

ROUX-EN-Y ESOPHAGOJEJUNOSTOMY AFTER TOTAL GASTRECTOMY FOR GASTRIC MALIGNANCY.

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Abstract

Out of 62 patients who underwent total gastrectomy for gastric malignancy, 40 patients had roux-en-y esophagojejunostomy. Their age ranged from 32 to 70 years. Seventeen patients were less than 60 years old and 27 were older. There were 23 males and 17 females. Operations were done through thoraco-abdominal incisions in 28 patients and upper midline incisions in 12. The anastomoses, on the other hand, were hand sewn in 34 patients and stapled in the other 6. The procedure included splenectomy in 37 patients, distal pancreatectomy in 6 and transverse colectomy in 2 patients. Postoperative complications included chest infection (8 patients), wound infection (7 patients) and anastomotic leak (1 patient). Eleven patients died postoperatively, the leading cause being pulmonary embolism, respiratory failure and over-whelming sepsis. Out of our surviving patients, 4 (10%) are still alive 5 years or more after surgery and are enjoying good health. Our results are well within the international figures although we think that the outlook could have improved had we gained access to certain facilities like hyperalimentation, chest physiotherapy units and measures that could prevent deep venous thrombosis. Roux-en-y esophagojejunostomy is a safe method to restore the continuity of the alimentary tract after gastrectomy. It requires less time than "pouch-forming" procedures, has less incidence of anastomotic leakage, produces acceptable morbidity and mortality, gives good nutritional value and does not require the special expertise needed to perform the "pouch-forming" procedures.

Introduction

Restoring the continuity of the digestive tract after total gastrectomy (TG) can follow either a "duodenal tract preserving" or "duodenal tract excluding" approach. The exclusion is designed to prevent contact of bile with the esophageal mucosa that results in the notorious bilious inflammation¹. Major modalities include Nakayama procedure,

roux-en-Y esophagojejunostomy and the pouch-forming procedures. Roux-en-Y esophagojejunostomy was first performed after TG on 1908 by Goldschwend. The technique entails the provision of a 40-50 cm between the esophagojejunostomy and jejunojunction making it virtually regurgitation-free in comparison with the Nakayama procedure which provides only 20 cm^{2,3}. Furthermore, it is less demanding both on the surgeon and the patient compared to pouch-forming

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techniques⁴. The study aimed at assessing the outcome of Roux-en-Y esophagojejunostomy regarding morbidity, with respect to various parameters, and mortality

Patients & Methods

This is a prospective study that included 40 patients (pts) who had roux-en-Y esophagojejunostomy following TG for gastric malignancy. For the sake of comparison, patients were divided into 2 groups: The first group included those who were more than 60 years old while the second included those who were less than 60. The procedures were performed through thoraco-abdominal (TA) or upper midline (UM) incisions. The choice depended mainly on the location of the tumor. High cardiac tumors necessitated TA rather than UM incisions. Anastomoses, on the other hand, were either hand sewn or stapled (with EEA staplers) according to the availability of the staplers at the time of operation. Because of the scarcity of staplers, they were sometimes reserved for high tumors for obvious technical reasons. Hand sewn anastomoses were executed with either 000 silk or 000 vicryl sutures, depending on the availability of each particular suture material. They were all done in one layer. The variables that were recorded, apart from age and sex, included the type of incision made, technique of suturing (hand-sewn or stapled), type of suture material used, additional procedures that had to be performed along with the esophagojejunostomy and the duration of hospital stay. In addition, the complications encountered were elaborately recorded. Finally, all deaths were discussed and the probable cause of death in each particular case was recorded.

Results

Out of 62 patients who underwent TG for gastric malignancy, 40 had Roux-en-Y esophagojejunostomy. There were 23 males and 17 females. Their age ranged from 32–70 years with a mean of 57.2 years. For the sake of comparison, pts were divided into 2 groups: The first group (23 pts) included those who were more than 60 years old while the second (17 pts) included those who were less than 60 years old. There were dramatic differences regarding the age between the two groups. Mean age was as high as 64.8 years (range= 60-70) for the first (older and larger) group and only 47 years (range= 32-58) for the second (younger and smaller) group. Details are outlined in table I.

	No.	M:F	Mean age (range)
overall	40	23:17	57.2 yrs (32-70)
< 60	17	9:8	47 yrs (32-58)
> 60	23	14:9	64.8 yrs (60-70)

Table I: General characteristics of pts.

The procedures were performed through thoraco-abdominal incisions in 28 pts. and upper midline (UMI) incisions in 12. There was no significant difference regarding the incision used amongst both groups. Anastomoses, on the other hand, were hand sewn in 34 pts. and stapled (EEA) only in 6. Hand sewn anastomoses were executed with silk in 10 pts and with vicryl sutures in 24 and were all done in one layer. Table II outlines the details.

	incision		H sewn		stapled
	TA	UM	S	V	
overall	28	12	10	24	6
< 60	10	7	3	12	2
> 60	18	5	7	12	4

Table II: Incisions and suturing.

We had to perform additional procedures depending on the case at hand.

Involvement of the splenic hilum necessitated splenectomy in 37 pts, mostly of the fist group (22 pts) while involvement of the tail of pancreas called for distal pancreatectomy in 6, 3 in each group. Transverse colectomy was performed in 2 patients in whom the transverse mesocolon was involved by the malignant process, table III.

	Splen.	Dist.Panc.	Tran.Col.	Fed.jej.
overall	37	6	2	2
< 60	15	3	1*	1
> 60	22	3	1	1

Table III: Additional procedures {*transverse Colectomy+ distal pancreatectomy}

We had to perform both distal pancreatectomy and transverse colectomy in one patient because of involvement of both structures. Main complications were chest infection (20%), wound infection (17.5%), anastomotic leakage (2.5%) and re-operation (2.5%). Hospital stay ranged from 7-32 days with a mean of 12.5 days. Eleven patients (27.5%) died postoperatively, 8 of them (72%) in the first group, table IV.

	Complication				Hosp. Stay
	W.inf	Chst.inf	Leak	Reop.	
overall	7	8	1	1	12.5 d.
< 60	4	2	1	1	(7-32)
< 60	3	6	0	0	

Table IV: Postoperative complications and hospital stay.

Causes of death were pulmonary embolism in 4 patients (3 in the first group), respiratory failure in 3 patients (2 in the first group), overwhelming sepsis in 2 patients (one group each), acute

ventricular failure in 1 patient (first group) and myocardial infarction in 1 patient (first group), table V.

	POD	Causes of POD				
		PE	RF	OS	AVF	MI
Overall	11	4	3	2	1	1
< 60	3	1	1	1	0	0
> 60	8	3	2	1	1	1

Table V: Postoperative deaths

POD= Postoperative Death
 OS = Overwhelming Sepsis
 AVF= Acute Ventricular Failure
 PE = Pulmonary Embolism
 RF = Respiratory Failure
 MI = Myocardial Infarction

Discussion

Although the mean age of our patients was 57.2 years, it is worth noting that around two thirds of them (23 pts) were older than 60 years. A fact that could have contributed to postoperative mortality being on the high end.



Figure 1: Tumor involving entire stomach

The thoracoabdominal approach was more frequently used because of tumor location that was often too high to be dealt with through an abdominal incision, otherwise UMIs would have been the

better option regarding both postoperative morbidity and operating time. Hand sewn anastomoses took significantly longer time (around one hour) giving staplers an advantage that provided us with some relaxation regarding limitations to surgery, notably for age and location of the tumor⁵.



Figure 2: Stomach completely dissected including the esophagus and duodenum

The dramatic reduction in operating time made the procedure much more suitable for the elderly and, for obvious reasons, higher tumors that would have otherwise necessitated TA incisions, were made accessible abdominally. For those very reasons, staplers were used twice as much in the first (older) group. No difference in leak was observed between hand sewn and stapled anastomoses⁶. Consequently, stapling would seem both logical and practical⁷. Sadly, however, stapling was limited in our study because of the shortage of staplers in general in our country and the unavailability of proper sizes. The incidence of leak was very low (2.5%), way lower than international figures⁸⁻¹¹. We think that the adoption of a single-layer-suturing-technique helped considerably to produce such a low percentage¹².

Additional procedures had no statistically significant effect on the final outcome in

general but it did affect the mean duration of hospital stay.

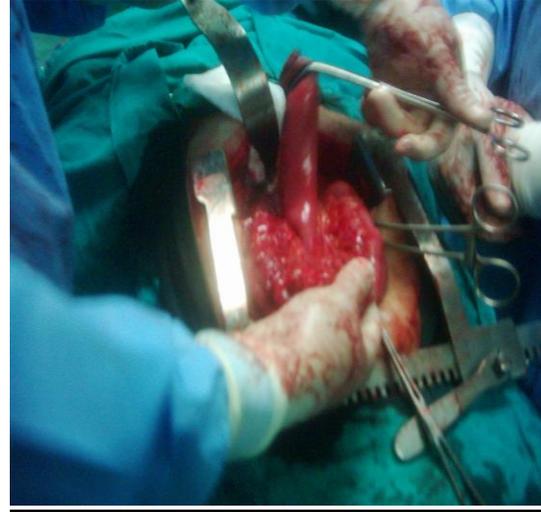


Figure 3: The retrocolic Roux limb.

The patient who underwent both transverse colectomy and distal pancreatectomy developed trouble-some leakage and had to be re-explored. He spent 32 days at hospital, about 3 times the duration of the longest hospital stay next to him. Was it not for him, the mean duration of hospital stay would have been dramatically reduced probably to within 10 days.

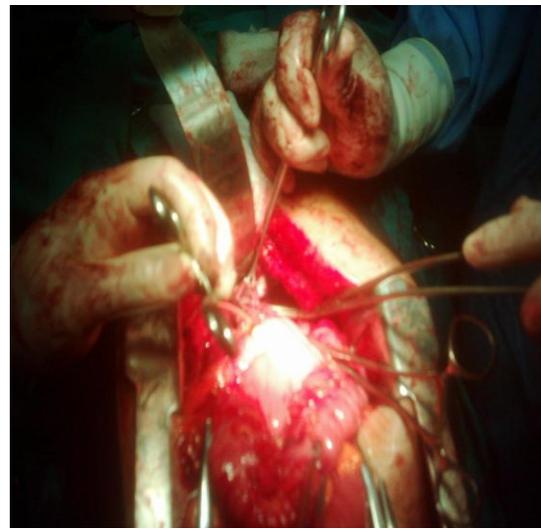


Figure 4: Esophagojejunal anastomosis

Chest infection, the leading cause of morbidity at 20%, occurred mainly in the

older group (75%). We think that the 2 causative factors were the fact that elderly patients, particularly those with ill health, are reluctant to move early and tend to stay longer in bed postoperatively and, secondly, that most patients who had thoracoabdominal incisions, known to result in weaker and less efficient respiratory function, were in this group (18 pts).



Figure 5: The "Gastrectomy" specimen.

Eleven patients (27%) died postoperatively, mainly for medical causes, and although this figure is relatively high, similar figures are reported worldwide¹³. One factor that played a major role in increasing postoperative mortality was the age of the patients who were mostly more than 60 years old, with a mean age much higher than the overall mean age (68.4 versus 57.2 years). Another factor that was detrimental to the outcome of surgery was the overall malnourishment

among our people that resulted from decades of economic hardship with all its ill effects on health. This problem was further augmented by the malignant process itself and its consequent difficulties of eating and swallowing. Additionally, the lack of certain supportive facilities like hyperalimentation, chest physiotherapy units and measures that help to prevent deep venous thrombosis made the situation even worse especially when we know that the two leading causes of death were pulmonary embolism (4 pts, 10%) and respiratory failure (3 pts, 7.5%). On the other hand, wound infection (7 pts) and anastomotic leakage (1pt), constituting 20% of complications, could have been markedly improved had we gained access to fluids utilized in hyperalimentation¹⁴.

Conclusion

Roux-en-Y esophagojejunostomy is a safe method to restore continuity of the alimentary tract after total gastrectomy for gastric malignancy as it requires less time (vs pouch-forming surgery), has less incidence of anastomotic leakage, produces acceptable morbidity and mortality, gives acceptable nutritional value and does not require the surgical expertise needed for pouch-forming procedures. Like so many colleagues throughout the world, we recommend Roux-en-Y esophagojejunostomy as the routine method of restoring continuity of the alimentary tract after total gastrectomy for gastric malignancy^{15,16}.

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