliation of dysphagia from inoperable oesophageal carcinoma using Atkinson tubes or self-expanding metal stents

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Key words: Oesophageal carcinoma; Dysphagia; Palliation; Intubation

Until recently, intubation for the palliation of malignant dysphagia has relied upon the insertion of a variety of plastic tubes. Self-expanding metal stents are reported to have a lower complication rate. We have compared the results of Atkinson tube insertion with self-expanding metal stents in patients with inoperable oesophageal carcinoma.

From 1990 to 1994 Atkinson tubes were inserted for the palliation of dysphagia from oesophageal cancer, from 1994 onwards self-expanding metal stents were used. Complications, mortality and hospital stay were compared in both groups of patients.

In all, 87 patients with inoperable oesophageal carcinoma were treated, 46 with an Atkinson tube and 41 with metal stents. Complications occurred at similar rates in both groups (56% Atkinson tubes, 44% metal stents). There was a significantly higher perforation rate associated with Atkinson tube insertion (8 patients, 17%) compared with metal stents (1 patient, 2.4%, $P=0.02$, χ^2). The length of stay was also significantly higher in the Atkinson tube group (median 10 days) compared with the metal stent group (3 days, $P<0.01$, Mann-Whitney U test). Mortality rates were similar in both groups.

The use of metal stents for the palliation of dysphagia in inoperable oesophageal carcinoma results in a lower perforation rate and a reduced length of stay and they represent a significant advantage over Atkinson tubes.

The majority of patients with oesophageal carcinoma are unsuitable for surgical resection (1). The palliation of distressing dysphagia is of major importance in these patients.

Intubation has the theoretical advantage of being a 'one off' therapy giving rapid relief of symptoms. Until recently, this was achieved with a variety of plastic prostheses that all required dilatation before insertion and were associated with a substantial complication rate (2).

Self-expanding metal stents have the advantage that they require a thinner delivery system for their placement and are said to have a lower complication rate than plastic tubes. However, they are about ten times more expensive than plastic tubes. There has been only one controlled trial comparing plastic tubes with metal stents (3). There were no early complications in the stent group and hospital stay was reduced. That study included patients with malignant dysphagia from a number of causes and included 42 patients from three centres. Plastic tubes were inserted under general anaesthesia, which is not standard practice in the UK.

We have compared our results for palliation of dysphagia in patients with oesophageal carcinoma using plastic Atkinson tubes or metal stents inserted under intravenous (IV) sedation.

Methods

In 1994, there was a change in management of patients requiring palliation of malignant dysphagia. We stopped using Atkinson tubes (Key Med Ltd, Southend-on-Sea,

(UK) and started inserting self-expanding metal stents. We were able to compare the results of a single surgeon (IEB) inserting Atkinson tubes with a single radiologist (HGT) inserting metal stents. Data on complications were collected prospectively for the patients having metal stents inserted and retrospectively for the patients having Atkinson tubes inserted, using the surgical department medical data index system. All patient notes were reviewed to ensure complete data collection. Only patients with oesophageal carcinoma were investigated. Demographic details, histology and position of the oesophageal tumour were noted. Atkinson tubes were inserted by a single surgeon under fluoroscopic control after IV sedation with midazolam (2–10 mg) and dilatation. Large (12.9 mm internal diameter) tubes were used. Metal stents were also inserted after IV sedation and with fluoroscopic monitoring. Dilatation was seldom required, and 18 mm to 25 mm stents were inserted. We used uncovered and covered (polyurethane) Wallstents (Schneider Europe, Bulach, Switzerland) and uncovered Strecker nitinol stents (Boston Scientific, St Albans, UK). Covered stents were employed when both ends of the stent could be located within the lumen of the oesophagus. Uncovered stents were used when the distal end of the stent lay within the stomach. The position of the stent was confirmed the following day by a barium swallow.

All early and late morbidity and mortality was recorded.

Statistics

Results were compared using a Mann-Whitney *U* test for non-parametric data and a χ^2 test.

Results

In total, 87 patients with inoperable oesophageal carcinoma were included; 46 patients had insertion of an Atkinson tube and 41 patients had a self-expanding metal stent. The two groups were well matched for age, sex, histology and position of tumour (Table I). Of the patients having metal stents inserted, 26 had an

Table I. Details of patients with inoperable oesophageal tumour treated by Atkinson tubes or self-expanding metal stents

	87 patients	
	Tube (<i>n</i> = 46)	Stent (<i>n</i> = 41)
Male:Female	29:17	29:12
Age, median (range)	78 (62–92)	74 (44–89)
Histology		
Adenocarcinoma	27 (59%)	28 (70%)
Squamous	19 (41%)	13 (32%)
Position		
Upper	3 (7%)	0
Mid	14 (30%)	9 (22%)
Lower	29 (63%)	32 (78%)

uncovered stent (Wallstent, *n* = 13; Strecker stent, *n* = 13) and 15 a covered Wallstent. All patients reported an improvement in dysphagia after prosthesis insertion.

Complications occurred in 26 (56%) of patients having Atkinson tubes inserted and in 18 (44%) having metal stents inserted. The frequency of early and late complications and details of early complications are shown in Table II. There was a significant difference ($P=0.02$, χ^2 test) in the perforation rate between Atkinson tubes, eight patients (17%) and metal stent patients, one (2.4%). The consequences of perforation were also greater in the Atkinson tube group. Of the eight patients perforated, the longest survivor was 70 days, and five patients died in hospital. The single patient perforated after metal stent insertion was treated with a further covered stent and survived 126 days.

Late tube-related problems occurred with similar frequency (26% and 24%) in both groups and required a number of re-interventions. In the Atkinson tube group, five patients had 15 bolus obstructions and eight patients had tumour overgrowth or late tube migration. In the metal stent group, four patients had 14 bolus obstructions and six patients had tumour overgrowth and ingrowth. These late complications were treated by a variety of methods: in the Atkinson tube group by tube replacement (*n* = 5), tube repositioning (*n* = 4), tube removal (*n* = 2) and metal stent placement (*n* = 1); in the metal stent group, tumour was dislodged from the lumen of the stent by abrasion with the end of an endoscope or Celestin dilator (*n* = 5), by laser ablation (*n* = 3), by alcohol injection (*n* = 2), or by placement of a second metal stent (*n* = 3).

All the patients have now died. In the Atkinson tube group, 30-day mortality was 11 patients (24%) and the median survival 72 days (range 4–365 days). This was not significantly different from the metal stent group who had a 30-day mortality of 24% (10 patients) and a median survival of 91 days (range 6–450 days).

Table II. Complication rate occurring in patients after insertion of Atkinson tubes or metal stents with details of the early complications

	Complications	
	Tube	Stent
Patients	26 (56%)	18 (44%)
Early	21 (46%)	15 (34%)
Late	12 (26%)	10 (24%)
	44 complications	27 complications*
<i>Early complications</i>		
Major	12 (26%)	6 (15%)
Perforation	8 (17%)	1 (2.4%)†
Migration	2 (4.4%)	3 (7.3%)
Bleeding	4 (8.7%)	3 (7.3%)
Chest infection	4 (8.7%)	4 (10%)
Chest pain	3 (6.5%)	3 (7.3%)
Septicaemia	0	1 (2.4%)

*Some patients had more than one complication

† $P=0.02$, χ^2 test

Table III. Length of hospital stay (days) in patients having Atkinson tubes and metal stents inserted, 95% confidence intervals (95% CI) are shown. The first admission refers to the placement of the prosthesis. The total admission time includes all subsequent admissions with tube- or stent-related problems

	Length of stay (days)	
	Tubes	Stent
First admission, median (range)	6.5 (2–35)	3 (1–24)*
95% CI	4–9	2–4
Total admission	10 (2–35)	3 (1–34)*
95% CI	8–12	2–6

* $P < 0.001$ Mann–Whitney U test

Length of stay in hospital was significantly reduced ($P < 0.01$ Mann–Whitney U test) in the metal stent group of patients, both when initial admission for prosthesis placement (median 3 days vs 6.5 days) and when total admission time was calculated (3 vs 10 days) compared with those having Atkinson tubes inserted (Table III).

Discussion

Palliation of dysphagia was achieved by both Atkinson tube insertion and metal stent insertion. The series reported represents a large number of patients treated by either a consultant surgeon or consultant radiologist and includes only patients with oesophageal carcinoma. This unit has an aggressive policy towards resection, and in the same period 49 patients underwent resection of oesophageal carcinoma with an operative mortality of 8%, and thus the patients reported here were unsuitable for resection. Complications with prosthesis insertion were similar in both groups. Early complications occurred in 34% of metal stent patients and, although many of these were minor, this contrasts sharply with Knyrim *et al.* (3) who reported a remarkable absence of procedure-related complications in the metal stent group. Early complications after stent insertion reported in the literature are similar to those reported here (4–7).

Some of the complications in the stent group may reflect our early experience with the technique. Major migrations were usually the result of a covered stent placed near to the gastro-oesophageal junction; a problem encountered by others (6) and largely resolved by using uncovered stents at this position. The most striking difference in the complication rates is the perforation rate associated with Atkinson tube insertion. Our rate of 17% is high, but is in keeping with figures in the literature (3,7–9); it probably relates to the need to dilate the cancerous stricture before insertion of the Atkinson tube. We have placed the large diameter tubes (12.9 mm) in the belief that the quality of swallowing with the smaller tubes is less acceptable. Perforation when inserting an Atkinson tube is a disaster for the patients. Of the eight patients

perforated, five died in hospital, and the longest survivor was 70 days. Celestin dilators were used, which may be more traumatic than some other forms of dilatation, but a 14% perforation rate with balloon dilators has been reported (3). We have compared two groups of patients over different time periods and treated by different specialists and are aware of the potential bias this creates. However, we believe the perforation rate reported is a true reflection of the problem of plastic tube insertion. There was one perforation in the metal stent group and, in contrast, this patient survived to leave hospital. Perforation can easily be treated by placing a covered stent. The mortality rate in both groups is similar and the 30-day mortality (24%) is the same. This is not always procedure-related and often relates to the advanced stage of the disease. While some may question the value of prosthesis insertion, particularly with an expensive metal stent, in patients who have a very short time to live, the distress of being unable to swallow one's own saliva makes palliation worthwhile, even if only for a very short time. Our philosophy of treating all suitable patients may be reflected in our complication rate.

The advantage of prosthesis insertion over other methods of palliation is that it is potentially a single procedure. This is true for about 75% of patients; however, 25% of patients re-present with tube-related problems, and there was no difference between Atkinson tubes and metal stents in this respect in our study. Similar rates (25–33%) of recurrent dysphagia have been reported for both plastic tubes and metal stents (3,5,9). This represents a significant inconvenience to the patient and extra work for the endoscopy unit. Bolus obstruction remains a problem. This occurred in the metal stent group, mainly in patients with the smaller diameter (18 mm) Strecker stents and has been less of a problem with the larger diameter (22 and 25 mm) Wallstents. Some bolus obstruction results in failure to heed dietary advice.

Tumour overgrowth occurs with both metal stents and the Atkinson tube, but ingrowth is a problem unique to metal stents. Passing a dilator, alcohol injection or laser can often clear this. The use of a laser in the presence of a metal stent has been cautioned by stent manufacturers but, in our limited experience, there have been no problems and the technique works well. Covered stents should reduce this problem, although tumour ingrowth at the 'uncovered' ends of covered stents did occur. Covered stents are not suitable for the gastro-oesophageal junction as they migrate and tumour ingrowth at this site is a problem. Advances in metal stent design and covering may eventually overcome this problem.

In conclusion, self-expanding metal stents are a definite improvement over Atkinson tubes in the palliation of oesophageal cancer. The reduction in the serious complication of perforation and an overall reduction in length of hospital stay more than makes up for their increased cost. Metal stent insertion is not as problem-free as some authors suggest and minor complications with insertion are common. Late stent-related problems, particularly tumour overgrowth and ingrowth, remain a challenge.

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Received 27 May 1998