



FIVE-YEAR SURVIVAL ANALYSIS OF SURGICALLY RESECTED GASTRIC CANCER CASES AT NATIONAL CANCER INSTITUTE, CAIRO UNIVERSITY

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Abstract

Background This study was carried out by the National Cancer Institute at Cairo University to look at the characteristics of the tumours, the specifics of the surgery, and the survival rates of cases of surgically resected stomach cancer.

Materials and methods: Retrospective analysis of patients with stomach cancer who had applied to our clinic was done. The patients' age and gender, primary site, histological characteristics, TNM stage, treatment, oncological treatment modalities, and survival results were examined.

Results: With a male to female ratio of 2.19, the trial included 83 individuals with a confirmed diagnosis of stomach cancer. 54.7 years old was the average age. The typical tumour size was 4 cm. Regarding the site of the tumor, it was distal in 59 (71.1 %) whereas proximal in 24 (28.9 %). Distal gastrectomy was done for 48 (57.8%) individuals while total gastrectomy while proximal gastrectomy were done for 27 (32.5%), 8 (9.6%) individuals respectively. Fifty (60.2%) individuals were subjected to Roux en y as a method of reconstruction while 33 (39.8%) individuals underwent Billroth II reconstruction. The majority of the tumours (80.72%) were T3 in size. T1, T2, and T4 tumours were comparatively rare. 51.8% of individuals (51.8%) had nodal disease that was positive. 39.75% of individuals had perineural invasion and lymph vascular invasion. Only one patient had grade 1 tumours, 44 (53%) had grade 2 tumours, and 38 (45.8%) had grade 3 tumours. All patients had negative resection margins (R0). The overall complication rate was 39%, and the median period of hospitalisation was 9 days. Neoadjuvant therapy was given for 40 (48.2%) individual and 51(61.44%) individuals received adjuvant treatment. The 5-year overall survival was 41.7% while the 5-year disease-free survival rate was 22.4. In univariate and multivariate assessment adjuvant treatment was the only independent predictor of survival.

Conclusions: This study revealed that the survival outcome of surgically resected gastric cancer was better among patients who received adjuvant therapy.

Keywords:Gastric cancer; Surgical outcome; Survival outcome

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1. INTRODUCTION

Globally, gastric cancer (GC) is the third most common type of cancer-related death and the fifth most common malignancy (1). The incidence of proximal gastric cancer (PGC) has significantly increased, despite the fact that its overall incidence appears to be declining (2).Although advances in

chemotherapy and surgery have improved the treatment outcomes for advanced gastric cancer, there is still room for improvement in terms of obtaining significant favourable effects to prolong patient lives (3). Age-related diseases like gastric cancer are frequently found in older people. Due to age-related decreased organ function, it is difficult to achieve the required therapy results (4).

While stomach cancer incidence has progressively decreased over the past 50 years in affluent countries, treatment outcomes are still subpar, mostly because the disease is often discovered after it is already advanced (5). We looked into the surgical results, prognoses, and survival rates of individuals who received curative resection of stomach cancer at Cairo University's National Cancer Institute.

2. MATERIALS AND METHODS

All 83 patients with gastric cancer who underwent surgery in the surgical department at the National Cancer Institute between January 2016 and December 2020 were included in this retrospective cohort study.

- **Preoperative workup**

As part of their preoperative workup for anaesthetic fitness, all patients who met the requirements for (PD) underwent a complete blood count, hepatic and renal activity tests, thyroid function tests, serum electrolytes, coagulation profile, electrocardiography, and a CT chest. All patients had assessments, including upper GIT endoscopy and computed tomography scanning to identify the stage of the tumour, before surgery.

STATISTICAL ANALYSIS:

SPSS was used to analyse the data (Statistical Package for Social Sciences, version 28). We'll utilise the median (range), mean, and standard deviation to describe quantitative data. Frequency and percentage were used to condense the qualitative data. The total survival will be calculated from the date of diagnosis to the latest follow-up date or the moment of death. From the date of surgery through the date of any reported recurrence, metastasis, death, or last follow-up, disease-free survivals were determined. The survival research was carried out utilising the Kaplan-Meier method. To compare two survival curves, the log-rank test was employed. In multivariate analysis, the Cox regression model was used to pinpoint independent predictors of overall survival, and risk was calculated using the hazard ratio and its 95% confidence interval. Results that have a p-value of 0.05 or less are considered significant.

3. RESULTS

In the period from January 2016 to December 2020, 83 patients with stomach cancer underwent surgery. The age ranged from 21 to 78, with the average age being 54.7. In the study, there were 26 women and 57 male patients. The most typical symptom that led people to seek medical attention was weight loss. (46.98 percent) (Table 1).

Table (1):displaying demographics and symptoms of patients.

Variables	Values
Age	54.7±11.2
Sex (%)	
Male	43(70.5)
Female	18 (29.5)
Smoker (%)	39(46.)
Symptoms (%)	
Anorexia & Weight loss	48(57.83)
Abdominal pain	23 (27.7)
Obstruction of Gastric Outlet	12 (14.45)

The average preoperative haemoglobin level was 11.2gm/dl and serum albumin was 3.7 gm/dl. The average tumor diameter was 4 cm. Regarding the site of the tumor, it was distal in 59 (71.1 %) whereas proximal in 24 (28.9 %). Distal gastrectomy was done for 48 (57.8%) individuals while total gastrectomy and proximal gastrectomy were done for 27 (32.5%), 8 (9.6%) individuals

respectively. D1 lymphadenectomy was done for 40 (48.2%) individuals while 43 (51.8%) individuals were subjected to D2 lymphadenectomy. Fifty (60.2%) individuals were subjected to Roux en y as a method of reconstruction while 33 (39.8%) individuals underwent Billroth II reconstruction (Table 2).

Table (2):The preoperative and intraoperative factors

Variable	Value
Laboratory readings:	Median (range)
Hemoglobin level(gm/dl)	11.2(8.9–13.2)
Total white blood cells count	7300(3400–13200)
Serum Albumin(gm/dl)	3.7(1.9–4.3)
Serum creatinine(mg/dl)	0.9(0.7–1.4)

Intraoperative factors	
Tumor diameter (cm)	4 (1-10)
Tumor site (%)	
Proximal	24 (28.9 %)
Distal	59 (71.1 %)
Type of Surgery (%)	
Proximal gastrectomy	8 (9.6%)
Total gastrectomy	27 (32.5%)
Distal gastrectomy	48 (57.8%)
Method of reconstruction (%)	
Billroth II reconstruction	33 (39.8%)
Roux-en-Y	50 (60.2%)
Extent of lymphadenectomy	
D1 lymphadenectomy	40 (48.2%)
D2 lymphadenectomy	43 (51.8%)

The majority of the tumours (80.72%) were T3 in size. T1, T2, and T4 tumours were comparatively rare. 51.8% of individuals (51.8%) exhibited positive nodal disease. 39.75% of individuals had perineural invasion and lymph vascular invasion. Only one patient had grade 1 tumours, 44 (53%) had grade 2 tumours, and 38 (45.8%) had grade 3 tumours. All patients had negative resection margins (R0). The overall complication rate was 39%, and the median period of hospitalisation was

9 days. Neoadjuvant therapy was given for 40 (48.2%) individual and 51(61.44%) individuals received adjuvant treatment. The overall survival rates at 2 and 5 years were 54% and 41.7% respectively while disease-free survival rates at 2 and 5 years were 36.2% and 22.4 respectively. In univariate and multivariate assessment adjuvant treatment was the only independent predictors of survival (Tables 3,4,5,6), (figures 1,2).

Table (3):Univariate analysis of factors affecting overall survival

		n	No. failures	Cumulative overall survival at 24 months	Cumulative overall survival at 60 months	Median survival	p-value
Whole Group		83	41	54%	41.7%	24.4	
Age groups (years)	< 55	36	16	61.8%	51.2%	---	0.132
	≥ 55	47	25	47.2%	33.3%	16.9	
Sex	Female	26	10	58.2%	53.2%	-----	0.188
	Male	57	31	52.5%	36.2%	24.1	
Tumour Size	<4cm	32	16	53%	44.5%	24.9	0.904
	≥4cm	51	25	54.5%	39.6%	24.1	
Grade	Grades 1 & 2	45	21	57.1%	48.8%	28.4	0.471
	Grade 3	38	20	49.3%	32.6%	23.9	
Site of the tumor	Proximal	24	15	43.1%	25.9%	19.6	0.080
	Distal	59	26	58.3%	48%	39.4	
Type of Surgery	Proximal gastrectomy	8	7	12.5%	12.5%	13.2	0.069
	Total gastrectomy	27	12	57.5%	41.2%	28.4	
	Distal gastrectomy	48	22	59.9%	47.7%	39.4	
Method of reconstruction	Roux en y	50	23	61.3%	43.2%	30.3	0.433
	Billroth II reconstruction	33	18	43.2%	39.4%	20.9	
Postoperative complication	No	44	19	66.7%	44.3%	30.3	0.229
	Yes	39	22	41%	37.9%	20.7	
Lymph node status	Negative	40	18	58.9%	48.8%	30.3	0.339
	Positive	43	23	49.2%	33.6%	23.9	
Neoadjuvant treatment	No	43	21	56.3%	46.5%	39.4	.470
	Yes	40	20	50.6%	35.4%	24.0	
Adjuvant treatment	No	32	21	25.5%	21.3%	12.5	<0.001
	Yes	51	20	69.7%	53.6%	----	

Table (4):Multivariate analysis of factors affecting overall survival

	p-value	HR	95.0% CI for HR	
			Lower	Upper
Adjuvant treatment (not receiving versus receiving)	<0.001	3.4	1.846	6.434

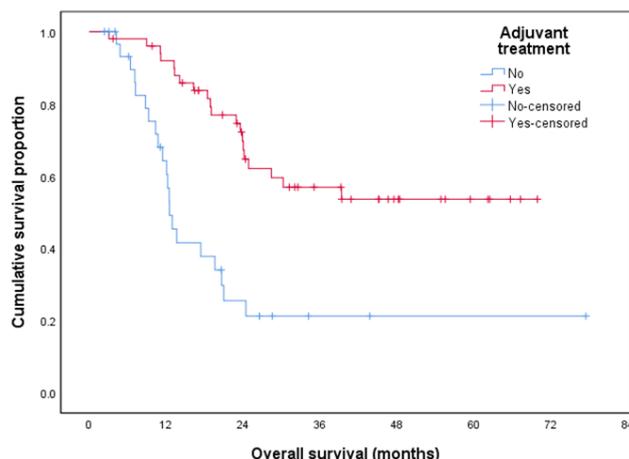


Figure (1): OS & its relation to adjuvant treatment (p value= <0.001)

Table (5):Univariate analysis of factors affecting disease-free survival

		n	No. failures	Cumulative disease-free at 24 months	Cumulative disease-free at 60 months	Median survival	p-value
Whole Group		83	54	36.2%	22.4%	16.4	
Age groups (years)	< 55	36	23	44.2%	24.8%	22.9	.145
	≥ 55	47	31	29.2%	20.8%	11.8	
Sex	Female	26	15	48.2%	30.4%	14.7	.255
	Male	57	39	30.9%	16.2%	16.4	
Tumour Size	<4cm	32	21	39.4%	27.6%	18.8	.654
	≥4cm	51	33	33.9%	18.5%	15.8	
Grade	Grades 1 & 2	45	30	41.4%	0%	18.8	.896
	Grade 3	38	24	28.9%	25.3%	14.5	
Site of the tumor	Proximal	24	17	24.6%	18.4%	8.7	.098
	Distal	59	37	40.9%	23.3%	18	
Type of Surgery	Proximal gastrectomy	8	7	12.5%	12.5%	8.8	.161
	Total gastrectomy	27	15	37.5%	32.2%	19.0	
	Distal gastrectomy	48	32	39.9%	19.3%	18.0	
Method of reconstruction	Roux en y	50	29	39.1%	32.7%	19.0	.090
	Billroth II reconstruction	33	25	32.4%	8.1%	12.9	
Postoperative complication	No	44	26	41.3%	23.4%	19.0	.231
	Yes	39	28	30.5%	20.9%	12.9	
Lymph node status	Negative	40	24	42.4%	28.8%	18.8	.182
	Positive	43	30	30.1%	17.8%	14.7	
Neoadjuvant treatment	No	43	29	42.9%	26.2%	19.8	.433
	Yes	40	25	27.7%	18.5%	14.5	
Adjuvant treatment	No	32	22	19%	19%	8.8	.005
	Yes	51	32	45.9%	26.4%	22.9	

Table (6):Multivariate analysis of factors affecting disease free survival

	p-value	HR	95.0% CI for HR	
			Lower	Upper
Adjuvant treatment (not receiving versus receiving)	0.006	2.183	1.252	3.805

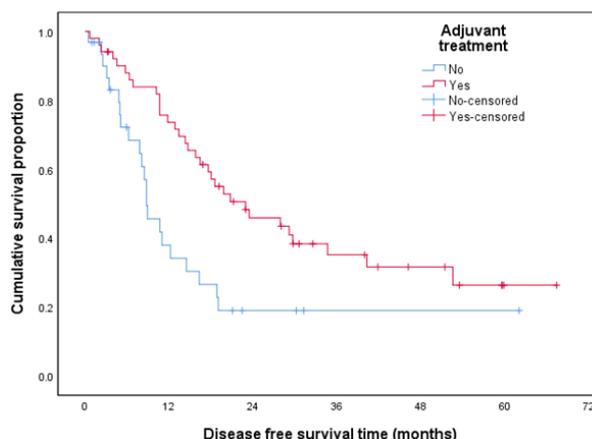


Figure (2): DFS & its relation to adjuvant treatment (p value= .005)

4. DISCUSSION

Although the incidence and mortality of GC have decreased globally, it is still the fifth-leading cause of cancer-related death (6). Although screening, diagnosis, and treatment methods have improved, surgical complications and mortality rates have not significantly decreased globally (7). The patients in this study ranged in age from 21 to 78, with a median age of 57, which is younger than the median age of patients who were reported in the Japanese Cancer Registry, which was 65.8 years. It can be assumed that the ageing of the Japanese population and increased life expectancy are the main causes of the decrease in average age in this study (8).

In comparison to the percentage of patients with cancer affecting the distal stomach (71.1%), which is present in Eastern countries where there have been a few reports of an increased incidence of esophagogastric junctional adenocarcinoma, the percentage of patients with cancer affecting the proximal stomach (28.9%) is lower.

On the other hand, since the middle of the 1970s, the prevalence of EGJA has increased in Western nations, particularly in White people and the United States (3.1 per 100.000). (9). In recent years, there has been a little rise in EGJA in China (11) and Japan (10). The higher incidence of distal gastric cancer (71.1%) and the Japanese gastric cancer guidelines, where the proportion of patients getting modified gastrectomy also increased, account for the larger proportion of patients undergoing distal gastrectomy (57.8%) than other surgical methods (12). In the national registry of 1991, Following resection, the 5-year overall survival rate was 68.2%, and it has remained there ever since. According to the American Cancer Society, this period saw no change in the 5-year overall survival rate (70%) either (13). With T1 tumours having a survival rate of 85–90% and T4 tumours and node-positive patients having a survival rate of

15%, survival rates vary depending on the T and N stages. (14).

The 5-year overall survival rate following resection in this study was 41.7%, which was lower than the previous figures. This could be attributed to the high rate of complications among our patients (39%) and the patients' lower disease-free survival rates, which were 36.2% at 2 years and 22.4% at 5 years. The small sample size in this study compared to the aforementioned studies, which discovered that the presence of lymph node involvement and tumour penetration through the stomach wall were both significant prognostic variables in the literature, may explain why the survival outcome among the group of patients with negative nodal disease was higher than the positive group but without statistical significance (15-17). Patients subjected to D1 lymphadenectomy were associated with better survival outcome compared to patients subjected to D2 lymphadenectomy which is opposite to the Japanese study (12). This is explained by the possibility that D1 lymphadenectomy was done mostly for patients with negative nodal disease and D2 was done mostly for node positive patients and our results also were non statistically significant.

Our study founded that the 5-year D.F.S rate for cases not accompanied by postoperative complications (23.4%) was higher than that of those accompanied with postoperative complications (20.9%), with non-significant p-value =0.2. postoperative complications didn't significantly affect the overall survival which is different from what P. Yuan et al., had stated (p = 0.001 and p = 0.003, respectively) that the major complications were linked to lower 3-year OS and DFS rates.(18).

A significant form of curative care is surgery. Despite advancements in surgical methods, a fair overall survival rate is still achieved with just surgery and no pre- or postoperative care. In patients with resectable gastric cancer, recent randomised studies comparing surgery with or without preoperative chemotherapy or comparing

D1 against D2 resection found overall survival between 20-30% with surgery alone. Consequently, a multi-modal strategy is required to enhance surgical outcomes. The most researched and successful treatment modalities are adjuvant chemotherapy alone, along with radiation, or during surgery (19, 20). Adjuvant therapy was the most significant independent prognostic factor determining the survival outcome in this study's multivariate analysis.

5. CONCLUSION

Following curative surgery, patients with gastric cancer who received multimodal treatment and adjuvant therapy had better survival outcomes when compared to those who did not.

Conflict of interest

The authors have not declared any competing interests.

Authors' Contributions

The research study was created by Fouad Abdelshaheed, Mohamed EmamSobeih, and Sara Mamdoh. The study was conducted by Sayed Shaker Sheier and Alaadin Hussein. The pathology was updated by Mostafa Ahmed Hussein. Sayed Shaker Sheier and Mahmoud Hussein wrote the manuscript. All authors made editorial changes to the text. All authors read and approved the final draught.

Participant consent and ethical endorsement

The NCI's Institutional Review Board (IRB) approved the study (IRB approval No. 00004025). Before the study began, each participant provided their informed consent to be included.

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