Esophageal Exclusion and Gastric Bypass for Unresectable Carcinoma of the Thoracic Esophagus

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Abstract
Total esophageal exclusion and substernal gastric bypass were performed on eight patients with unresectable carcinoma of the thoracic esophagus who had received radiotherapy as the primary treatment. One patient died postoperatively. Three patients developed cervical anastomotic leaks which settled with conservative treatment. Average survival after the surgery was eight months and all seven survivors were able to eat normally. The simplicity and effectiveness of the operation have been emphasized.

Key words: Carcinoma esophagus, dysphagia, esophageal exclusion, gastric bypass.

Introduction
Restoration of swallowing in advanced carcinoma of the esophagus remains the prime therapeutic objective as it prevents the patients from suffering a slow death due to starvation and the agonizing inability to swallow their own saliva. Bypassing the obstructed esophagus without draining the excluded segment appears to offer an alternative to esophageal intubation in patients with unresectable disease and poor general condition this appears to be a safe procedure.29

This communication reports the use of substernal gastric bypass with total esophageal exclusion for palliation of unresectable carcinoma of the thoracic esophagus where radiation therapy either failed to give lasting relief or was ineffective.

Material and Methods
Eight patients underwent gastric bypass with total esophageal exclusion in one surgical unit of our hospital between May 1986 and May 1988. All patients had squamous cell carcinoma of the middle third of the esophagus with involvement of the lower third in three patients (Table). The diagnosis was made by barium swallow, esophagoscopy and biopsy. In addition, each patient underwent chest radiography and abdominal ultrasonography apart from biochemical and hematological investigations. CT scanning of the thorax was done in two patients, documenting periesophageal spread in both.

All patients had undergone radiotherapy as a primary procedure that had continued for at least one month before surgery was undertaken. The dose of radiation varied between 3,500 and 3,100 rads. Only two patients showed good response to this therapy in the form of ability to swallow solids, but this improvement was short-lived, lasting one and two months respectively. One patient, in addition, received combination chemotherapy with bleomycin, mitomycin and cis-platinum, but had responded poorly.

All patients had absolute dysphagia at the time of inclusion in the study. One patient (case 3) had hoarseness of voice due to a right recurrent laryngeal nerve palsy but no other evidence of dissemination. No other patient had any evidence of spread of the disease and abdominal ultrasonography did not reveal any evidence of hepatic secondaries or lymphadenopathy around the celiac axis.

Thus, only those patients with unresectable strictures exceeding 5 cm in length, with no demonstrable dissemination and who had been irradiated, were subjected to the bypass procedure. Local extension of the disease process in itself was not considered a contraindication for this procedure.

Patients were subjected to surgery after correction of dehydration and anemia, nutritional support and initiation of breathing exercises.

Operation
After exploration through a median laparotomy, the stomach was mobilised preserving the arterial arcade, the right gastro-epiploic and the right gastric vessels. The esophagus was then mobilised at the hiatus and palpated for extension of the tumour to the lower end. The duodenum was thereafter Kocherised to permit the pylorus to reach the xiphisternum and a short pyloroplasty performed. The esophagus was then divided at the gastroesophageal junction and the divided lower end of the esophagus was closed in two layers. The cardioesophageal junction was closed in two layers and the stomach laid aside.

A J-shaped incision was fashioned on the left side of the neck along the anterior border of the sternomastoid and across the suprasternal notch. Protecting the recurrent laryngeal nerves, the cervical esophagus was mobilised and divided as low as possible and the distal divided end closed over in two layers. A substernal tunnel was then fashioned by blunt dissection from both the ends and the mobilised stomach was fed into this and delivered at the cervical end. A single layer anastomosis was made between the fundus of the stomach and the proximal end of the esophagus over a nasogastric tube positioned at the operation. The neck was closed with a suction drain.
Table: Clinical profile of patients undergoing subternal gastric bypass

<table>
<thead>
<tr>
<th>Case No</th>
<th>Age/Sex</th>
<th>Diphagogastric duration (months)</th>
<th>Level of lesion</th>
<th>Stricture length (cm)</th>
<th>Index of operability*</th>
<th>Postoperative morbidity</th>
<th>Survival (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19/M</td>
<td>8</td>
<td>Mid 1/3</td>
<td>8</td>
<td>Periesophageal spread</td>
<td>Right vocal cord palsy; pulmonary TB at 6 months</td>
<td>20 (alive)</td>
</tr>
<tr>
<td>2</td>
<td>48/M</td>
<td>5</td>
<td>Mid &amp; lower 1/3</td>
<td>7</td>
<td>Glands along the LGA</td>
<td>Right pneumothorax; aggravated bronchectasis at 4 months</td>
<td>14 (alive)</td>
</tr>
<tr>
<td>3</td>
<td>50/F</td>
<td>3</td>
<td>Mid &amp; lower 1/3</td>
<td>9</td>
<td>R-recurrent laryngeal nerve palsy</td>
<td>Nil</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>55/M</td>
<td>4</td>
<td>Mid 1/3</td>
<td>6</td>
<td>—</td>
<td>Nil</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>45/F</td>
<td>6</td>
<td>Mid 1/3</td>
<td>10</td>
<td>Back pain; periesophageal spread (on CT scan)</td>
<td>Left pneumothorax; pneumonitis; cervical leak</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>57/M</td>
<td>12</td>
<td>Mid 1/3</td>
<td>11</td>
<td>Spread along lesser curve; glands along LGA</td>
<td>Pneumonitis; neck abscess; cervical leak; esophageal fistula; esophagobronchopleural fistula</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>48/F</td>
<td>6</td>
<td>Mid &amp; lower 1/3</td>
<td>8</td>
<td>—</td>
<td>Pneumonitis; deep vein thrombosis; pulmonary embolism; bilatera pleural effusion; pneumonitis; neck abscess; cervical leak</td>
<td>Expired 11th day 2 (alive)</td>
</tr>
<tr>
<td>8</td>
<td>40/F</td>
<td>8</td>
<td>Mid 1/3</td>
<td>5</td>
<td>Periesophageal spread (on CT scan)</td>
<td>peptide:</td>
<td>3</td>
</tr>
</tbody>
</table>

* apart from long stricture
LGA = left gastric artery

Operative findings

At laparotomy, two patients (cases 2 and 6) had suspicious lymph nodes along the left gastric artery. One patient (case 6) had tumour extending onto the proximal lesser curve. The glands were excised, the involved portion of the stomach excluded and the resection line and the glands were submitted for histology. Both cases showed evidence of non-keratinising squamous cell carcinoma.

Case 3, who had right recurrent laryngeal nerve palsy, had involved lymph nodes in the superior mediastinum as examined on exploration from the neck. Another patient (case 5) had evidence of secondary deposits in the left lower deep cervical lymph nodes which were clinically impalpable. Both showed tumour in the biopsies.

Postoperative care

All patients received intravenous crystalline penicillin, gentamicin and metronidazole routinely after the surgery. A chest X-ray was done in every patient postoperatively. The stomach was kept decompressed by nasogastric suction and tube feeding was commenced on resumption of bowel activity. Regular chest physiotherapy was administered. A gastrostomy swallow was done routinely on the 3rd postoperative day. After excluding anastomotic leak, the tube was removed and oral fluids permitted. The diet was gradually changed to semisolid and subsequently solids were introduced, with normal feeding generally possible by the end of two weeks.

Results

Postoperative mortality

One patient (case 7) died. She developed bronchopneumonia; after she recovered from this, she developed deep vein thrombosis. While still on anti-coagulants, she had a massive pulmonary embolus and expired on the 11th postoperative day.

Postoperative morbidity

Various other postoperative complications developed in our patients (Table). Three patients developed, between the fourth and seventh postoperative days, cervical anastomotic leaks which settled in 3 to 11 days on conservative treatment with wide drainage and nasogastric tube feeding. One of these patients (case 6) also developed a leak from the closed lower end of the esophagus which showed histological evidence of tumour infiltration. This possibly prevented healing at the suture line and led to fistula formation. This patient later developed an esophagobronchopleural fistula. Although he did have normal deglutition following healing of the cervical leak, he continued to have a lower esophageal fistula till his demise three months later.

Right recurrent laryngeal nerve palsy in case 1, which possibly occurred due to excessive traction at surgery, recovered spontaneously in three months.

Plural injury occurred in three patients. In one, it was recognised and repaired at surgery. In the other two, it was detected in the immediate postoperative period on chest X-ray, which showed a pneumothorax and bilateral pleural effusion in one patient each. Both were drained for a period of 24 to 48 hours.

Three patients (all with cervical anastomotic leaks) developed postoperative bacterial pneumonias which was treated with antibiotics and chest physiotherapy, with complete resolution. None developed mediastinitis.

Survival and delayed complications

The seven surviving patients were followed up for periods up to 20 months. The average postoperative survival was 8 months (range 2 to 20 months, Table). Three patients were alive and well at 20, 14 and 3 months after the operation. The longest survivor, also the youngest patient of the group, is now 21 years old (case 1).

ESOPHAGEAL CARCINOMA BYPASS—GUPTA ET AL

78 INDIAN J GASTROENTEROL Vol 8 No 2 APRIL 1989
Swallowing status

All patients, even those with anastomotic leaks, eventually resumed normal oral feeding. Even the patient who expired had resumed oral feeding from the sixth postoperative day onwards. There has been no incidence of anastomotic stenosis or stricture.

Delayed complications

One patient (case 2) had aggravation of his pre-existing bronchiectasis four months after the operation but he had no demonstrable airway-oesophageal fistula. He swallows normally and has no symptoms attributable to the excluded esophagus, neither is his bronchiectasis disressing.

Case 1, the longest survivor, developed pulmonary tuberculosis at 6 months post-operation. This was duly treated and the patient has been totally asymptomatic since completion of the anti-tuberculous therapy five months back.

CT scanning of the thorax in these two patients, done on development/aggravation of chest symptoms, did not reveal any evidence of alteration in the esophageal anatomy apart from extension of the disease process.

Discussion

Our results show that total esophageal exclusion and substernal gastric bypass restored normal swallowing in all the seven survivors. The average postoperative survival was eight months. As the operative mortality for curative surgery for carcinoma esophagus varies from 10% to 20% and no more than 10% of the operative cases survive for 5 years, any therapy is palliative at the best and any cure is a bonus. Relieving the patients of dysphagia should be the primary therapeutic goal as progressive dysphagia in these patients further worsens cachexia.

Amongst the therapeutic modalities available for the relief of dysphagia, radiation therapy gives substantial relief in less than 50% of the patients; this is generally short lived, for periods upto 6 months.** Chemotherapy has not been beneficial after radiation. Intraluminal intubation is the simplest but does not allow the use of a normal diet, besides having its own complications. Laser therapy removes obstruction but does not restore normal swallowing and is not freely available.

Bypass procedures therefore offer the best palliation as they restore normal swallowing and also permit the use of normal diets. While free of the ill-effects of radiation and chemotherapy, they, however, do carry a certain morbidity and mortality. The choice between stomach, colon and jejunum as the bypass conduits and the routes of their access to the neck—presternal, substernal or intrathoracic—are largely dictated by the morbidity and mortality that attend each procedure. The stomach is the preferred organ for bypass as this obviates the need for multiple intra-abdominal anastomoses and thereby reduces the possibility of subsequent septic complications which can possibly follow anastomotic leaks. It is a more physiological organ for this bypass and more resistant to the action of the re-fluxing bile. Besides, the procedure has an acceptable mortality of less than 10%.* In contrast, the mortality following colon transplantation can be as high as 30% to 50%** and that following jejunal bypass can reach 67%.*

In selecting the route for access to the neck, it must be ensured that the bypass conduit lies outside the field of irradiation where radiotherapy is reserved for the postoperative control of the disease.*** Substernal or subternal routes are to be preferred in such situations—subternal route being cosmetically far more acceptable. Since all our patients had preoperative radiotherapy, our selection of route was not influenced by this factor. In selecting the procedure, care also must be exercised to stay clear of any suspected area of malignant infiltration. In case 6, where the resection line at the lower end of the esophagus showed tumour infiltration, the choice of the conduit should have been more in favour of the colon and this would have prevented the persistent esophageal fistula which the patient had to bear with.

Draining the lower end of the esophagus when bypassing thoracic lesions** was not practised in our patients as no significant difference in survival has been observed.*** We encountered no untoward effects in any of the patients because of total exclusion. None of the patients developed any fistula because of exclusion and no mucosal formation has been observed in the two patients who underwent postoperative CT scanning. This can be partly explained by the radiotherapy received preoperatively by all patients.

As this procedure restores normal swallowing, has offered a decent average postoperative survival of eight months with a good quality of life and has an acceptable mortality, we recommend its use for palliation of unresectable carcinoma of the middle third of the esophagus without evidence of dissemination.

References