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Factors associated with anastomotic leak following gastrectomy for gastric adenocarcinoma and its effect on long-term outcomes

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ABSTRACT

Objective: Gastrectomy for cancer is a technically demanding surgery and anastomotic leak is an important complication of this surgery. This study aimed to identify the factors associated with anastomotic leak following gastrectomy in gastric cancer patients and its long-term effect on outcomes.

Material and Methods: This is an ambispective study of 181 patients who underwent curative gastrectomy for gastric adenocarcinoma over 13 years, at our institution. Groups with and without anastomotic leak were compared using the Mann-Whitney U test (continuous variables) and Chi-square test (categorical variables). A multivariable analysis was performed to determine the factors associated with anastomotic leak.

Results: Out of the 181 patients who underwent curative gastrectomy, 12 (6.6%) patients experienced anastomotic leak. A multivariable analysis revealed that younger age, presence of comorbidities, hypoalbuminemia, tumor location in the proximal stomach, type of reconstruction, and positive margin status were associating factors for anastomotic leak. During a median follow-up of 34 months (ranging from 12 to 130), it was observed that 25 (18.3%) patients developed anastomotic stenosis, but it was not related to anastomotic leak. The incidence of post-operative pulmonary complications, administration of adjuvant therapy, recurrence rates, and mortality due to anastomotic leak did not significantly change. Moreover, neoadjuvant therapy did not increase the incidence of anastomotic leaks.

Conclusion: Factors like younger age, presence of comorbidities, hypoalbuminemia, tumor location in the proximal stomach, type of reconstruction, and positive margin status were associated with increased risk of anastomotic leak, which needs further studies to validate the findings. Thus, preoperative optimization and resection with adequate margins may be of utmost importance in preventing anastomotic leaks.

Keywords: Gastric cancer, gastrectomy, anastomotic leak, long-term effect, gastrojejunostomy, esophagojejunostomy

INTRODUCTION

Gastric cancer is the fifth most common cancer and the fourth most common cause of cancer deaths in the world (1). Gastrectomy with D2 lymphadenectomy is the main treatment for gastric cancer (2). Gastrectomy for cancer requires expertise, with complication rates varying from 20%-46% (2). The incidence of anastomotic leak following gastrectomy is 1.5-14.4% (3-7). Mortality due to anastomotic leak is 38.5% of all surgery-related mortality after gastrectomy for gastric cancer (7). Anastomotic leaks lead to poor quality of life, lengthening hospital stay, increased financial burden, and mortality (8).

Post-operative complications can hamper recovery, delaying the initiation of adjuvant chemotherapy, which can adversely affect the overall and recurrence-free survival of patients after curative gastrectomy for gastric cancer. These complications can be disastrous to both short and long-term outcomes (9,10). There is some uncertainty about neoadjuvant therapy causing an increased risk of post-operative anastomotic leak (11).

Most of the studies have assessed risk factors for esophago-jejunal anastomotic leak, but few have addressed the complications following gastrojejunostomy leak. No randomized study is available, and the existing literature has shown conflicting results in terms of determinants of leak and its sequelae. The present study aimed to identify the factors associated with anastomotic leak following gastrectomy in gastric adenocarcinoma patients and its long-term effect on outcome.

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MATERIAL and METHODS

It is an ambispective observational study in which all consecutive patients who underwent potentially curative gastrectomy (total, subtotal/distal, proximal) for gastric adenocarcinoma from 2009 to 2021 at a tertiary care center were included after ethical clearance from institutional ethics committee (IEC code: 2023-93-MCh-EXP-52 PGI/BE/224/2023). Data was retrieved from a prospectively maintained hospital information system and informed consent was taken from the patient/patient's family. Patients who underwent resection or a bypass procedure for benign pathology, non-adenocarcinoma malignant pathology, or metastatic disease were excluded from the study.

Patients' demographic characteristics were recorded along with the following clinical, surgical, and pathological characteristics (e.g., pre-operative patient factors, neoadjuvant therapy, surgery-related factors, and tumor-related factors). Early post-operative complications like pulmonary, and cardiac complications were also evaluated.

All patients were divided into two groups as anastomotic leak (AL) group and no anastomotic leak (NAL) group. These groups were compared in terms of the above clinicopathological and surgical factors. All patients were followed up for at least 12 months. Follow-up data was collected from the outpatient records and/or telephonic conversations. Long-term anastomotic complications (anastomotic stenosis, fistula formation) were noted and analyzed.

The decision for neoadjuvant therapy was made after a discussion in a tumor board. Total or proximal gastrectomy or subtotal/distal gastrectomy with D2 lymph node dissection with or without adjacent organ resection was determined by the stage of the disease and location of the tumor, using standard criteria.

Anastomotic leak in the present study was defined as the leak of luminal contents from the anastomotic line that is from Roux-en-Y esophago-jejunal (RYEJ)/esophagogastric (EG) or gastro-jejunal (GJ) anastomotic site with clinical manifestations. They presented clinically as luminal contents through a wound or drain or with collection near the anastomosis associated with fever, inflammatory response, metabolic disturbance, and/or multiple-organ failure, confirmed by oral contrast CT or at re-operation.

Anastomotic stenosis in the present study was defined as anastomotic site narrowing post-gastrectomy who presented with features of gastric outlet obstruction at least after one month of surgery confirmed by endoscopy or contrast study and those requiring endoscopic intervention or revision surgery.

Anastomotic leaks containing collections were managed by percutaneous drainage, antibiotics, and enteral feeding through a feeding jejunostomy (FJ) tube (placed during primary surgery). In patients who could not tolerate enteral feeds or in whom enteral feeding access was not available, total parenteral nutrition (TPN) was initiated. Surgical re-exploration was reserved for hemodynamically unstable patients, who demonstrated signs of clinical deterioration on conservative management or in case of free contrast leak into the peritoneal cavity.

Endoscopic balloon dilation was considered a primary treatment for anastomotic stenosis following gastrectomy and surgery was reserved for the failures.

Statistical Analysis

Patients were divided into two groups as anastomotic leak (AL) and no anastomotic leak (NAL) groups. Continuous variables were expressed as median and compared using the Mann-Whitney U test. The association between categorical data was compared using the Chi-square test. Univariate analysis was done with logistic regression analysis and the variables which had $p< 0.05$ were considered for multivariable regression analysis. $P< 0.05$ was considered significant. Statistical analysis was done using the IBM SPSS 26.0 (SPSS Inc., Chicago, IL, United Stated of America) package program.

RESULTS

Of a total of 287 patients who underwent gastrectomy for gastric tumors of all types during this period, a total of 181 patients were included for analysis. Twelve (6.6%) of them had anastomotic leak (six following total gastrectomy; five following distal/subtotal gastrectomy; one following proximal gastrectomy). Nine were managed conservatively with antibiotic upgradation and the drain was kept for a longer time or percutaneous drain placement done in them. The remaining three patients underwent re-exploration due to the persistence of symptoms or deterioration with conservative management. Median time of presentation of the leak was on the 6^{th} post-operative day (range four to 48 days), and median hospital stay was 18 days (range nine to 23 days).

Median age of the patients was 54 (18-85) years with 75.7% being male. Comorbidities were more commonly seen in the AL group ($p= 0.02$). Univariate analysis suggested that the following factors were associated with anastomotic leak younger age, presence of comorbidities, pre-operative anemia, blood transfusion, hypoalbuminemia, total gastrectomy, positive margin status, and tumor location. Neoadjuvant therapy, the technique of anastomosis, the extent of lymphadenectomy, en-bloc resection of adjacent organs, and tumor-related pathological factors were not correlated with increased anastomotic leak (Table 1-3). Pulmonary complications were more common in the AL group (33.3% vs.15.4%), although the difference was not statistically significant. There was no difference in the post-operative mortality, administration of adjuvant therapy, or recurrence rates between the two groups (Table 4).

Table 1. Univariate analysis of pre-operative factors affecting anastomotic leak

Characteristic	Overall [n= 181 (100%)]	AL Group [n= 12 (6.6%)]	NAL Group [n= 156 (93.4%)]	Univariate Analysis (p)
Median Age (Years)	54 (18-85)	44 (24-65)	55 (18-85)	0.03
Sex				
Male	137 (75.7%)	9 (75%)	128 (75.7%)	0.95
Female	44 (24.3%)	3 (25%)	41 (24.3%)	
Comorbidities				
Present	62 (34.3%)	9 (75%)	53 (31.4%)	0.02
Absent	119 (65.7%)	3 (25%)	116 (68.6%)	
Addiction				
Yes	70 (38.7%)	7 (58.3%)	63 (37.3%)	0.40
No	111 (61.3%)	5 (41.7%)	106 (62.7%)	
Pre-operative Anaemia (<8.5 mg/dL)				
Present	55 (30.4%)	11 (91.6%)	44 (28.2%)	0.00
Absent	126 (69.6%)	1 (8.4%)	125 (71.8%)	
Pre-operative/Intraoperative Blood Transfusion				
Yes	74 (40.9%)	11 (91.7%)	63 (37.3%)	0.02
No	107 (59.1%)	1 (8.3%)	105 (62.1%)	
Hypoalbuminemia (<3.5 mg/dL)				
Present	53 (29.3%)	8 (66.6%)	45 (26.6%)	0.03
Absent	128 (70.7%)	4 (33.4%)	124 (73.4%)	
Pre-operative Nutrition Supplementation				
Yes	25 (13.8%)	5 (41.6%)	20 (11.8%)	0.00
No	156 (86.2%)	7 (58.4%)	149 (88.2%)	
Neoadjuvant Therapy				
Yes	37 (20.4%)	3 (25%)	34 (20.1%)	0.68
No	144 (79.6%)	9 (75%)	135 (79.9%)	

AL: Anastomotic leak, NAL: non-Anastomotic leak.

On multivariable analysis, factors that conferred significant adverse impact on anastomotic leak rate were younger age, presence of comorbidities, hypoalbuminemia, proximal tumor location, type of reconstruction, and positive margin status (Table 5).

Of the total of 181 patients, 136 were available for evaluation of long-term anastomotic complications. Out of the 136 patients, 25 (18.3%) developed anastomotic stenosis after a median follow-up of 34 months (12 to 130 months). No chronic fistula was documented. Only two out of 25 patients who developed anastomotic stricture (8%) had a history of AL, and the remaining 23 (92%) had tumor recurrence (local, distant, and both local and distant recurrence). Anastomotic leak did not influence the rate of anastomotic stenosis (8% vs. 9%, p= 0.97). Most of these patients were presented with dysphagia or gastric outlet obstruction, evaluated by upper GI endoscopy and biopsy from stricture. In the AL group, both patients with stenosis had benign stricture, underwent esophageal dilatation, and none required reoperation. In the NAL group, all stenoses were due to the recurrence of the disease. Two patients with local recurrence at the anastomotic site leading to stenosis underwent endoscopic guided SEMS placement, the remaining 21 patients were managed conservatively with best supportive care.

DISCUSSION

In the present study, anastomotic leak rate following curative gastric resection for adenocarcinoma was 6.6%. This is similar to that reported at various centers across the globe. The Japanese National Clinical Database (NCD) of digestive surgery reported an anastomotic leak rate following total gastrectomy as 4.4% (881 of 20011) in 2011. Recent studies from Japan and Korea have shown anastomotic leak incidence ranging from 1.5-4.9%, whereas studies from the Western world ranged from 5.2-14.4% (3-7).

Table 2. Univariate analysis of factors related to extent of surgery and technique affecting anastomotic leak

Characteristic	Overall [n= 181 (100%)]	AL Group [n= 12 (6.6%)]	NAL Group [n= 156 (93.4%)]	Univariate Analysis (p)
Extent of Resection				0.009
Distal/Subtotal gastrectomy	134 (74%)	5 (41.7%)	129 (76.3%)	
Proximal gastrectomy	12 (6.6%)	1 (8.3%)	11 (6.5%)	
Total gastrectomy	35 (19.3%)	6 (50%)	29 (17.2%)	
Combined Organ Resection				0.03
Performed	14 (7.7%)	3 (25%)	11 (6.5%)	
Splenectomy	9 (5%)	3 (25%)	6 (3.6%)	
Transverse colectomy	3 (1.7%)	0	3 (1.8%)	
Pancreatico-splenectomy	1 (0.6%)	0	1 (0.6)	
Liver wedge	1 (0.6%)	0	1 (0.6%)	
Not performed	167 (92.3%)	9 (75%)	158 (93.5%)	
Type of Reconstruction				0.008
Bilroth II	92 (50.8%)	2 (16.7%)	90 (53.3%)	
RYGJ	42 (22.5%)	3 (25%)	39 (23.1%)	
EGA	12 (6.6%)	1 (8.3%)	11 (6.5%)	
RYEJ	35 (19.3%)	6 (50%)	29 (17.2%)	
Technique of Anastomosis				0.75
Handsewn	161 (89%)	11 (91.7%)	150 (88.8%)	
Stapled	20 (11%)	1 (8.3%)	19 (11.2%)	
GJ Position				0.38
Antecolic	60 (33.1%)	2 (16.7%)	58 (34.3%)	
Retro colic	49 (27.1%)	5 (41.7%)	44 (26%)	
Details not available	72 (39.8%)	5 (41.7%)	67 (39.6%)	
Extent of LN Dissection				0.98
D2	170 (93.9%)	12 (100%)	158 (93.5%)	
D1	10 (5.5%)	0	10 (5.9%)	
D1+	1 (0.6%)	0	1 (0.6%)	
Margin Status				0.04
Negative margin	154 (85.1%)	8 (66.7%)	146 (86.4%)	
Positive microscopic margin	27 (14.9%)	4 (33.3%)	23 (13.6%)	

AL: Anastomotic leak group, NAL: Non-anastomotic leak group, RYGJ: Roux-en-Y gastrojejunostomy, EGA: Esophaga-gastric anastomosis, RYEJ: Roux-en-Y esophago-jejunostomy, GJ: Gastrojejunostomy, LN: Lymph node.

Of the 12 patients in the AL group, nine (75%) were successfully managed conservatively (five required percutaneous drain insertion, four had prolonged surgical drain in situ), while three (25%) patients required re-exploration. In a systematic review in 2015, surgical re-exploration was necessary in 23.7% of patients which is comparable to the present study (12). Mortality following an anastomotic leak in the present study was 8.3%, which was comparable with a large-volume retrospective study by Roh et al. (7).

In our study, younger age, presence of comorbidities, hypoalbuminemia, tumor location, type of reconstruction, and positive margin status were associated with increased risk of anastomotic leak.

We found that the leak rate was higher in younger age patients. Median age of patients in the AL group was nearly 10 years less than that in the NAL group. This is in contrast with other studies that reported more complications in the older age group (7,13). A definitive explanation is not possible, however, in the present study, we found that younger patients had a higher incidence of signet ring cell tumors involving the proximal stomach necessitating more extensive resection (total gastrectomy) and esophagojejunostomy.

The presence of co-morbidities independently increased the risk (odds ratio was 15) of anastomotic leak. Out of 12 patients presenting with leak, nine (75%) were suffering from one or more medical illnesses (diabetes, hypertension, chronic pulmonary disease, or cardiac illness). A Korean study by Roh et al. documented similar findings wherein the patients who developed AL, 61 percent were affected by one or multiple co-morbidity (7). Kim et al. in their report have suggested the presence of cardiovascular disorder as a significant factor influencing the rates of anastomotic dehiscence (odds ratio 1.8) (13). Cardiovascular diseases and diabetes may increase the need for vasopressor support in the peri-operative period, impair the microcirculation, and adversely affect the glucose

Table 3. Univariate analysis of clinicopathological characteristics of tumour affecting anastomotic leak

Characteristic	Overall [n= 181 (100%)]	AL Group [n= 12 (6.6%)]	NAL Group [n= 156 (93.4%)]	Univariate Analysis (p)
Tumour Location				0.02
Antrum and pylorus	128 (70.7%)	4 (33.3%)	124 (73.4%)	
GEJ	27 (14.9%)	4 (33.3%)	23 (13.6%)	
Whole stomach/body	26 (14.4%)	4 (33.3%)	22 (13%)	
Histopathology				0.45
Differentiated adenocarcinoma	144 (74.1%)	10 (83.3%)	124 (73.4%)	
Signet ring-cell adenocarcinoma	47 (25.9%)	2 (16.7%)	45 (26.6%)	
T Stage (AJCC 8th)				0.94
T1	11 (6.1%)	1 (8.3%)	10 (5.9%)	
T2	23 (12.7%)	1 (8.3%)	22 (13%)	
T3	65 (35.9%)	4 (33.3%)	61 (36.1%)	
T4	82 (45.3%)	6 (50%)	76 (45%)	
N Stage (AJCC 8th)				0.92
N0	34 (18.8%)	1 (8.3%)	33 (19.5%)	
N1	21 (11.6%)	1 (8.3%)	20 (11.8%)	
N2	16 (8.8%)	2 (16.7%)	14 (8.3%)	
N3	39 (21.5%)	3 (25%)	36 (21.3%)	
Nx (inadequate LNs examined or neoadj therapy given)	71 (39.2%)	5 (41.7%)	66 (39.1%)	
Number of Positive LNs	4.1	4.7	4.0	0.91
Lymphovascular Invasion				0.95
Present	44 (24.3%)	3 (25%)	41 (24.3%)	
Absent	17 (75.7%)	9 (75%)	128 (75.7%)	
Perineural Invasion				0.76
Present	52 (28.7%)	3 (25%)	49 (29%)	
Absent	129 (71.3%)	9 (75%)	120 (71%)	

AL: Anastomotic leak group, NAL: Non-anastomotic leak group, GEJ: Gastroesophageal junction, AJCC: American joint committee on cancer staging, LN: Lymph node.

Table 4. Comparison of post-operative outcomes following curative gastrectomy between the two groups

Characteristic	Overall [n= 181 (100%)]	AL Group [n= 12 (6.6%)]	NAL Group [n= 156 (93.4%)]	Univariate Analysis (p)
Immediate (<7 days) Post-operative Pulmonary complications				0.11
Present	30 (16.6%)	4 (33.3%)	26 (15.4)	
Absent	151 (83.4%)	8 (66.7%)	143 (84.6%)	
Adjuvant Chemotherapy				0.72
Taken	103 (56.9%)	6 (50%)	97 (57.4%)	
Not taken	25 (13.8%)	4 (33.3%)	21 (12.4%)	
Not known	53 (29.3%)	2 (16.7%)	51 (30.2%)	
Recurrence				0.87
Present	51 (28.2%)	4 (41.7%)	47 (43.2%)	
Absent	78 (43.1%)	5 (33.3%)	73 (43.2%)	
Not known	52 (28.7%)	3 (25%)	49 (29%)	
Hospital Mortality				0.19
Yes	7 (3.9%)	1 (8.3%)	6 (3.6%)	
No	174 (96.1%)	11 (91.7%)	163 (96.4%)	
Death				0.63
Yes	90 (49.7%)	7 (58.3%)	83 (49.1%)	
No	46 (25.4%)	0	46 (27.2%)	
Not known	45 (24.9%)	5 (41.7%)	40 (23.6%)	

AL: Anastomotic leak group, NAL: Non-anastomotic leak group.

Table 5. Multivariate analysis of factors affecting anastomotic leak rate

Characteristic	P-value on Multivariate Analysis	Odds Ratio (Confidence Interval)
Age (younger age)	0.001	0.8 (0.81, 0.94)
Presence of comorbidities	0.007	15 (2.07, 109.62)
Hypoalbuminemia	0.009	9.6 (1.76, 53.18)
Tumour location (whole stomach or body of stomach involvement)	0.04	8.1 (1.01, 66.12)
Type of reconstruction (RYEJ)	0.04	8.3 (1.01, 69.06)
Margin status (positive margin)	0.04	6 (1.03, 35.62)

RYEJ: Roex-en-Y esophagojejunostomy.

metabolism thus impeding the process of wound (anastomotic) healing.

Hypoalbuminemia (albumin <3.5 gm/dL) was also found to be an independent factor associated with anastomotic leak with an odds ratio of 10. Malnutrition renders patients more susceptible to infection, increases tissue edema, prolongs wound healing, and increases the risk of post-operative complications (10). It emphasizes the importance of pre-operative nutritional optimization. Liu et al., in their report, have documented similar results (14). On the contrary, Migita et al. and Kim et al. fhave ailed to demonstrate any association between serum albumin and anastomotic healing (8,13).

Tumors with microscopic margins positive for tumor cells (R1 resection) had a higher risk (six times) of anastomotic leak. Kim et al. have also documented a significant rise in anastomotic complications (2.3 times) with a positive resection margin (13).

Eight times increased risk of anastomotic leak was documented in patients with tumors involving the whole stomach or most of the body of the stomach necessitating total gastrectomy and esophagojejunostomy. A similar rise has been noted with proximal tumors (proximal third of the stomach) in a study by Kim et al. (13). Regardless of the anastomotic technique (stapled or sutured), RYEJ is considered technically more difficult than GJ. Moreover, the esophagus is a less compliant organ in comparison to the stomach as well as the blood supply is less robust. The proximal gross margin in the case of proximal gastrectomy (1-2 cm) is less than that in distal gastrectomy (usually >5 cm). The proximity to the tumor tissue might be responsible for poor healing capacity.

Conversely, combined organ resection, technique of anastomosis, extent of lymph node dissection, and stage of the disease did not affect the leak rate. Importantly, in our study, 37 of 181 (20.4%) patients received neoadjuvant therapy but this did not lead to an increased rate of anastomotic leak. Studies on the effect of neoadjuvant therapy in colorectal cancer have demonstrated tumor regression to the extent of complete pathologic response leading to improved local control (15). This may counteract the ill effects (tissue edema and inflammation) of neoadjuvant therapy (chemotherapy and/or radiotherapy), and thus may not translate into increased AL.

In the present study, 47/181 (25.9%) patients had signet ring cell adenocarcinoma, however, histopathological type did not significantly increase leak rates. Similarly, the need for multi-visceral resection, the extent of lymphadenectomy, the technique of anastomosis, and the stage of the disease did not have a significant effect on anastomotic dehiscence as confirmed by a Japanese study by Migita et al. (8). In the present study, 25/136 (18.3%) patients developed anastomotic stenosis during follow-up. However, post-operative leak (16.7% vs. 18.5%) was not associated with the development of stricture. Fukagawa et al. have documented the stenosis rate of 7.8% following open proximal gastrectomy, and 3.4% following open total gastrectomy (16). Multiple factors have been proposed for the development of mechanical gastric outlet obstruction: Ischemia, tension following tissue approximation, subacute obstruction, use of circular staplers, narrow diameter staplers, and the occurrence of an anastomotic leak (17). However, the present study did not show any difference in terms of anastomotic leaks.

Being an ambispective single-centre study, the limitations of this study include small sample size, the possibility of selection bias, and a low incidence of anastomotic leaks. Multicentre large prospective studies are required to validate the results.

CONCLUSION

Factors like younger age, presence of comorbidities, hypoalbuminemia, tumor location in the proximal stomach, type of reconstruction, and positive margin status were associated with increased risk of anastomotic leak, which needs further studies to validate these findings. Thus, pre-operative optimization and resection with adequate margins may be of utmost importance in preventing anastomotic leaks.

Ethics Committee Approval: This study was obtained from Sanjay Gandhi Post Graduate Institute Medical Sciences of Ethics Committee (Decision no: 2023-93-MCh-EXP-52, Date: 22.06.2023).

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Mide adenokarsinomu için gastrektomi sonrası anastomoz kaçağı ile ilişkili faktörler ve uzun vadeli sonuçlar üzerindeki etkisi

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ÖZET

Giriş ve Amaç: Kanser için yapılan gastrektomi, teknik olarak zorlu bir cerrahidir ve anastomoz kaçağı bu cerrahinin önemli bir komplikasyonudur. Bu çalışmanın amacı, mide kanseri hastalarında gastrektomi sonrası anastomoz kaçağı için öngörücü faktörleri ve bunun uzun vadeli sonuçlar üzerindeki etkisini belirlemektir.

Gereç ve Yöntem: Bu çalışma, kurumumuzda 13 yıl boyunca mide adenokarsinomu nedeniyle küratif gastrektomi yapılan 181 hastayı kapsayan amprisifik bir çalışmadır. Anastomoz kaçağı olan ve olmayan gruplar Mann-Whitney U testi (sürekli değişkenler) ve Ki-kare testi (kategorik değişkenler) kullanılarak karşılaştırıldı. Anastomoz kaçağı için öngörücü faktörleri belirlemek amacıyla çok değişkenli bir analiz yapıldı.

Bulgular: Küratif gastrektomi yapılan 181 hastadan 12 (%6,6)'sinde anastomoz kaçağı görülmüştür. Çok değişkenli analiz, genç yaş, komorbidite varlığı, hipoalbüminemi, proksimal midede tümör yerleşimi, rekonstrüksiyon tipi ve pozitif marjin durumunun anastomoz kaçağının bağımsız belirleyicileri olduğunu ortaya koymuştur. Ortanca 34 aylık (12 ile 130 arasında değişen) takip süresince, 25 (%18,3) hastada anastomoz darlığı geliştiği, ancak bunun anastomoz kaçağı ile ilişkili olmadığı görülmüştür. Ameliyat sonrası pulmoner komplikasyon insidansı, adjuvan tedavi uygulaması, nüks oranları ve anastomoz kaçağına bağlı mortalite önemli ölçüde değişmemiştir. Ayrıca, neoadjuvan tedavi anastomoz kaçağı insidansını artırmamıştır.

Sonuç: Genç yaş, komorbidite varlığı, hipoalbüminemi, proksimal midede tümör yerleşimi, rekonstrüksiyon tipi ve pozitif marjin durumu gibi faktörler anastomoz kaçağı riskini bağımsız olarak öngörmektedir. Bu nedenle, ameliyat öncesi optimizasyon ve yeterli sınırlarla rezeksiyon, anastomoz kaçaklarının önlenmesinde büyük önem taşımaktadır.

Anahtar Kelimeler: Mide kanseri, gastrektomi, anastomoz kaçağı, uzun dönem etki, gastrojejunostomi, özofagojejunostomi

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