The role of rigid oesophagoscopy in oesophageal carcinoma


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Summary: The efficacy and safety of rigid oesophagoscopy in diagnostic and therapeutic settings in a consecutive series of 404 patients with oesophageal carcinoma were studied and compared to that for flexible oesophagoscopy in the same group. In addition, we examined the same parameters in a smaller group who had undergone radiotherapy with subsequent malignant stricturing. We performed 328 rigid procedures and 118 flexible procedures in a single regional surgical referral unit over a 7 year period. The combined perforation rate was 1.3%, with an overall mortality of 1% from 446 procedures. We conclude that rigid oesophagoscopy in the presence of carcinoma retains an important diagnostic and therapeutic role which can be achieved with low incidence of perforation in high-risk patients.

Introduction

Oesophagoscopy remains the most reliable investigative procedure in obtaining the diagnosis of cancer of the oesophagus.1,2 Dilatation and intubation have expanded the therapeutic application of this procedure.2-4 Increasingly, fibroptic instruments have been regarded as superior to the rigid instrument for both roles 2-5 Advantages in terms of anaesthesia, patient compliance and the ability to manipulate the instrument through a tumour area with greater safety than rigid instrumentation, have been reported.5 Oesophageal perforation is a serious event which if untreated is frequently fatal.6-8 Available data regarding this complication come from reports with considerable heterogeneity in patient groups studied, patient selection, indications for endoscopy and techniques employed in which instrumental perforation is reported without defining whether it arose during diagnostic or therapeutic oesophagoscopy. Perforation after oesophagoscopy is a recognized hazard irrespective of the skill of the operator or the type of anaesthetic used4,5,8,9 and in all series is increased in the presence of tumour.

The purpose of this study is to clarify the safety of the rigid oesophoscope in diagnosis and therapeutic use, and to identify its usefulness in comparison to flexible endoscopy in patients with carcinoma of the oesophagus.

Patients and methods

Case notes were reviewed retrospectively over a 7 year period in a consecutive series of all 404 patients attending the Northern Ireland Regional Thoracic Surgical Unit at the Royal Victoria Hospital, Belfast, for treatment of carcinoma of the oesophagus. Two full-time thoracic surgeons and a number of registrars performed the procedures.

Rigid oesophagoscopy was performed in all cases under general anaesthesia and direct vision using a Negus oesphagoscope. For dilatation of the site of neoplastic strictures a Maloney mercury-filled bougie set was employed. Rigid oesophagoscopy was performed in 328 patients, 53 of whom were referred after failure of flexible instrumentation in the hands of others to obtain biopsy or dilate a stricture. Eleven patients underwent oesophagoscopy after treatment of their tumour with radiotherapy and are discussed as a separate group. Cases of spontaneous perforation, perforation at the site of post-resection anastomosis, those referred following perforation in other units, those occurring during open operative procedures, or those with tubes in situ have been excluded from this study.

Results and management

Four hundred and forty-six endoscopic procedures were performed in 404 patients resulting in six perforations (1.3%) and four deaths (1.0%) (Table I).
### Diagnostic rigid oesophagoscopy

This procedure was always performed under general anaesthesia. The rigid scope was used for diagnosis under direct vision, with confirmation on biopsy diagnosis in 165 procedures without perforation. In those cases where tumour was directly visualized, 137 (95.1%) of 144 biopsy reports confirmed this observation. In the remaining cases tumour was not suspected visually but was confirmed on subsequent histopathology. There were no perforations in this group.

### Therapeutic rigid oesophagoscopy

The rigid scope was used to dilate tumour stricture or to assist with intubation of tumour stricture in 176 procedures. Two perforations (1.13%) resulted at the tumour site; both patients subsequently died.

### Diagnostic flexible oesophagoscopy

The flexible fiberoptic instrument was used for diagnosis in 118 procedures without perforation occurring. In those patients where tumour was directly visualized, 89 (87.2%) of 102 biopsy reports confirmed this observation. In the remaining cases tumour was not suspected visually but was confirmed on subsequent histopathology. There were no perforations in this group.

### Therapeutic flexible oesophagoscopy

In five patients with tumour the flexible instrument was used to dilate a neoplastic stricture, and in a further five cases assisted intubation by passage of a guide wire. Perforation did not occur in any patient in this group.

Rigid and flexible instruments were equally successful in terms of perforation when diagnosis was the aim. There was no significant difference in the successful strike rate of 95% vs 87% of biopsy using either instrument (chi-square $P > 0.5$).

Therapeutic intervention by the rigid oesophoscope accounted for all the mortality in this study (1.1%) and occurred at the site of tumour during biopsy and dilatation of a neoplastic structure. The flexible instrument was very rarely used for therapeutic intervention and does not provide a reliable group for comparison.

The age distribution of patients suffering perforation was 46–82 years (mean 63–64 years) and was similar to that in the non-perforated group. Table II shows the site of tumours in this study. The associated site of perforation for each tumour site is not significantly different (chi-square $P > 0.5$).

### Therapeutic rigid oesophagoscopy postradiotherapy

Oesophagoscopy was required in 11 patients who had received radiotherapy to the site of the carcinoma in the oesophagus. Table III shows this group of patients with advanced disease. In this group of patients intubation and dilatation resulted in four perforations (36%) from 11 procedures. The incidence of perforation in this group is significantly increased compared to that for therapeutic rigid oesophagoscopy before radiotherapy (chi-square $P < 0.02$). This group accounted for 2.7% of all patients in the study but 67% of the total perforations. If combined with the main group this would disproportionally increase morbidity and mortality.

### Mortality

In four cases, death followed perforation by insertion of a palliative tube across the tumour. In three cases intubation by the oesophoscope was used as a therapeutic measure. In two cases it was possible to resect the tumour as a primary procedure to deal with the perforation without mortality. One patient who underwent bypass procedure after perforation died. In all but one case, drainage

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**Table I** Rigid oesophagoscopy in the presence of neoplasm

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Perforation</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>328</td>
<td>6 (1.8%)</td>
<td>4 (1.2%)</td>
</tr>
<tr>
<td>Intubation</td>
<td>152</td>
<td>3 (1.9%)</td>
<td>3 (1.9%)</td>
</tr>
<tr>
<td>Biopsy/dilatation</td>
<td>176</td>
<td>3 (1.7%)</td>
<td>1 (0.5%)</td>
</tr>
</tbody>
</table>

**Table II** Distribution of tumours by site

<table>
<thead>
<tr>
<th>Site</th>
<th>Number</th>
<th>Perforation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oesophagus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper third</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Middle third</td>
<td>113</td>
<td>2 (1.7%)</td>
</tr>
<tr>
<td>Lower third</td>
<td>138</td>
<td>4 (2.9%)</td>
</tr>
<tr>
<td>Cardia</td>
<td>144</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>404</td>
<td></td>
</tr>
</tbody>
</table>

**Table III** Oesophagoscopy after radiotherapy to tumour site

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Perforation</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>11</td>
<td>4 (36%)</td>
<td>1</td>
</tr>
<tr>
<td>Intubation</td>
<td>8</td>
<td>3 (37%)</td>
<td>1</td>
</tr>
<tr>
<td>Dilatation</td>
<td>3</td>
<td>1 (33%)</td>
<td>0</td>
</tr>
</tbody>
</table>
of the mediastinum or repair of the perforation was performed, with the one patient treated by conservative measures dying after 4 days. Overall mortality after oesophagoscopy was 0.9%, and 67% in those patients suffering perforation.

Discussion

In this study of 404 patients with carcinoma of the oesophagus, we accept the limitations of a retrospective analysis but since all case notes have been retrieved and complete follow-up was available, we believe the results to be valid. In those undergoing diagnostic rigid oesophagoscopy the perforation rate of zero compares favourably with previous studies using either instrument. The perforation rate of 1.1% for therapeutic rigid oesophagoscopy is higher than that associated with most reports of flexible oesophagoscopy (0.018–0.03%) and compares favourably with other reports using rigid instrumentation (0.2–13%). For those patients who underwent the procedure after radiotherapy this rises to 34%, a significant difference in a group considered separately.

Perforation is a hazard of oesophagoscopy irrespective of the type of instrument used and is an objective measure to make comparisons between the instruments. Although no perforations occurred in our hands with the flexible fibreoptic instrument, this has been reported in other studies. In our patients the flexible fibreoptic instrument is used for diagnostic biopsy rather than for therapeutic intervention, there being no difference in the instrument’s rate of perforation when used in this setting.

As an objective measure the success of diagnosis can be assessed by positive biopsy results where tumour is suspected on direct vision. The rigid instrument proved superior to the flexible instrument in this regard though no statistically significant difference was apparent. The rigid instrument enables larger biopsy specimens and in combination with dilatation access to all areas of the tumour in the majority of cases. The claims made that flexible fibreoptic instrumentation should be preferred to the rigid instrument have failed to examine or compare the flexible and rigid instruments in diagnosis of patients with carcinoma and have failed to appreciate the increased risk associated with therapeutic use of the rigid instrument for which the flexible instrument may be unsuited. Endoscopic perforation of malignant strictures of the oesophagus and gastric cardia is a recognized hazard and is not comparable to intubation in the normal oesophagus. This hazard is increased by attempted dilatation and intubation in a group of elderly high-risk patients, many of whom are inoperable, debilitated and who undergo these procedures to palliate dysphagia.

Most authors acknowledge the risk of diagnostic and therapeutic intervention being increased further if radiotherapy has been given at the site of the tumour through which an oesophoscope then has to pass. Our study confirms this as a significantly increased risk and it remains speculative whether flexible instrumentation is suitable in this group or could decrease this high risk. Previous studies have reported incidences in a similar group of patients ranging from 7.9–13% using the rigid instrument. Once instrumental perforation has occurred, risk of death is high and management remains controversial. By utilizing a surgical management regime in all but one case, our mortality rate in patients sustaining this complication is 67%, though this number is too small to make meaningful comment on management debate as each case is assessed individually. This applies also to balancing the risk of perforation with the benefit that may be obtained by dilatation. If the current vogue of surgical audit induces surgeons to act defensively and in this case avoid interventions aimed at palliation in patients with fatal disease, then this will gain nothing for those who are soon to die and will lose the benefits obtained by dilatation. In our study, the rigid instrument achieved this with low mortality except in those where radiotherapy had failed to relieve dysphagia (1.1% vs 34%).

In conclusion, we have demonstrated that rigid instrumentation of the oesophagus in the presence of carcinoma retains an important diagnostic and therapeutic role which can be achieved with low incidence of perforation in high-risk patients for whom, in most cases, flexible fibreoptic instrumentation is unsuitable. This risk is considerably increased where radiotherapy has failed to relieve dysphagia. Reports of increased safety in terms of risk of perforation using the flexible fibreoptic instrument may be more apparent than real since, to date, there has been no prospective randomized clinical trial comparing the instruments in diagnostic as opposed to therapeutic setting and in high- or low-risk patient groups.

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References


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