Nasojejunal Feeding following Surgery for Carcinoma of Lower Oesophagus

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Abstract
A major problem in the post-operative care of patients undergoing oesophageal resection is to maintain their fluid, electrolyte and nutritional balance. We report our experience with 50 patients in whom oesophageal resections were done over a period of 41 years. Nutrition was maintained by an indwelling jejunal tube passed through the nose and thus could completely dispense with intravenous fluids within seventy two hours after surgery. In addition to promoting the safety and well being of the patient, the tube permitted the healing of oesophageal leaks in some cases.

Key words: Surgery for cancer oesophagus, oral hyperalimentation.

Introduction
Cancer of the oesophagus poses several nutritional problems. Because of mechanical obstruction to the intake of food, many patients present with dehydration, electrolyte imbalance and hypoproteinaemia and anaemia. In the immediate post-operative period, they are routinely treated with parenteral fluids for several days. If there is doubt about the integrity of the anastomosis or if there is a leak, the parenteral regime continues for weeks. This may necessitate parenteral hyperalimentation. All these procedures are expensive, physically and emotionally exhausting to the patient, and associated with complications ranging from thrombophlebitis and non-availability of veins for cannulation to septicemia.

In order to overcome these complications we have evaluated enteral alimentation through a catheter passed during surgery through the nose and placed in the jejunum.

The object of this paper is to present our experience with the management of 50 cases of oesophageal resections with trans-nasal jejunal intubation.

Material and Methods
This is a study of 50 cases (29 males, 21 females; aged 31-82 years) of oesophageal resection done in one surgical unit at the Tata Memorial Hospital, Bombay, during a 41 years period from October 1953 to April 1994. Thirty nine patients had dysphagia for solids only, 10 could take liquids with great difficulty and one was totally obstructed.

All the patients had a complete blood count, serum electrolyte, creatinine, total protein and liver function estimation, ECG, chest X-ray and pulmonary function tests done. None of our patients required parenteral hyperalimentation.

Operative Procedure
A left thoraco-abdominal incision was taken through the seventh intercostal space. The lesion was deemed inoperable in the presence of ascites, peritoneal and omental deposits, multiple liver metastases or extensive involvement of the pancreas and the coeliac group of lymph nodes. The proximal part of the stomach and lower half of the oesophagus upto the level of the inferior pulmonary vein along with the paraoesophageal and left gastric, coeliac and pancreatic group of nodes were resected.

Continuity was restored by anastomosing the distal part of the stomach to the proximal cut end of the oesophagus. The anastomosis was done with a single layer of interrupted 3-0 silk sutures. After the posterior layer of the sutures was tied, an infant gastric feeding tube of polyethylene (Romson's No 8 size) was passed through the nose, across the anastomosis into the stomach. In order to facilitate the passage of the thin soft tube and to prevent it from getting coiled up, a guide wire of an angiogram catheter was placed in the lumen of the feeding tube before it was passed into the patient. The anterior layer of the anastomosis was then completed.

A pyloroplasty was then performed. The pyloro-duodenal junction was incised longitudinally for one centimeter, through the full thickness. The feeding tube was then pulled down further and passed across the pylorus to the duodenum and thence to the jejunum. The incision at the pylorus was then closed transversely. The feeding tube was fixed securely to the nostril.

After extubation of the endotracheal tube, a rubber catheter (No 9 size) was passed through the nose into the upper oesophagus.
Post-operative Management

The naso-oesophageal tube was connected to a Wangenstein apparatus for 48 hours to aspirate air and saliva from the oesophagus. It was then removed. Intravenous fluids were given for 48 hours to maintain fluid and electrolyte balance.

After 48 hours, when the peristaltic sounds had returned, jejunal feeds were started. The first 2-3 feeds, 150 cc of Ringer lactate or electrolyte powder in solution and coconut water, were given as a drip into the jejunum. If these feeds were tolerated, intravenous fluids were discontinued 72 hours after surgery and the patient maintained on jejunal feeds. Originally they were given a drip consisting of milk, buttermilk, fruit juice, soup, electrolyte powder, egg and protein preparations dissolved in milk for the first 4-5 days but it is now changed to standard blended diet (Table). Eight days after surgery fluoroscopy was done with thin barium. The tip of the feeding tube was located in the jejunum. No displacement had occurred during the post-operative period. If the anastomosis was intact, 50% of the feeds were given by mouth and 50% through the tube for the next two days. On the 10th post-operative day, the tube was removed and the patient was then put on a soft diet.

Table: The Regime of Blended Diet

<table>
<thead>
<tr>
<th>Time</th>
<th>Ingredients</th>
<th>Quantity</th>
<th>Calories</th>
<th>Proteins</th>
</tr>
</thead>
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<tr>
<td>6.00 AM</td>
<td>Milk</td>
<td>200 ml</td>
<td>190</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>Sugar</td>
<td>10 g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.30 AM</td>
<td>Milk</td>
<td>200 ml</td>
<td>363</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>Sugar</td>
<td>10 g</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eggs</td>
<td>100 g</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Fruit Juice</td>
<td>2 pieces</td>
<td>43</td>
<td>0.8</td>
</tr>
<tr>
<td>1.00 PM</td>
<td>Blended Diet*</td>
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<td>300</td>
<td>9.0</td>
</tr>
<tr>
<td>3.00 PM</td>
<td>Milk</td>
<td>200 ml</td>
<td>190</td>
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<td></td>
<td>Sugar</td>
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</tbody>
</table>

TOTAL 1576 60.1

*Ingredients (in grams)

- Mung Dal: 75
- Carrots: 60
- Pumpkin: 60
- Spinach: 50
- Rice: 100
- Bread: 49
- Butter: 7
- Oil: 20

The ingredients are all cooked, blended, strained and the volume made to 1000 ml.

If there was a leak at the site of the anastomosis, oral feeds were withheld and jejunal feeds continued for a further period of 8-10 days. A repeat barium swallow was then performed; oral feeds were not started until the leak had healed.

Results

Serum protein levels were estimated post-operatively in 10 cases. In 3 of them the levels had increased, in 3 it remained steady and there was a decrease in two patients.

Of 10 cases in whom body weight was recorded before and after surgery, only 2 cases had weight loss following surgery while five patients actually gained weight.

Six patients (12%) died post-operatively; one each died of anastomotic leak and septicaemia, and two each of myocardial infarction and respiratory failure.

We had three other patients with anastomotic leaks. One went home on the 28th day, discharged at request. She had a nasojejunal tube at the time of discharge and, despite the leak, her general condition, body weight, protein levels and electrolyte levels were maintained within normal limits throughout these two weeks.

Two patients showed an anastomotic leak on a barium swallow done on the 8th day. They were continued on jejunal feeds. Barium swallow taken 10 days later showed that the leak had healed; the patients were then discharged (Fig).

![Post-operative barium swallow of a patient showing a leak at the site of anastomosis.](image-a)

![Barium swallow taken a week later showing that the leak has healed.](image-b)
One patient who had G-6 PD deficiency developed haemolytic jaundice and severe diarrhoea and had to have tube feeding for 26 days. No intravenous fluid was given and, despite severe diarrhoea, his fluid and electrolyte balance was maintained by jejunal feeds alone. He did however lose weight and his serum proteins levels came down.

Discussion

Post-operative feeding and maintenance of fluid and electrolyte balance after oesophageal surgery are challenging to the skill and judgement of the surgical team. The surgeon is rightly concerned about the integrity of the oesophago gastric anastomosis and is cautious in starting oral feeds, which as a result is delayed to the 7th or 8th day. IV fluids for nearly a week immobilises the patient and limited Ryle's tube feeding does not give enough proteins and calories. All these problems are compounded if a leak is suspected or established, resulting in prolonged IV fluids, parenteral hyperalimentation, mini-laparotomy and placement of jejunostomy catheter and so on, with further delay in healing of wounds.

We devised the concept of nasojugal tube feeding for the several advantages it offers: no intravenous fluids after 72 hours; early ambulation; better maintenance of nutrition; it gives a chance for the anastomotic leaks to heal. Since the tube is soft and thin, it can be kept for weeks without the complications associated with a standard Ryle's tube. The only drawback is that it requires a little care and patience to negotiate the tube across the anastomosis and the pylorus.

Clinical evaluation of nutrition remains the oldest, simplest and the best used method.1,2 Serum albumin is not a useful parameter in assessing malnutrition since far more albumin is sequestered in the body tissues than the amount of albumin circulating in the serum. Moreover there is a remarkable adaptation in the body that withdraws proteins from the tissues and muscles. Thus, in marasmus, despite grossly deficient protein intake, there is remarkable hormonal adaptation and serum protein level is not grossly changed; in kwashiorkor this adaptation fails, giving rise to oedema and low serum albumin.3

Our mortality figures are comparable with those reported in literature.4,5 The major cause of mortality is anastomatic leak. Desai reported 28 leaks in 300 cases; only 2 of them survived. We had 4 leaks, and 2 of them healed. It is possible that minor leaks of the oesophagogastric junction will heal if the affected part is rested and the patient's nutrition maintained, which the nasojugal tube achieves.

References