

Palliative intubation of oesophagogastric neoplasms at fiberoptic endoscopy

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SUMMARY Of one hundred and twenty-one patients with neoplastic obstruction of the oesophagus or cardia 118 underwent palliative intubation at fiberoptic endoscopy on a total of 135 occasions. Sixty had adenocarcinoma, 49 had squamous carcinoma, and in nine the oesophagus was involved by a growth arising elsewhere. Satisfactory swallowing was restored in 112 patients. Thirteen patients died in hospital shortly after the procedure. Five fatal and 10 non-fatal perforations were sustained in 135 intubation procedures. Complications of tube function included food blockage on 26 occasions, tumour overgrowth on seven occasions, displacement on 16 occasions, disappearance of the tube in two patients, and late oesophageal perforation on nine occasions. Fifty-six patients survived for three months, 33 for six months, and 10 for a year after intubation. Comparison with series in the literature of patients who underwent surgical palliative intubation suggests that endoscopic palliation has lower mortality and morbidity, and an increased survival time, and is now the method of choice for palliation of oesophagogastric neoplasms.

Carcinomas of the oesophagus and gastric cardia cause progressive dysphagia and, in the absence of treatment, starvation is a common cause of death. Surgically incurable disease is present in over 60% of patients at the time of presentation¹ and in the majority of these patients palliative relief of dysphagia is of pressing importance. Any method of palliation should therefore have a low mortality and morbidity, preferably associated with a short hospital stay, and be effective in the relief of dysphagia. For many years prosthetic oesophageal tubes inserted either by operation or endoscopic means have been used to relieve dysphagia,²⁻⁵ but operative methods require a laparotomy and rigid endoscopic methods may be associated with a high incidence of oesophageal perforations, especially with lesions in the lower oesophagus. The advent of fiberoptic endoscopy has facilitated the placement of prosthetic tubes which may be slid into position over the endoscope itself⁶ or over a guide wire after mounting on an introducer.⁷ The quality and duration of life after intubation depend, among

other factors, on the efficacy and stability of the prosthetic tube, and relatively little is known of how patients fare after intubation.

In this paper we describe the immediate and long-term outcome in a consecutive series of 118 patients with neoplastic obstruction of the oesophagus or gastric cardia treated by endoscopic intubation.

Methods

INTUBATION

Intubation was carried out using a tube introducer developed in our unit (Nottingham Introducer)⁷ after the diagnosis had been confirmed by biopsy at a previous endoscopic examination. Usually with the patient under general anaesthesia, the tumour was inspected with a fiberoptic endoscope (Olympus GIF/P2 scope of 8.8 mm diameter), and a stainless steel guide-wire passed through the narrow part and into the stomach using radiological control if necessary. The lumen was dilated to a size 50 French gauge olive (16.6 mm diameter) using the Eder-Puestow metal olive dilators. After dilatation an endoscopic assessment of the extent of the tumour was made. A suitable prosthetic tube was selected and attached to the Nottingham Introducer (Fig. 1).

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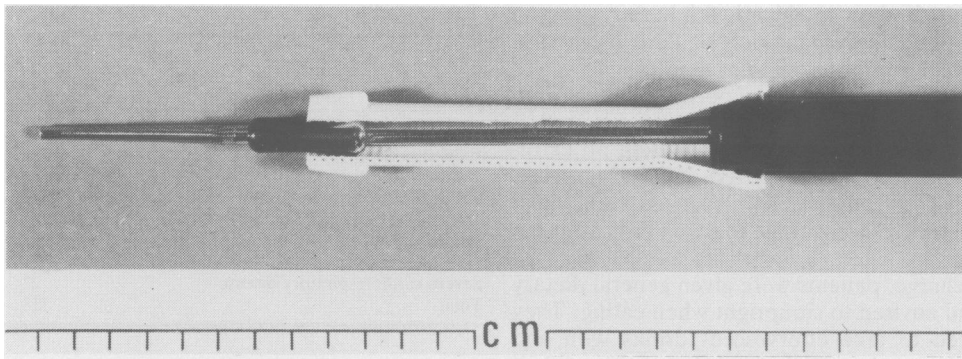


Fig. 1 Sectional view of silicone rubber tube mounted on a Nottingham introducer and held in place by the positioning tube. The Delrin cup is expanded by sliding the metal olive into it, so gripping the tube from the inside. The positioning tube engages in the proximal end of the prosthetic tube to prevent its displacement during removal of the introducer after satisfactory positioning.

A positioning tube was positioned behind the tube, over the introducer, and the whole assembly was slid along the guide-wire and under radiological control was placed in a satisfactory position across the stricture. The introducer and guide-wire were then removed while the tube was held in position by the positioning tube, which was itself finally removed. On completion of the intubation the position of the tube was checked by passing the endoscope through the lumen of the tube into the stomach, to confirm that a satisfactory food passage was now established.

TYPE OF TUBE

One hundred and thirty-five tubes were inserted in 118 patients. Forty-three were Celestin latex rubber tubes incorporating a nylon spiral in the wall cut to an appropriate length after endoscopic assessment of the extent of growth, 57 were Celestin tubes which had been modified by the attachment of a distal shoulder formed from the funnel of a second tube, and 35 were silicone rubber tubes incorporating a nylon spiral in the wall with a pre-formed distal shoulder and of either 13 or 18 cm overall length (Fig. 2). Both types of tube were of similar cross-sectional dimensions (Celestin tubes: luminal diameter 11.5 mm, external diameter 14.5 mm; silicone rubber tubes: luminal diameter 11.5 mm, external diameter 15.5 mm).

POST-INTUBATIONAL CARE

All patients were examined for subcutaneous emphysema and radiographs of the chest and neck were taken within six hours of intubation to detect interstitial emphysema. If oesophageal or pharyngeal perforation were detected the patient was treated conservatively with intravenous feeding

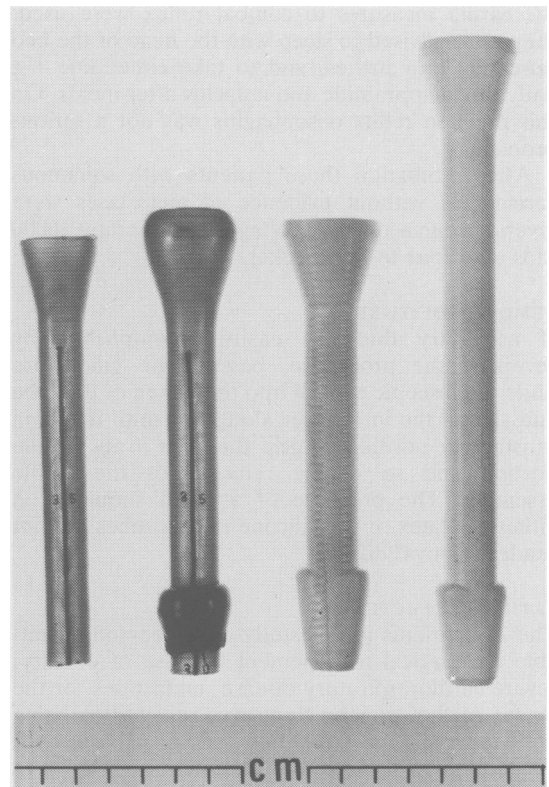


Fig. 2 Types of tubes used in endoscopic palliative intubation. A Celestin latex rubber tube is shown on the left, with a latex rubber tube modified by the addition of a distal shoulder next to it. The two tubes on the right are silicone rubber tubes of different lengths, both with preformed distal shoulders.

for seven to 10 days combined with broad spectrum antibiotics and the elimination of fluid by mouth. Oesophageal aspiration was not used.

If there were no evidence of perforation a barium swallow was performed on the following day, and, if this flowed readily into the stomach with no extravasation, oral feeding was started. After 12 hours on oral fluid a soft diet was introduced, and most patients returned home three to seven days after the procedure.

On discharge, patients were given general dietary advice and advised to sit upright when eating. They were asked to take effervescent drinks with and after meals, to chew their food thoroughly and, if necessary, to obtain adequate dentures. On discharge they were followed up at monthly intervals in the outpatient clinic, and, if this was not practical, contact was maintained through the family physician.

In patients in whom the prosthetic tube straddled the cardia measures to combat reflux were used: they were advised to sleep with the head of the bed raised by four inches, and to take cimetidine 1 g daily, metaclopramide and antacids after meals. On this regimen reflux oesophagitis was not a serious problem.

After intubation those patients with squamous carcinomas without evidence of metastases were given a course of megavoltage radiotherapy (6000 rads over four to five weeks).

REMOVAL OF TUBE

If necessary this was easily accomplished by reversing the procedure, passing the guide-wire under endoscopic control into the lumen of the tube and sliding the introducer along this until it was in satisfactory position to grip the tube in its middle portion and so enable removal of the whole assembly. The presence of a distal shoulder on either the latex or the silicone rubber tubes did not render removal difficult.

PATIENT SELECTION

The 121 patients in this study were deemed unsuitable for surgical management because of debility, severe cardiorespiratory disease, metastases, or the extent of the growth. None was rejected as being unfit for palliative intubation, and the reasons for deciding upon this form of treatment are shown in the Table. Investigations to determine the presence of metastatic disease were confined to clinical examination, radiograph of the chest, liver function tests, and isotopic liver scans. If, at preliminary endoscopy, the carcinoma involved a short length of the oesophagus and there was no obvious metastatic disease, then the advice of a surgical colleague on

Table *Indications for palliative intubation*

	<i>Number of patients</i>
Metastatic disease on presentation	44
Extensive carcinoma (>8 cm in length)	26
Previous resection	11
Recurrence after radiotherapy	7
Tracheo-oesophageal fistula	5
Inoperable at thoracotomy	2
Hodgkin's disease	1
Severe cardiorespiratory disease	22
Total	118

the suitability of that patient for a resection was obtained. In three patients endoscopic intubation was unsuccessful because it was not possible to pass the guide-wire through very extensive carcinoma into the stomach. The 118 who were successfully intubated are now considered.

Age and sex

There were 69 men and 49 women. Their ages ranged from 50 to 91 years. Thirty-four patients were aged under 65 years; 34 between 65 and 75 years; 43 between 75 and 85 years, and seven were aged over 85.

TYPE OF GROWTH

Sixty patients had adenocarcinoma of the lower oesophagus or gastric cardia, 49 had squamous carcinomas, three patients had bronchial carcinomas invading the oesophagus, two patients had extrinsic compression of the oesophagus by metastatic disease from carcinoma of the breast, and one patient had Hodgkin's disease involving the oesophagus. In the remaining three patients a histological diagnosis was not made, but the clinical and radiological presentation and subsequent course left little doubt that they had malignant disease of the oesophagus.

POSITION OF GROWTH

The tumour was in the upper third of the oesophagus in 11 patients, in the middle third in 55, and in the lower third or involving the cardia in 52. In 11 patients the tumour had recurred at the site of the anastomosis after a previous resection. Tracheo-oesophageal fistulae were present in five patients, two of whom had a bronchial carcinoma.

Results

OUTCOME

Immediate mortality

Eleven patients died within a week of intubation;

one from complications of anaesthesia, two from carcinomatosis, three from aspiration pneumonia, one from myocardial infarction, one from cerebrovascular disease, and three from mediastinitis secondary to oesophageal perforation. Two other patients died in hospital as result of intubation; one of mediastinitis at 10 days and the other of multiple lung abscesses at 36 days.

One hundred and two patients left hospital to return home and three patients remained in hospital, but for social rather than medical reasons. A life table survival analysis for the 118 patients is shown in Fig. 3. Actual numbers surviving were 56 patients at three months, 33 patients at six months, and 10 for 12 months or longer. Eight patients are still alive with survival times ranging from one month to 52 months; this latter patient having had squamous carcinoma treated by intubation and radiotherapy. Removal of the tube was possible in five patients after satisfactory response to radiotherapy.

Influence of tumour type on survival

Survival curves for 60 patients with adenocarcinomas and 26 with squamous carcinomas who did not receive radiotherapy, together with 23 patients with squamous carcinomas treated by radiotherapy are shown in Fig. 4. Survival in squamous carcinoma is apparently improved by radiotherapy, but the two squamous carcinoma groups were not comparable, as those not offered radiotherapy were either very elderly or had obvious disseminated disease at the time of intubation. Survival in

adenocarcinoma was either slightly better or slightly worse than in squamous carcinoma depending on whether treatment with radiotherapy was given for squamous growths.

IMPROVEMENT IN DYSPHAGIA

After intubation there was a marked improvement in swallowing ability, which was graded on a five point scale (Fig. 5). Before intubation 41% could not swallow even fluid in adequate amounts, while afterwards 96% were able to take a soft diet. The relief of dysphagia usually resulted in an increased feeling of well being and an arrest in the trend of weight loss. The length of hospital stay for uncomplicated intubations was less than five days for most patients and the majority of patients died at home, in most cases swallowing well until death.

Tracheo-oesophageal fistula is an absolute indication for intubation, as it seals off the fistula with consequent improvement in the quality of life, and in respiratory and nutritional status. There was a striking improvement in dysphagia in the five patients with tracheo-oesophageal fistula.

TUBE FUNCTION

Tube patency

The commonest complication was blockage of the tube by food, usually caused by inadequate mastication or dietary indiscretion. It occurred on 26 occasions in 18 patients, and was easily dealt with by passing the paediatric endoscope up and down the tube displacing the impacted food bolus on into the

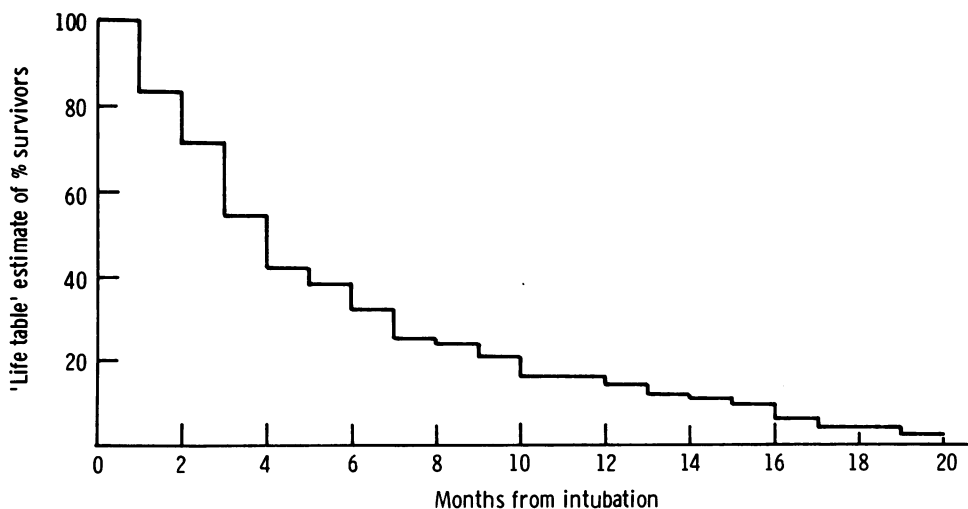


Fig. 3 Life table survival analysis for 118 patients with oesophagogastric neoplasms treated by endoscopic intubation.

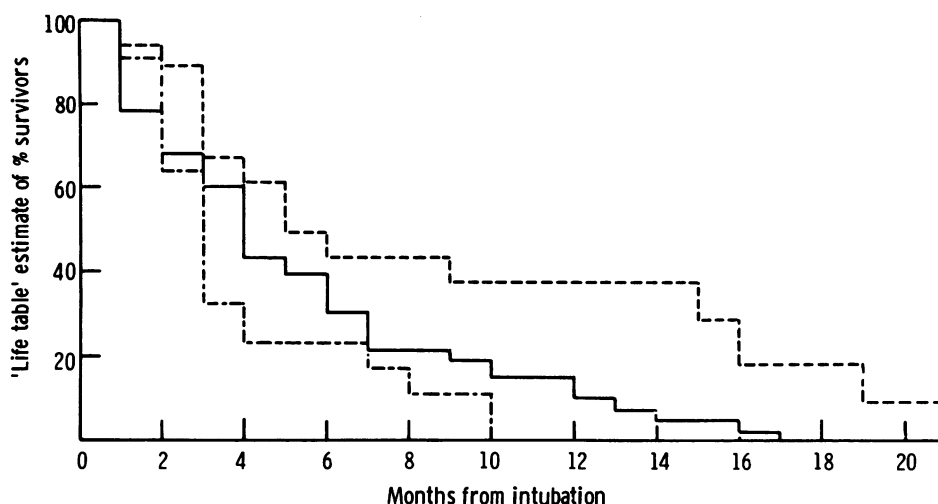


Fig. 4 Life table survival analysis for patients undergoing palliative endoscopic intubation for oesophago-gastric neoplasms. Twenty-three patients had squamous carcinoma treated by intubation and radiotherapy (---), while 26 patients with squamous carcinoma did not receive radiotherapy (.....). Sixty patients had adenocarcinoma (—). Survival in the squamous and adenocarcinoma groups treated by intubation alone was similar, but radiotherapy appeared to improve the survival of patients with squamous carcinoma.

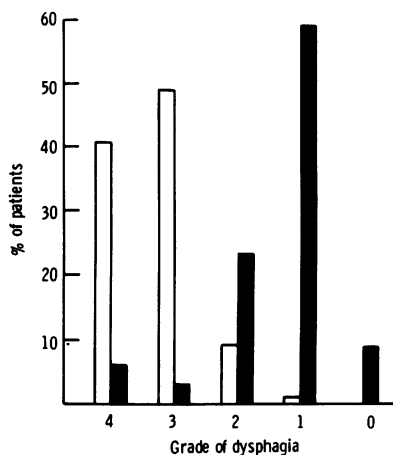


Fig. 5 Improvement in dysphagia after intubation in 112 patients undergoing endoscopic intubation. The open columns indicate the degree of dysphagia before intubation, and the solid columns indicate the degree of dysphagia after intubation. Dysphagia grading: 0 – nil, 1 – normal diet avoiding certain foods such as raw apple and steak, 2 – semi-solid diet, 3 – fluids only, and 4 – complete dysphagia for even liquids.

stomach. Food blockage tended to occur more often with those tubes over 10 cm in length than with shorter tubes but there was no difference between the two types of tube. In seven patients the tube became overgrown by tumour and this occurred between two and 11 months (mean five months) after intubation. In four patients it was possible to remove the tube and replace it with a longer one. Radiotherapy in one patient reduced the size of the growth, thus improving swallowing and in the remaining two patients nutrition was maintained by a fine bore nasogastric feeding tube inserted through the growth at endoscopy.

TUBE DISPLACEMENT

Displacement of the tube necessitating repositioning occurred on 15 occasions, and its incidence was reduced by the addition of a distal shoulder to the tube; 11 proximal displacements occurred in the 43 Celestin tubes without a distal shoulder, compared with four in the 57 tubes with a distal shoulder, and one in the 35 silicone rubber tubes with a pre-formed distal shoulder. The addition of a distal shoulder therefore reduced the incidence of proximal displacement ($\chi^2=9.76$; $p<0.01$). The other two displacements occurred in a distal direction with the tube passing on into the stomach. In one patient removal required laparotomy, but in the second the tube was allowed to remain in the

stomach and a further tube inserted through the growth which enabled him to swallow satisfactorily for another four months.

Two tubes disappeared, no trace of either being found at endoscopy or abdominal radiography, and may have been passed through the gut.

Tube deterioration

Two tubes fractured; in one patient recurrence of dysphagia prompted endoscopy, which revealed that the distal 3 cm of the tube had disappeared through the pylorus, although still attached to the proximal portion by the nylon spiral. After cutting the spiral it was possible to remove the proximal portion of the tube endoscopically, and the distal fragment was passed per rectum three days later. In a second patient the distal portion was present in the stomach, again attached to the proximal part of the tube by the intact nylon spiral. On this occasion both fragments were removed endoscopically. These two tubes had been in position for three months and four months respectively, and the first patient had received radiotherapy. It is now our policy to do a routine check endoscopy to look for evidence of structural deterioration at six monthly intervals, and if present, to remove and replace the tube.

COMPLICATIONS

During the 135 intubations in the 118 patients, 15 perforations were sustained giving a perforation rate of 11%; five were fatal and 10 non-fatal. Although throughout the series there was no fall in the incidence of perforation, mortality from the complication did decrease. When a perforation was sustained during the procedure, wherever possible intubation was completed because the presence of the tube helped to seal off the tear.

Late perforations

Nine patients died from late perforation and each had a squamous carcinoma treated by intubation and radiotherapy. Perforation occurred at intervals ranging from one month to 19 months after intubation. In four patients the growth eroded into the aorta causing fatal massive haemorrhage, and in the other five perforations occurred into the mediastinum resulting in mediastinitis and in one patient a large lung abscess. In this latter patient, necropsy demonstrated the perforation of the carcinoma to be related to the edge of the funnel of a silicone rubber tube.

Discussion

While surgical resection of carcinoma of the oesophagus may carry a hope of cure, more than

60% of patients prove inoperable, and only 18% survive for one year.¹ Operative mortality is high and increases with age. Hence the clinician commonly has to resort to palliative intubation to relieve dysphagia in a group of patients who are often severely undernourished. Our experience is that the fiberoptic method is highly effective in the relief of dysphagia, restoring satisfactory swallowing in 112 of 118 patients. In addition, it has an acceptably low mortality in a group of malnourished, often elderly, patients, who frequently have other serious medical conditions. Published series of tubes inserted by laparotomy and pull-through technique^{8,9} show that this method carries a 23% mortality, combined with the associated morbidity of laparotomy. Long-term survival is more difficult to compare directly, and is related to the rate of growth of the tumour, extent of spread at intubation, cardiorespiratory disability, and nutritional status. It is unusual for patients with tubes inserted surgically to survive longer than nine months,^{10,11} whereas in our series 10% of patients survived for a year. This difference is largely due to the risk of abdominal surgery in patients who are already catabolic. With the exception of those patients in whom surgical exploration is performed with a view to curative resection, the laparotomy and pull-through method no longer appears to be justifiable as a means of palliative intubation.

The use of a guide-wire to introduce the dilators and then the tube offers a distinct advantage when the anatomy is distorted by previous surgery such as total gastrectomy, or where the anatomy at the cardia is fixed and distorted by the tumour. Repeated dilatations without intubation in patients with carcinoma give only transient relief. When radiotherapy is required preliminary intubation by relieving dysphagia will minimise nutritional deterioration and may so enable the patient better to withstand treatment.

Eighty-six per cent of our patients were fit to return home after endoscopic intubation. Of the 13 deaths in the immediate post-intubational period, several resulted from the disease itself rather than from the procedure. den Hartog Jager *et al*¹² using a fiberoptic endoscopic method of intubation obtained similar results with a 16% mortality during the first fortnight in 161 patients. Perforation of the growth during intubation is usually recoverable provided it is recognised early and appropriate conservative measures are instituted immediately before the patient is fed. Usually the endoscopist is aware during the examination that a perforation has been sustained, but routine examination for subcutaneous emphysema and radiographs of the chest and neck within six hours of intubation will detect a small

number of previously unsuspected perforations. Ten of our 15 patients recovered and in den Hartog Jager's series¹² only one of 16 perforations proved fatal.

Late perforation from pressure necrosis caused by the prosthesis is at present an unavoidable complication, and radiotherapy may be a predisposing factor. Often late perforations go undetected, but any penetration of the aorta leads to a massive and fatal haematemesis.

Starvation is the commonest cause of death in untreated carcinoma of the oesophagus or cardia and the re-establishment of adequate swallowing by intubation usually halts the deterioration in nutrition. Improvement in dysphagia is striking and allows the majority of patients to be managed at home during the terminal stages of their illness. With attention to adequate mastication, diet, and taking plenty of fluid with food most patients become more confident about eating and some on occasions become over-confident with consequent tube blockage. In this series food blockage was not a major problem, but if it does occur then clearing the tube is urgent because of the risk of overspill into the trachea. Unblocking is best done under direct vision with the endoscope, as the food bolus may be impacted, or the blockage may be due to tumour growth above the tube.

The incidence of proximal tube displacement was reduced by the addition of a distal shoulder to the tube and this is important as tubes introduced endoscopically cannot be sutured in position. Distal displacements are rare but when they do occur laparotomy may be needed for removal. In patients with advanced disease in whom laparotomy may not be justified, however, it appears possible to leave the tube in the stomach and insert another tube without untoward effect.

A potentially serious complication is disintegration and fracture of the prosthetic tube which may lead to small bowel ulceration and perforation.¹³⁻¹⁹ In addition to the two tubes which actually fractured, in several others we found evidence of structural deterioration at endoscopy. It is important to be able to remove a prosthetic tube if it becomes structurally unsound, and, using the instrument we employed, this can easily be done by reversal of the insertion procedure. Extubation has been performed on 20 occasions in the 118 patients in this series without complications, and we now inspect endoscopically all tubes which have been in position for six months or more and replace those which show evidence of structural deterioration. Recent *in vitro* work²⁰ suggests that silicone rubber tubes are more resistant to attack by acid than those made of latex rubber.

Extension of the growth may occlude the upper or lower end of the prosthetic tube after it has been in position for some months, and it is often possible to remove the tube endoscopically and replace it with a longer tube. If this is not feasible, at endoscopy a fine bore nasogastric tube can usually be passed through the neoplastic stricture and on into the stomach for feeding purposes.

Survival after intubation is limited by the spread of the growth; one in three patients survive for six months and one in 10 for a year. Radiotherapy appears to prolong survival in patients with a squamous carcinoma, although it may increase the risk of late perforation. Whatever the effect of intubation upon survival, its essential value lies in improving the quality of life by correcting dysphagia and so allowing the patient to be managed in his own home.

The Nottingham Introducer and silicone rubber prosthetic tubes are manufactured by Key Med Ltd, Southend, Essex, England, and Celestin latex rubber tubes are manufactured by Ambletin Ltd, Tetbury, Gloucestershire, England. ALO is in receipt of financial support from Berk Pharmaceuticals Ltd.

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