Spinghar University- Kabul

Spinghar Journal of Biomedical Sciences (SJBS)

Vol. 2, No. 2, Oct 2026, pp.161-172

Clinicopathological Characteristics and Treatment Response of Esophageal and Gastroesophageal Junction Cancers in Kabul, Afghanistan: A Retrospective Single-Center Study

*Sayed Hussain Amiri [1#], Noorullah Amiri [2#], Sayed Musa Danish [3], Sayed Zia Askari [2], Mohammad Sediq Karimi [4]

1. *Para clinic Department, Faculty of Curative Medicine, Shifa University, Kabul, Afghanistan*
2. *Department of Medical Technology, Razi University, Kabul, Afghanistan*
3. *Faculty of Stomatology, Afghan Swiss Medical University, Kabul, Afghanistan*
4. *Histotecnologist, Nasir Pathology Laboratory, Kabul, Afghanistan*

#These authors contributed equally to this work

ARTICLE INFO

Type: Original Article
Received: 19/05/2026
Accepted: 29/09/2026

*Corresponding Author:
Sayed Hussain Amiri

E-mail address:
Amirihussain706@gmail.com

DOI:
https://doi.org/10.64444/sjbs.57

ABSTRACT

Background: Esophageal cancer (EC) represents a significant global health burden, characterized by diverse geographical and histological patterns. Esophageal and gastroesophageal junction (GEJ) cancers are poorly characterized in Afghanistan. We describe here the patient characteristics, histological distribution, and treatment response at a single center in Kabul, Afghanistan.

Methods: In this retrospective, record-based study at Nasir Pathology Laboratory, conducted from January 2024 to December 2025, 104 of 500 patients who underwent upper gastrointestinal biopsy; had histologically confirmed esophageal or GEJ carcinoma which were analyzed. Clinical, pathological, and treatment-response data were extracted from records

Results: The mean age was 59 years; 73 patients (70.2%) were male. Tumors were esophageal in 78 (75.0%) and GEJ in 26 (25.0%). Histology was squamous cell carcinoma (SCC) in 58 (55.8%), adenocarcinoma in 44 (42.3%), and other in 2 (1.9%). Substance use was recorded for 63 patients (60.6%). A favorable treatment response occurred in 50 patients (48.1%): 54.5% in adenocarcinoma and 41.4% in SCC (OR 1.70, 95% CI 0.77–3.75; P=0.231). No examined characteristic was significantly associated with tumor site or response (all P>0.05), but the study had limited power.

Conclusion: SCC was the most frequent type and adenocarcinoma a substantial minority. Substance use was frequently recorded, but without a comparison group no inference about risk is possible. The findings are descriptive, limited by the retrospective single-center design, the small sample, and incomplete documentation of tumor stage and treatment, and they require confirmation in larger studies.

Keywords: Esophageal cancer; Gastroesophageal junction cancer; Clinicopathological characteristics; Treatment response; Afghanistan

Copyright © 2026. Spinghar Journal of Biomedical Sciences, and Spinghar University-Kabul. All rights reserved.
This work is licensed under a Creative Commons Attribution-Noncommercial 4.0 International License

Introduction

Esophageal cancer is a leading cause of cancer death worldwide. GLOBOCAN estimated about 604,100 new cases and 544,100 deaths in 2020 and about 511,000 new cases and 445,000 deaths in 2022 [1, 2]. The number of deaths approaches the number of new cases, which reflects poor survival in most countries despite advances in surgery and multimodal therapy [3, 4].

Two histological types account for nearly all cases, and they differ in geography and etiology. Squamous cell carcinoma (SCC) represents roughly 85% of cases worldwide [1] and predominates in the so-called Asian (or Central Asian) esophageal cancer belt, which extends from northern Iran through Central Asia to north-central China [1, 4, 5]. Adenocarcinoma is the more frequent type in several high-income Western countries, where its incidence has risen over recent decades [6, 7]. Established risk factors also differ by type: tobacco, alcohol, very hot beverages, poor oral health, and micronutrient deficiencies for SCC [8-10], and chronic reflux, obesity, male sex, and Barrett's esophagus for adenocarcinoma [11, 12]. In northeastern Iran, a case–control study found higher SCC risk among people who used opium or tobacco [13], and environmental exposures have been examined in high-incidence African settings [14]. The two types are also biologically distinct [15].

We evaluated esophageal and gastroesophageal junction (GEJ) tumors together because the distal esophagus and proximal stomach are anatomically contiguous and the organ of origin of carcinomas at the junction can be difficult to assign. Adenocarcinomas of the junction have been classified by the position of the tumor center relative to the anatomical cardia [16], and in the eighth edition of the American Joint Committee on Cancer staging system, junctional tumors whose center lies no more than 2 cm into the gastric cardia are staged as esophageal cancers [17].

Information on esophageal cancer in Afghanistan is limited but growing. Studies from Kabul have described risk-factor profiles of patients with esophageal carcinoma, including oral snuff use and hot tea consumption [18], and a recent retrospective case series from a tertiary referral hospital described the distribution of esophageal and gastric cancers by sex, age, and histology [19]. To our knowledge, however, no report from Kabul has described esophageal and GEJ carcinomas together with their response to treatment. Descriptive information from even a single center can help to frame hypotheses and to design larger studies.

We therefore describe the demographic characteristics, recorded substance use, tumor site, histological type, and treatment response of patients with histopathologically confirmed esophageal or GEJ carcinoma at Nasir Pathology Laboratory in Kabul, Afghanistan. We also explored whether sex, age, marital status, education, and substance use were associated with tumor site, and whether sex, age, education, substance use, tumor site, and histological type were associated with treatment response. Because this is a hospital-based series without a comparison group, we did not aim to identify risk factors or to estimate incidence or temporal trends.

Materials and Methods

Study Design

This was a retrospective, single-center, record-based observational study. Data were extracted from existing medical, pathology, and oncology treatment records. The primary aims were descriptive, and comparisons of tumor site and treatment response were exploratory. The report follows the Strengthening the Reporting of Ob-

servational Studies in Epidemiology (STROBE) guideline.

Setting and study period

The study was conducted at Nasir Pathology Laboratory, Kabul, Afghanistan. Records of patients evaluated between from January 2024 to December 2025, were reviewed.

Histopathological diagnoses were made at Nasir Pathology Laboratory. Treatment, imaging, and follow-up information were obtained from Nasir Pathology Laboratory in Kabul.

Study Population

During the study period, 500 patients underwent upper gastrointestinal evaluation with biopsy at the center and formed the initial cohort. Of these, 104 (20.8%) had histopathologically confirmed esophageal or GEJ carcinoma and were included in the final analysis (Figure 1). All histopathological diagnoses were independently reviewed and verified by two pathologists.

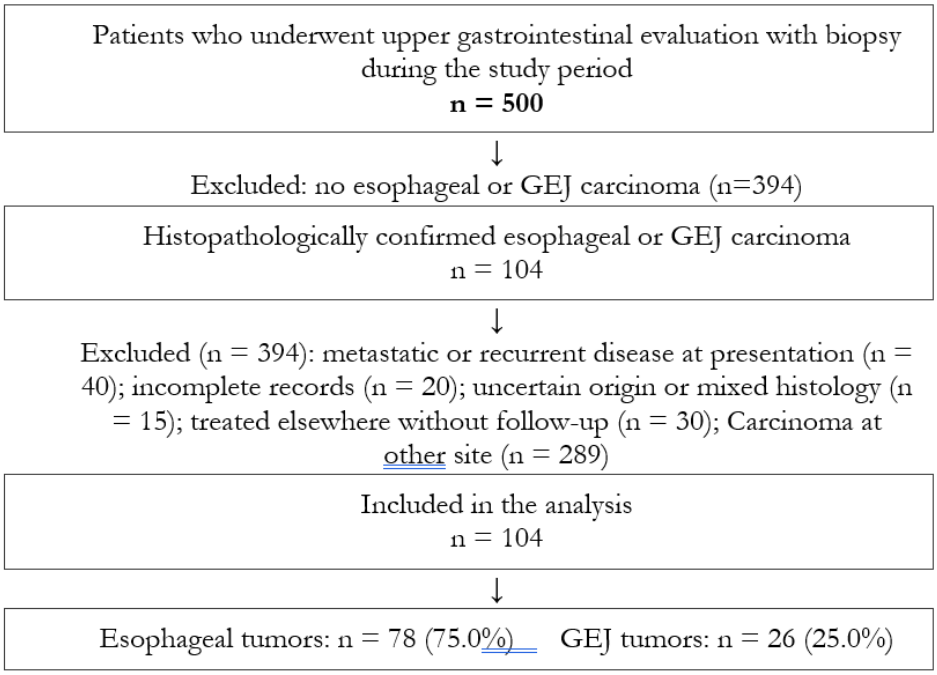


Figure 1: Flow diagram of patient selection.

Eligibility criteria

Patients were eligible if they had: histopathologically confirmed esophageal or GEJ carcinoma; age of 18 years or older at diagnosis; complete demographic, clinicopathological, and treatment data; and treatment with surgery or chemoradiation at the study center.

Patients were excluded if they had recurrent or metastatic disease at initial presentation, incomplete medical or pathology records, uncertain tumor origin or mixed histology involving adjacent organs, or treatment received outside the institution without adequate follow-up documentation.

Data collection and variable definitions

Data were abstracted retrospectively from hospital archives, pathology records, and oncology treatment logs using a standardized data-collection form. The variables were demographic (age, sex, marital status, education level), behavioral (substance use, including tobacco, alcohol, or narcotics), tumor-related (site and histological type), and treatment-related

(clinical response). Age was analyzed as a continuous variable and in two groups (<60 and ≥60 years). Education was recorded in three categories: no formal education, secondary education (up to 12th grade), and bachelor's degree or higher. Substance use was recorded as present or absent from the patient record; the type, duration, and quantity of use were not consistently documented and were not analyzed.

Tumor site, histology, and stage

Tumors were classified histologically according to the World Health Organization (WHO) Classification of Tumors, 5th edition, Digestive System Tumors [20]. Tumor site was categorized as esophageal or GEJ.

Tumor stage, histological grade, and location within the esophagus were not consistently documented in the available records and were therefore not analyzed.

Treatment response

Treatment response was assessed from follow-up imaging and clinical notes and was classified as favorable (complete or partial response) or unfavorable (stable disease or progression), applying the Response Evaluation Criteria in Solid Tumors (RECIST) version 1.1 where applicable.

Ethical considerations

The study used retrospective, de-identified records, and the requirement for individual informed consent was waived in accordance with institutional guidelines and the principles of the Declaration of Helsinki (2013 revision). Patient information was kept confidential and used only for research purposes.

Statistical analysis

Analyses were performed with IBM SPSS Statistics, version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables are presented as mean ± standard deviation (SD), and categorical variables as frequencies and percentages. Confidence intervals for proportions were calculated by the Wilson score method. We examined the association of demographic and behavioral characteristics with tumor site (esophageal vs GEJ) and, separately, with treatment response (favorable vs unfavorable); tumor site and histological type were also compared with treatment response.

For comparisons of two groups we used the two-sided Fisher's exact test, and for education, which had three categories, Pearson's chi-square test. Unadjusted ORs with 95% CIs (Woolf logit method) were calculated from the corresponding contingency tables, which gives the same ORs and Wald confidence intervals as univariable logistic regression. In Table 1 the outcome is esophageal (rather than GEJ) location, and in Table 3 it is a favorable response; the reference category of each comparison is given in the table footnotes. Estimates based on very small cell counts are described as imprecise, and no OR is reported when a cell is empty. Histological type was compared only between SCC and adenocarcinoma because two patients had other histologies. A P value below 0.05 was considered statistically significant, and P values below 0.001 are reported as $P<0.001$. Because the analyses were exploratory and the sample was small, we did not adjust for multiple comparisons or fit multivariable models, and the P values should be interpreted with caution. No formal sample size calculation was performed; all eligible patients in the study period were included.

Results

Patient selection and demographic characteristics

Of the 500 patients who underwent upper gastrointestinal evaluation with biopsy, 104 (20.8%) had histopathologically confirmed esophageal or GEJ carcinoma and were analyzed (Figure 1). The mean age was 59 years.

Sixty-eight patients (65.4%) were younger than 60 years and 36 (34.6%) were 60 years or older. A history of substance use was recorded for 63 patients (60.6%) (Table 1).

Table 1: Demographic and behavioral characteristics of the 104 patients, overall and by tumor site.

Characteristic	*Category*	*Total n (%)*	*Esophageal n (%)*	*GEJ n (%)*	*OR (95% CI)*	*P-value*
All patients		104 (100)	78 (75.0)	26 (25.0)	–	–
Sex	Male	73 (70.2)	58 (79.5)	15 (20.5)	2.13 (0.84–5.39)	0.138
	Female	31 (29.8)	20 (64.5)	11 (35.5)		
Age group (yr)	<60	68 (65.4)	52 (76.5)	16 (23.5)		
	≥60	36 (34.6)	24 (66.7)	12 (33.3)	0.62 (0.25–1.50)	0.354
Marital status	Married	95 (91.3)	70 (73.7)	25 (26.3)	0.35 (0.04–2.94)	0.444
	Single	9 (8.7)	8 (88.9)	1 (11.1)		
Substance use	Yes	63 (60.6)	48 (76.2)	15 (23.8)	1.17 (0.48–2.89)	0.818
	No	41 (39.4)	30 (73.2)	11 (26.8)		
Education	No formal education	55 (52.9)	41 (74.5)	14 (25.5)		0.767
	Secondary (up to 12th grade)	12 (11.5)	10 (83.3)	2 (16.7)	1.71 (0.33–8.76)	
	Bachelor or higher	37 (35.6)	27 (73.0)	10 (27.0)	0.92 (0.36–2.37)	

Tumor characteristics

Tumors were located in the esophagus in 78 patients (75.0%) and at the GEJ in 26 (25.0%) (Table 2). Location within the esophagus, histological grade, and tumor stage were not consistently documented in the available records and were therefore not analyzed.

Histopathological characteristics

SCC was the most frequent histological type (58 patients, 55.8%; 95% CI 46.2–64.9%), followed by adenocarcinoma (44 patients, 42.3%; 95% CI 33.3–51.9%). Two patients (1.9%) had other histologies (adenosquamous or papillary carcinoma) (Table 2). Representative gross and microscopic findings are shown in Figures 1 to 3.

Data on tumor stage, histological grade, and location within the esophagus were not consistently documented and are therefore not shown.

Table 2: Tumor and treatment characteristics of the 104 patients

Characteristic	***Category***	***n (%)***
Tumor site	Esophageal	78 (75.0)
	Gastroesophageal junction	26 (25.0)
Histological type	Squamous cell carcinoma	58 (55.8)
	Adenocarcinoma	44 (42.3)
	Other (adenosquamous or papillary)	2 (1.9)
Treatment modality	Surgery; chemoradiation; other	[n (%): insert]



Figure 1: Gross specimen of a tumor at the gastroesophageal junction, showing an irregular nodular mass that extends across the junction and involves the distal esophagus and proximal stomach

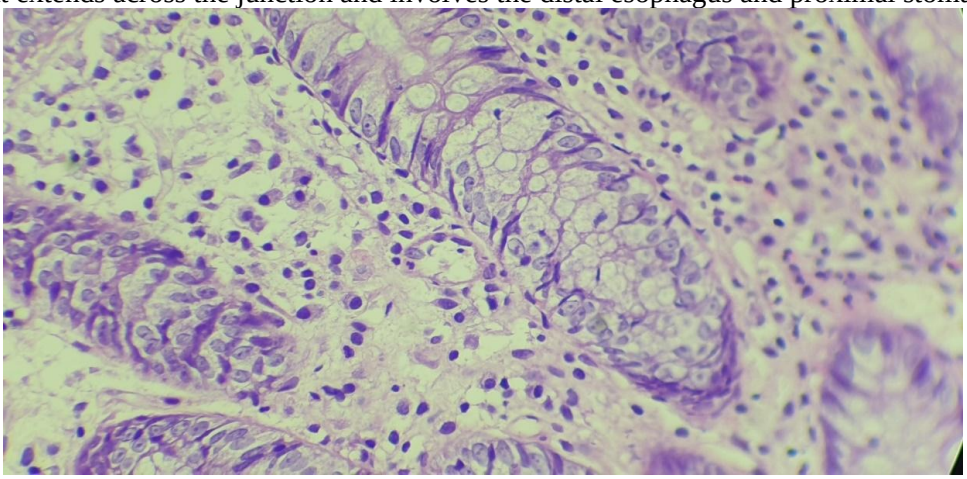


Figure 2: Adenocarcinoma of the esophagus (hematoxylin and eosin, ×40). Irregular glandular structures are lined by atypical columnar cells, in a pattern consistent with adenocarcinoma

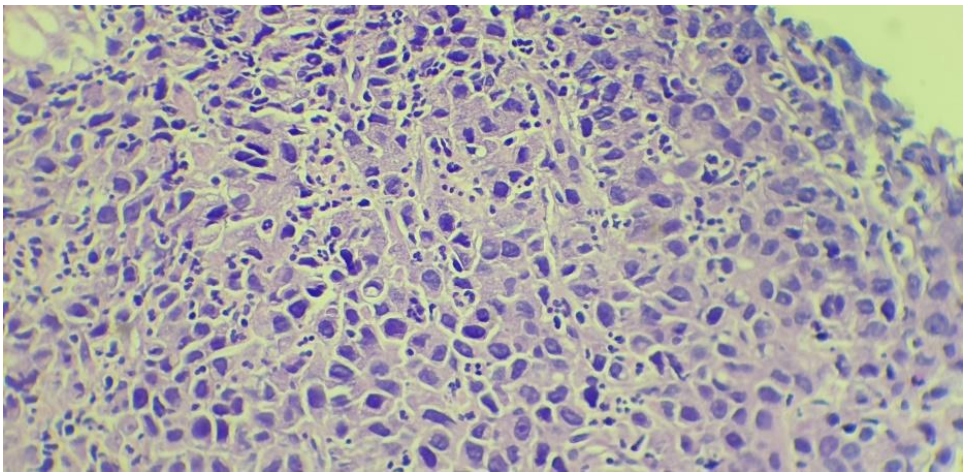


Figure 3: Squamous cell carcinoma of the esophagus (hematoxylin and eosin, ×40). Sheets of pleomorphic malignant cells are shown

Treatment response

A favorable response (complete or partial) was documented in 50 patients (48.1%; 95% CI 38.7–57.6%), and an unfavorable response (stable disease or progression) in 54 (51.9%). A favorable response was recorded in 36 of 78 patients with esophageal tumors (46.2%) and 14 of 26 with GEJ tumors (53.8%), and in 24 of 58 patients with SCC (41.4%) and 24 of 44 with adenocarcinoma (54.5%). Both patients with other histologies had a favorable response (Table 3), but two patients are too few to interpret.

Associations with tumor site and treatment response

The proportion of tumors located in the esophagus rather than at the GEJ was numerically higher in men than in women (79.5% vs 64.5; P=0.138) and in patients younger than 60 years than in older patients (76.5% vs 66.7%; OR for age ≥60 years 0.62, P=0.354). None of these differences, nor any difference by marital status, education, or substance use, was statistically significant (all P>0.05; Table 1). The confidence intervals were wide, particularly for marital status (nine single patients) and secondary education (12 patients), so these estimates are imprecise.

Treatment response was not significantly associated with any examined characteristic (all P>0.05; Table 3). The proportion with a favorable response was higher in adenocarcinoma than in SCC (54.5% vs 41.4%), but the difference was not statistically significant (P=0.231). The response did not differ significantly by tumor site (OR for esophageal vs GEJ 0.73, P=0.508) or by substance use (P=0.424).

Table 3: Treatment response according to demographic, behavioral, and tumor characteristics

Characteristic	*Category*	*Total n (%)*	*Favorable n (%)*	*Unfavorable n (%)*	*OR (95% CI)*	*P-value*
All patients		104 (100)	50 (48.1)	54 (51.9)	–	–
Sex	Male	73 (70.2)	34 (46.6)	39 (53.4)	0.82 (0.35–1.90)	0.673
	Female	31 (29.8)	16 (51.6)	15 (48.4)	-	

Age group	<60 years	68 (65.4)	34 (50.0)	34 (50.0)	-	
	≥60 years	36 (34.6)	16 (44.4)	20 (55.6)	0.80 (0.36–1.80)	0.681
Tumor site	Esophageal	78 (75.0)	36 (46.2)	42 (53.8)	0.73 (0.30–1.79)	0.508
	GEJ	26 (25.0)	14 (53.8)	12 (46.2)	-	
Histological type	Squamous cell carcinoma	58 (55.8)	24 (41.4)	34 (58.6)	-	
	Adenocarcinoma	44 (42.3)	24 (54.5)	20 (45.5)	1.70 (0.77–3.75)	0.231
	Other (adenosquamous or papillary)	2 (1.9)	2	0	Not estimable	–
Substance use	Yes	63 (60.6)	28 (44.4)	35 (55.6)	0.69 (0.31–1.52)	0.424
	No	41 (39.4)	22 (53.7)	19 (46.3)	-	
Education	No formal education	55 (52.9)	24 (43.6)	31 (56.4)	-	0.577
	Secondary (up to 12th grade)	12 (11.5)	7 (58.3)	5 (41.7)	1.81 (0.51–6.41)	
	Bachelor or higher	37 (35.6)	19 (51.4)	18 (48.6)	1.36 (0.59–3.15)	

Discussion

In this retrospective series of 104 patients with histopathologically confirmed esophageal or GEJ carcinoma at a single center in Kabul, men made up 70% of the patients, three-quarters of the tumors were esophageal, SCC was the most frequent histological type, and adenocarcinoma accounted for 42% of cases. A history of substance use was recorded for 61% of patients, and a favorable treatment response was documented in 48%. None of the demographic or behavioral characteristics we examined was significantly associated with tumor site or treatment response, but the sample was small and the confidence intervals were wide.

The male predominance and the age of our patients are in line with surveillance data from other settings, in which esophageal cancer is more frequent in men, with incidence rates two to three times higher than in women, and in middle-aged and older adults [21]. A pathology-department series of 240 esophageal cancers in Kabul reported a mean age of about 60 years and a male proportion of 71% in SCC and 78% in adenocarcinoma [22], similar to ours, whereas a case series from a referral hospital reported 53.2% men among esophageal cancers [19]. Differences in referral, case ascertainment, and access to diagnostic services between centers may contribute, but we did not examine why

men were over-represented, and we cannot assess it with these data.

SCC was the most frequent type in our series [55.8%), which fits the predominance of SCC worldwide, where it accounts for about 85% of cases [1], and in other Asian settings such as China [1, 23) and Mumbai, India (81.4% SCC) [24]. Adenocarcinoma, however, accounted for 42.3% of our patients [95% CI 33.3–51.9%), a proportion higher than the 14% of cases reported worldwide [1], the 18.6% reported from a large cancer center in Mumbai [24], and the 17.6% of esophageal cancers reported from a Kabul referral hospital [19]. A similar proportion [about 41%) was reported in a Kabul pathology series [22]. Registry data show wide differences in the balance between the two types across countries [25]. Several explanations for our finding are possible and cannot be separated with our data: the inclusion of GEJ tumors, although we did not cross-tabulate histology by site; the referral and selection patterns of the center; differences in how tumors at the junction were classified; differences in the underlying risk profile of the population; and chance, given the width of the confidence interval. In Western countries the rise in adenocarcinoma has been linked to obesity, gastroesophageal reflux, and Barrett's esophagus [6-8]. We did not measure these factors, so their role in our patients remains a hypothesis. Nor can hospital data from a single period show whether the histological distribution in Afghanistan has changed over time; that question would need population-based registry data collected over several years.

Sixty-three patients (60.6%) had a recorded history of substance use. We report this as a descriptive characteristic of the study population. Because there was no comparison group of people without cancer, the frequency of substance use among our patients cannot be taken as evidence that substance use increases cancer risk, and it cannot be compared with the general population. The type, duration, and quantity of substance use were not analyzed, and the information came from records, so misclassification of exposure is possible. Case–control studies from northeastern Iran have reported higher SCC risk among people who used opium or tobacco [13], and a case–control study in two Kabul hospitals reported higher odds of esophageal cancer with oral snuff and hot tea consumption [18]. Drinking very hot beverages has been classified by the International Agency for Research on Cancer as probably carcinogenic to humans [10]. Such findings provide context for future work in Afghanistan but cannot be extended to our data, in which oral snuff, hot tea, and other exposures were not analyzed separately. In our series, substance use was not significantly associated with tumor site or treatment response (Tables 1 and 3).

More than half of the patients (52.9%) had no formal education, and 91.3% were married. These are descriptive characteristics; interpreting them would require the sociodemographic profile of the population from which the patients came, which we did not have. Socioeconomic status has been examined as a correlate of esophageal and gastric cardia adenocarcinoma in case–control data (26], but our design does not allow us to assess it.

A favorable treatment response was documented in 48.1% of patients. Response was numerically higher in adenocarcinoma (54.5%) than in SCC (41.4%), but the difference was compatible with chance. The overall proportion should be interpreted cautiously. Patients were eligible if they had been treated with surgery or chemoradiation, so treatment was heterogeneous, and response was assessed from follow-up imaging and clinical notes, with RECIST 1.1 applied where applicable; the categories may therefore not be comparable between patients, and the timing of assessment may have varied. Information on tumor stage was not available for analysis, so we cannot say whether differences in disease extent explain the observed proportion, and we do not attribute the response to late

presentation, advanced stage, or limited access to care. Such factors have been described in other low- and middle-income settings [27, 28], but we did not measure them. Comparison with published response or survival figures is also difficult, because studies differ in design, population, tumor location, histological classification, stage, treatment regimen, and follow-up.

Limitations

First, the retrospective, record-based design depends on the completeness and accuracy of existing documentation. Tumor stage, histological grade, and treatment details were not consistently recorded, which prevented analysis of these determinants of response and precluded adjustment for them. Second, the study was done at a single center, and the findings may not be generalizable to other centers or to the wider Afghan population. Third, the cohort was drawn from 500 patients who underwent upper gastrointestinal biopsy at one center, and eligibility required complete records, treatment at the study center, and no metastatic or recurrent disease at presentation. This process may have introduced selection and referral bias, for instance by under-representing patients who were diagnosed elsewhere, who were not treated at the center, or who presented with advanced disease. The proportion of biopsied patients with cancer (20.8%) reflects this selection and cannot be read as a prevalence or incidence. Fourth, the sample was small and had limited power to detect modest associations; for example, with 58 SCC and 44 adenocarcinoma patients, the study had about 80% power (two-sided α=0.05, normal approximation) only for an absolute difference of roughly 28 percentage points in the proportion with a favorable response. Some subgroups were very small (nine single patients, 12 with secondary education, two with other histologies), which produced imprecise or non-estimable ORs. Fifth, substance use was taken from records without standardized assessment of substance type, quantity, or duration, so exposure misclassification is possible. Sixth, treatment was heterogeneous and the timing and method of response assessment may have differed between patients, which may have led to misclassification of response; in addition, RECIST 1.1 is designed for measurable disease and may not be applicable after surgery. Seventh, tumor site was not independently verified against standardized anatomical criteria, so some tumors may be misclassified as esophageal or GEJ. Finally, the observational design and the absence of a comparison group preclude causal inference, and the comparisons were exploratory and unadjusted for multiple testing.

Conclusion

This retrospective, single-center series provides hospital-based descriptive information on the clinicopathological characteristics and treatment response of 104 patients with esophageal or GEJ carcinoma in Kabul. SCC was the most frequent histological type, adenocarcinoma accounted for a substantial minority of cases, and a favorable treatment response was documented in about half of the patients. Substance use was frequently recorded, but the study design does not allow conclusions about its role in causing cancer. No examined characteristic was significantly associated with tumor site or treatment response, although the study had limited power. These findings should be confirmed in larger studies.

Funding

This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Ethical consideration

This retrospective study used de-identified records and was conducted in accordance with the

principles of the Declaration of Helsinki (2013 revision).

Acknowledgments

The authors thank the staff of Nasir Pathology Laboratory, Kabul, and the two pathologists who independently reviewed the histopathological diagnoses, for their support. Claude (Sonnet 5.5; Anthropic) was used solely to assist with translation and the correction of spelling and grammar. It was not used to generate scientific content, ideas, data, analyses, or interpretations. All scientific content, ideas, and conclusions presented in this manuscript are the authors' own.

Conflicts of interest

The authors declare no conflicts of interest, financial or otherwise, that could have influenced the work reported in this study.

Reference

1. Morgan E, Soerjomataram I, Rumgay H, Coleman HG, Thrift AP, Vignat J, et al. The global landscape of esophageal squamous cell carcinoma and esophageal adenocarcinoma incidence and mortality in 2020 and projections to 2040: new estimates from GLOBOCAN 2020. Gastroenterology. 2022;163(3):649-58. e2.
2. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2024;74(3):229-63.
3. Fan J, Liu Z, Mao X, Tong X, Zhang T, Suo C, et al. Global trends in the incidence and mortality of esophageal cancer from 1990 to 2017. Cancer Med. 2020;9(18):6875-87.
4. Li J, Xu J, Zheng Y, Gao Y, He S, Li H, et al. Esophageal cancer: Epidemiology, risk factors and screening. Chinese J Cancer Res. 2021;33(5):535.
5. Zhang C, Chen L, Xiu Y, Zhang H, Zhang Y, Ying W. Burden of esophageal cancer in global, regional and national regions from 1990 to 2021 and its projection until 2050: results from the GBD study 2021. Front Oncol. 2025;14:1518567.
6. Trivers KF, Sabatino SA, Stewart SL. Trends in esophageal cancer incidence by histology, United States, 1998–2003. Int J Cancer. 2008;123(6):1422-8.
7. Cattelan L, Ghazawi FM, Le M, Lagacé F, Savin E, Zubarev A, et al. Epidemiologic trends and geographic distribution of esophageal cancer in Canada: a national population-based study. Cancer Med. 2020;9(1):401-17.
8. Zhang Y. Epidemiology of esophageal cancer. World J Gastroenterol. 2013;19(34):5598.
9. Schaafsma T, Wakefield J, Hanisch R, Bray F, Schüz J, Joy EJ, et al. Africa's oesophageal cancer corridor: geographic variations in incidence correlate with certain micronutrient deficiencies. PloS One. 2015;10(10):e0140107.
10. Loomis D, Guyton KZ, Grosse Y, Lauby-Secretan B, El Ghissassi F, Bouvard V, et al. Carcinogenicity of drinking coffee, mate, and very hot beverages. Lancet Oncol. 2016;17(7):877-8.
11. Hvid-Jensen F, Pedersen L, Drewes AM, Sørensen HT, Funch-Jensen P. Incidence of adenocarcinoma among patients with Barrett's esophagus. N Eng J Med. 2011;365(15):1375-83.
12. Melhado RE, Alderson D, Tucker O. The changing face of esophageal cancer. Cancers. 2010;2(3):1379-404.
13. Nasrollahzadeh D, Kamangar F, Aghcheli K, Sotoudeh M, Islami F, Abnet C, et al. Opium, tobacco, and alcohol use in relation to oesophageal squamous cell carcinoma in a high-risk area of Iran. Br J Cancer. 2008;98(11):1857-63.
14. Mlombe Y, Rosenberg N, Wolf L, Dzamalala C, Chalulu K, Chisi J, et al. Environmental risk factors for oesophageal cancer in Malawi: A case-control study. Malawi Med J. 2015;27(3):88.
15. Talukdar FR, di Pietro M, Secrier M, Moehler M, Goepfert K, Lima SSC, et al. Molecular landscape of esophageal cancer: implications for early detection and personalized therapy. Annals

of the New York Academy of Sciences. 2018;1434(1):342-59.
16. Siewert J, Stein H. Classification of adenocarcinoma of the oesophagogastric junction. Br J Surg. 1998;85(11):1457.
17. Rice TW, Ishwaran H, Ferguson MK, Blackstone EH, Goldstraw P. Cancer of the esophagus and esophagogastric junction: an eighth edition staging primer. J Thoracic Oncol. 2017;12(1):36-42.
18. Saadaat R, Abdul-Ghafar J, Haidary AM, Atta N, Ali TS. Esophageal carcinoma and associated risk factors: A case-control study in two tertiary care hospitals of Kabul, Afghanistan. Cancer Manag Res. 2022:2445-56.
19. Tawakoli MF, Salihee H, Rahmati A, Hatami MN. Hospital-based patterns of esophageal and gastric cancer cases at a major tertiary referral center in Kabul, Afghanistan: a retrospective case series. BMC Cancer. 2026.
20. Steliarova-Foucher E, Colombet M, Ries LA, Rous B, Stiller CA. Classification of tumours. International Incidence Childhood Cancer. 2017;3:31-6.
21. Then EO, Lopez M, Saleem S, Gayam V, Sunkara T, Culliford A, et al. Esophageal cancer: an updated surveillance epidemiology and end results database analysis. World J Oncol. 2020;11(2):55.
22. Saadaat R, Abdul-Ghafar J, Hanifi AN, Khalid S, Khairy AL, Ibrahimkhil AS, et al. Risk factors associated with esophageal cancers, diagnosed at tertiary level in Afghanistan: a descriptive cross-sectional study. BMC Cancer. 2022;22(1):1112.
23. Liang H, Fan J-H, Qiao Y-L. Epidemiology, etiology, and prevention of esophageal squamous cell carcinoma in China. Cancer Biol Med. 2017;14(1):33-41.
24. Noronha V, Sekar A, Rajendra A, Mokal S, Patil V, Menon N, et al. Epidemiological trend of esophageal cancer at a tertiary cancer center in Mumbai, India, over the past 15 years. J Gastrointest Cancer. 2023;54(3):903-12.
25. Huang J, Koulaouzidis A, Marlicz W, Lok V, Chu C, Ngai CH, et al. Global burden, risk factors, and trends of esophageal cancer: an analysis of cancer registries from 48 countries. Cancers. 2021;13(1):141.
26. Gammon MD, Ahsan H, Schoenberg JB, West AB, Rotterdam H, Niwa S, et al. Tobacco, Alcohol, and Socioeconomic Status and Adenocarcinomas of the Esophagus and Gastric Cardia. J Nati Cancer Inst. 1997;89(17):1277-84.
27. Esther N, Julius S, Deogratius MA. Understanding health-seeking and adherence to treatment by patients with esophageal cancer at the Uganda cancer Institute: a qualitative study. BMC Health Serv Res. 2021;21(1):159.
28. Hassen HY, Teka MA, Addisse A. Survival Status of Esophageal Cancer Patients and its Determinants in Ethiopia: A Facility Based Retrospective Cohort Study. Front Oncol. 2020;10:594342.