

Original Paper**Post Oesophagectomy Leakage at Kenyatta National Hospital – Nairobi - Kenya****S.W.O. Ogendo**

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Background: Post oesophagectomy leakage is a common postoperative complication. This present review was aimed at documenting the problem of post-oesophagectomy leakage and associated variables at Kenyatta National Hospital (KNH) between January 1998 and December 2004.

Methods: All patients presenting with carcinoma of the oesophagus and who underwent an oesophagectomy were included into the study. Analysis of data was carried out to determine the leakage rate as well as determining the association of leaks with other preoperative and postoperative variables. Statistical analysis performed on Microsoft Excel (10.2614.2625), and Epiinfo 2002. The Chi² test was used to determine statistical significance. Level of significance was achieved if the p value was < 0.05.

Results: A total of 201 oesophagectomies were carried out in the period under review. The male to female sex ratio was 1.6:1. The average age was 57 years with a range of 24 years to 88 years. Two thirds (67.1%) of the anastomoses were fashioned within the thoracic cavity while the rest were fashioned within the cervical area. A total 16.4% of anastomoses leaked. The in-hospital mortality rate for all oesophagectomies was 28.9%. The in-hospital mortality for the post anastomotic leakage patients was 48.4% as compared to 27.2% among those patients who did not develop anastomotic leakage.

Conclusion: Post oesophagectomy leakage remains common complication at Kenyatta National Hospital (KNH).

Introduction

Leakage post oesophagectomy still remains one of the most feared postoperative complications associated with oesophagectomies. Mortality figures between centres will vary but, mortality post leakage will range from as low as 6% to as high as 50% and over depending on the severity of the leak and the institution^{1,1,2}. As a result, any setback noted in the postoperative follow-up period should alert the surgeon as to the possibility of an anastomotic leak having occurred.

In a concerted effort to improve the results of surgical anastomoses, efforts have been made to identify the primary variables associated with the occurrence of post surgical leakage. Various

authors have investigated variables like patient age, operative technique and anastomotic site, amongst others, as having a significant association with leak occurrence³.

Almost all reports include anastomotic leak as a significant contributor to in hospital mortality. Interestingly, some authors however suggest that on multivariate analysis anastomotic leak is not an independent predictor of mortality and only age and pneumonia being the responsible independent variables⁴.

Identification of, and thereafter attention directed at alleviating the effects of these variables will no doubt have an impact on the occurrence of leakage, and secondarily, on the operative mortality and quality of life after surgery.

This study attempts to examine the problem of post-oesophagectomy leakage within the Kenyatta National

Hospital in Nairobi and determine associated variables at this institution.

Patients and Methods

This study is a retrospective review of prospectively collected data by the author covering the period January 1998 to December 2004 within the cardiothoracic unit of the Kenyatta National Hospital. The database was initially developed to collect mainly follow up data for post oesophagectomy patients. Later, modifications to collect other peri-operative variables were made, as a result data collection may not be a hundred percent complete for all variables.

All patients presenting with carcinoma of the oesophagus and who underwent an oesophagectomy were included into the study. The study end point was when the patient was the death of the patient, patient lost to follow up, or the 31st December 2004; whichever came first.

All surgeries were performed by the seven cardiothoracic surgeons within the unit and consisted of the Ivor Lewis, MacEwen and transhiatal oesophagectomies. Regional lymph node dissection was not carried out. Choice of procedure was the prerogative of the surgeon based on location of the lesion and personal preference.

All oesophagogastric anastomoses were hand sewn using either ethibond or vicryl suture. In the majority of cases suture of the posterior layer was achieved using continuous suture while interrupted suturing was used on the anterior layer. All suture lines were fashioned as single layer anastomosis.

The use of pyloroplasty as a drainage procedure within the study period was low. As an alternative to formal

pyloroplasty, a “finger pyloroplasty”, was used in a few cases but in the majority of cases no pyloroplasty was performed.

Postoperatively patients were returned to the ward on nil by mouth and nasogastric suction till the eighth to tenth postoperative day when a methylene blue dye test was carried out to evaluate the anastomotic outcome. If the anastomosis was found to be intact, oral feeding was gradually reintroduced to the patient. For those patients who obviously leaked before then action was taken as appropriate.

Data collected relating to leakage was not specific as to whether the leak was due to necrosis of the graft conduit or resulting from localised anastomotic failure, all these were considered together as leaks.

Analysis of data was carried out to determine the leakage rate as well as determining the association of leaks with other preoperative and postoperative variables. Statistical analysis performed on Microsoft Excel (10.2614.2625), and Epiinfo 2002. The Chi² test was used to determine statistical significance. Level of significance was achieved if the p value was < 0.05.

Results

A total of 201 oesophagectomies were carried out in the said period. Of these patients 125 (62.2%), were male while 76 (37.4%), were female.

The average age for the group was 57 years (n = 181), with a range of 24 years to 88 years.

Of those patients with a weight and height measurements at the time of admission the body mass index was estimated, from this the parameters of

normal weight range, overweight and underweight were estimated. A total of 60%, (57/95) of the patients were underweight, 33.7%, (32/95) normal and 6.3% overweight.

A total of 67.1% of the anastomoses were fashioned within the thoracic cavity while the rest were fashioned within the cervical area. There were 33 (16.4%) leakages recorded during the study period.

There were 58 in-hospital deaths giving an in-hospital mortality rate of 28.9% for all oesophagectomy operations. The in-hospital mortality for the post leakage patients calculated at 48.4% as compared to 27.2% for those patients who did not develop anastomotic leakage.

Using the Chi² test, the occurrence of leakage was compared with the age of the patients, sex and the total serum protein and albumin levels. In addition the test compared leakage occurrence with the preoperative admission body mass index (BMI) of the patient, admission haemoglobin level and the anastomotic site (cervical versus thoracic). For the comparison of leakage

rates between the different surgeons the Chi² test for trend was deployed, with an adjustment taking into consideration the number of years they had worked as a consultant within the unit. (The skill of the various operating surgeons in this study varied from one year to over twenty years)

With the exception of a higher hospital mortality and prolonged hospital stay prior to discharge, no statistical significance was noted between the occurrence of leakage and the other variables, (Tables 1a and 1b). Similarly no significant association was noted between the occurrence of postoperative leakage and later development of benign stricture in these patients compared to those who did not develop leakage.

An attempt at analysis of the follow up survival of the two groups (leakage and no leakage) was not possible. This was due to the number of patients who suffered a postoperative leakage were too few to allow a Kaplan-Meier analysis to compare follow up between the two groups.

Table 1a. Association of leakage

<u>Variable</u>	<u>Patients</u>			<u>P Value</u>	<u>Significance</u>
	ALL PATIENTS	WITH LEAK	NO LEAK		
SURGICAL EXPERIENCE LEVEL					
Surgeon A	11	2	9	0.0859	n/s
Surgeon B	13	5	8		
Surgeon C	29	7	22		
Surgeon D	33	3	30		
Surgeon E	40	5	35		
Surgeon F	55	10	45		

Table 1b. Association of leakage and various variable peri-operative variables

<u>Variable</u>	<u>Patients</u>			<u>P Value</u>	<u>Significance</u>
	All Patients	With Leak	No Leak		
AGE: < 50yrs 50 – 75 yrs > 75 yrs	57 110 14	10 16 3	47 94 11	0.748	n/s (some ages unknown)
SEX; Male Female	125 76	22 11	103 65	0.561	n/s
BMI: Underweight Normal Obese	57 32 6	9 8 2	48 24 4	0.4069	n/s
Anastomotic Site Cervical Thoracic	53 108	8 23	45 85	0.348	n/s
Serum Protein High Normal Low	28 50 1	8 6 0	20 44 1	0.2631	n/s
Admission Hb >15gms% 10 – 15gms% <10gms%	5 13 147	1 3 26	4 10 121	0.8848	n/s
Transhiatal Resection No yes	185 16	30 3	155 13	0.508	n/s
Discharge <12 days >12 days	36 80	0 11	36 69	0.01333	Significant
In Hospital Mortality Post Leakage No Yes	126 58	16 17	110 41	0.006355	Significant
Postop Stricture Yes No	10 187	1 32	9 155	0.4770	n/s

BMI= BODY MASS INDEX

Discussion

With the realization of the significant morbidity and mortality associated with postoperative leakage, the obvious benefit of identifying and addressing the primary associated variables is important.

Leakage post oesophagectomy still remains high at this institution (16.4%), compared to international quoted figures; with a lot of the centres in the western world quoting figures less than 10%^{1,2}. One centre in China reports a leakage rate as low as 0.57% in a review of 1965 patients⁶; this exceptional result has not been matched elsewhere.

What would be the way forward for us in addressing this difficult condition? The options lie between early detection of predictive variables leading to leakage, improved operative techniques and appropriate choice and timing of surgical intervention in the event a leak occurs.

Though not brought out in this study, the results of several studies suggest the aetiology of anastomotic leakage to be multifactorial with ischemia being the main primary underlying anomaly⁷. Early identification and correction of these abnormalities preoperatively is an important prerequisite if the surgeon is to strive to reduce anastomotic leakage rates. This means adequate preoperative patient preparation and thereafter attention to surgical technique. Proper surgical handling of tissues is a basic surgical requirement, foremost being the avoidance of excessive tissue tension⁸.

Despite this study not showing any association with some of the suggested variables and anastomotic leakage; the overwhelming strength of the data from the other centres should not be ignored.

Most would anticipate that the more experienced surgeon(s) would have better results with lower leakage and mortality rates⁹; this was not however born out in this study even though the significance was almost achieved ($p = 0.086$). Other studies

have also shown better results with increasing experience of the surgeon. This mainly applies to those performing hand sewn oesophageal anastomoses. This variation however did not apply to the use of the stapler device¹⁰. What does come out however by “eyeballing” the figures of procedures performed by the surgeons is, those who performed more surgeries within the study period tended to have a lower leakage rate. Miller et al⁹, in their study showed that surgeons performing six or more surgeries a year (frequent surgeons) had significantly lower leaks than those performing fewer surgeries. Even though not statistically significant in the case of this study, possibly this is an area requiring attention in an effort to reduce the leakage rates. Those surgeons performing fewer surgeries should be encouraged to perform more procedures

Juneman-Ramirez et al¹¹ in their paper highlighted the role of pyloroplasty as being preventive of the later occurrence of leaks. Their study found this to be an independent predictor of leakage. Unfortunately this variable was not evaluated as a variable associated with leakage in this study. Possibly the utilization of this procedure could assist us to reduce our leakage rate. They do in addition however, state that the benefit it provides is by virtue of acting as a gastric outlet mechanism, which in our patients is provided by the nasogastric tube during the critical period of wound healing.

The possibility of other variables like the surgical equipment used in fashioning the anastomoses requires special mention^v. Today the stapling device is used in nearly all areas of gastrointestinal anastomoses including the oesophagus. Significantly reduced leakage rates, a shorter operating time and a lower blood loss are a few of the benefits offered by staplers^{12,13,14}. Though the majority of studies suggesting lower leakage rate, this however is not however born out by all studies with a few showing similar rates¹². Despite this, the generally accepted theory is that the stapler device has a lower postoperative leakage rate compared

to hand sewn anastomoses. At this institution the stapler is not in use and this could be the single most important variable accounting for the difference between our results and those in other "high volume" centres.

When all is taken into consideration, the cost of investing in the stapling device against the reduced morbidity/mortality and total in hospital cost may warrant our considering investing in these devices in this hospital in future.

Once leakage occurs, its early detection is just as critical to successful total patient management¹⁷. This indirectly points to the surgeons' index of suspicion and available diagnostic facilities¹⁷. Surgical intervention post leakage is associated with a greater morbidity and mortality and thus recently attention has been directed towards conservative treatment for oesophageal leaks. This takes the form of endoscopic insertion of self expanding stents with or without endoscopic drainage procedures²⁰. For conduit necrosis however the only option is re-exploration and refashioning as appropriate for the situation¹⁹.

The long term complication of post oesophagectomy stricture has been shown to be dependent on the occurrence of postoperative leakage^{2,21}. Though not demonstrated in this study, in most studies this is a significant independent variable.

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