

## Oesophagogastrectomy using the end to end anastomotic stapler: results of the first 100 patients

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The introduction of the end to end anastomotic stapling device into oesophageal surgery has reduced the mortality and morbidity associated with oesophageal resection, mainly owing to a reduction in the incidence of anastomotic leak.<sup>1</sup> Our previous report on the first 30 consecutive patients using this device documented the safety and efficacy of the technique,<sup>2</sup> and we now report the results of the first 100 consecutive patients undergoing oesophagogastrectomy with the end to end anastomotic stapler.

### Methods

From January 1980 to April 1984 100 patients underwent oesophageal resection, of whom 65 were men. The mean age was 63 years (range 41-83), but 22 patients were over 70 years of age. Carcinoma was the indication in 88 patients and benign stricture in 12. Of the malignant lesions 34 were located in the middle third of the oesophagus, 27 in the lower third, and 27 mainly in the cardia with oesophageal extension.

The essential steps of the operation have been published previously.<sup>2</sup> A left thoracoabdominal incision was used in 64 patients and an Ivor Lewis approach in 16 patients with mid oesophageal lesions. Since April 1983 20 resections have been carried out through a left thoracotomy alone with access to the abdomen through a radial incision in the left hemidiaphragm. For adequate proximal clearance in cases where the tumour is located in the upper part of the mid oesophagus, the arch of the aorta can be mobilised to facilitate resection. In this situation we found the end to end anastomotic stapler with a curved handle useful because an anastomosis can be readily made in the apex of the chest through a relatively low thoracotomy.

Pyloroplasty was used only when there was evidence of narrowing of the pylorus and was not carried out routinely. Pyloroplasty was performed in 28 patients; 17 of these were stapled and 11 hand sewn. Pyloromyotomy was performed in three patients.

Preoperative care consisted primarily of ensuring optimum pulmonary function with chest physiotherapy and, when indicated, antibiotics or bronchodilators or both. Parenteral nutrition was not used routinely before or after operation. Chest drains were removed on the first or second day. A nasogastric tube was left in place until the aspirates were minimal. Water was started by mouth on the fourth day and

the diet rapidly advanced thereafter. Early mobilisation was encouraged.

### Results

Eight patients died within 30 days of operation—four from respiratory failure, two from adrenal failure, one from massive pulmonary embolism, one from dehiscence of the gastrotomy suture line. All surviving patients were having a solid diet when discharged from hospital. There were no clinically apparent anastomotic leaks.

Dehiscence of the gastrotomy suture line occurred in three patients. Two of these patients were initially managed with pleural drainage and feeding jejunostomy, followed by successful surgical closure of the fistula. The third patient was also managed conservatively but succumbed to pneumonia on the fourth postoperative day.

Three patients developed chylothorax. Two responded well to conservative management. Surgical closure of the chylous fistula had to be undertaken in the other because of failure of conservative treatment. This patient, a 61 year old woman with oesophageal carcinoma, died shortly after surgical repair of her chylothorax, and in retrospect earlier repair should have been attempted. This death occurred six weeks after oesophageal resection.

### Discussion

Anastomotic leak is the most serious complication of oesophagogastrectomy and frequently leads to death.<sup>3</sup> Chassin's review of over 2000 oesophagogastric anastomoses showed this complication rate to vary from zero to 41% (mean 10%) and to account for half of the postoperative deaths.<sup>4</sup> Hopkins *et al* reported a 3.5% anastomotic leakage rate in 200 stapled anastomoses, some of which were done with the Russian stapler.<sup>1</sup> The average leak rate with the modern end to end anastomotic stapler is only 1.4% (table). Meticulous use of this stapler is essential and in no way reduces the care and attention required to complete an adequate anastomosis.

Dehiscence of the stapled gastrotomy incision occurred in three patients. West *et al* reported this complication in two of their 31 patients.<sup>6</sup> We now oversee without invagination both everted gastric staple lines, and there have been no further leaks since we started this practice.

Hospital mortality rates of 1-22.5% (mean 11%) have been reported for stapled oesophagogastric anastomoses (table) and our mortality rate of 8% compares favourably with them. No patient with a benign stricture died, and only one of the last 20 patients had died, since we adopted the exclusive left thoracic approach.

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## Reported complications of stapled oesophagogastric anastomoses

Authors	No of patients	Anastomotic leaks (%)	Anastomotic strictures (%)	Mortality (%)
Present series	100	0	8	8
Hopkins <i>et al</i> <sup>1</sup>	60	1.7	13	13
Behl <i>et al</i> <sup>5</sup>	40	5	10	22.5
West <i>et al</i> <sup>6</sup>	31	0	13	3
Fekete <i>et al</i> <sup>7</sup>	30	3.3	0	13
Dorsey <i>et al</i> <sup>8</sup>	7	0	14	0
Shakinion <i>et al</i> <sup>9</sup>	12	0	8	0
Total	280	1.4	7	11

Our present report confirms our earlier experience that the end to end anastomotic stapler facilitates the creation of a quick and secure oesophagogastric anastomosis. With care and experience the frequently fatal complication of anastomotic leak can be practically eliminated. The curved end to end anastomotic stapler facilitates a high oesophageal anastomosis and allows the use of a left thoracotomy approach for even middle third resections, thus speeding the operation and possibly reducing morbidity. In our unit a stapled oesophagogastric anastomosis is the method of choice to restore oesophagogastric continuity.

Benign anastomotic stricture has been reported after both sutured (incidence 2.3–10%)<sup>10,11</sup> and stapled (average incidence 7%) anastomoses (table). In our series the incidence was 8%. One patient had to undergo reoperation for resection of the stricture. In the remaining patients the strictures were soft and responded well to bouginage.

Instrumental malfunction occurred twice during the early part of the series. On both occasions, although the staples were fired satisfactorily, the knife failed to cut the central core of tissue adequately. In one patient the device could be withdrawn only after cutting the central core of tissue manually through the gastrotomy incision. In the other patient the excess residual tissue had to be removed endoscopically when the patient developed dysphagia after operation. This patient later developed a tight stricture at the anastomotic site and is the one who required a further resection seven months later.

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