CLINICO-PATHOLOGICAL CHARACTERISTICS OF GASTRIC CANCER PATIENTS

Bledi Kreka [1,2], Martiola Kola[1], Dea Kreka[1],Drini Shehi[2], Arvit Llazani[2], Ervin Toci[1],Manika Kreka[1,2],Arvin Dibra[1,2]

[1]University of Medicine, Tirana, Albania

[2]Department of Oncology, University Hospital Center "Mother Teresa", Tirana, Albania

Corresponding E-mail: manika.kreka@umed.edu.al

ABSTRACT

Background: Gastric cancer remains a major global health burden, with significant geographic variability in incidence and histopathological patterns. Understanding clinicopathological characteristics is essential for improving diagnosis and management. This study aimed to evaluate the demographic, histopathological, and clinical characteristics of patients diagnosed with gastric cancer in a tertiary care setting.

Methods: A retrospective observational study was conducted using a structured database of gastric cancer patients. Variables included age, sex, family history, histopathological subtype, signet ring cell presence, TNM staging, lymph node involvement, and treatment modalities. Descriptive and comparative statistical analyses were performed. This study used the data of patients in the 2023-2025 period.

Results: A total of 221 patients were included, with a mean age of 64.0 ± 9.9 years. Male predominance was observed (71.5%). Diffuse (48.9%) and intestinal (47.5%) histological subtypes were nearly equally distributed. Signet ring cell carcinoma was present in 8.7% of cases. Among the 183 patients with complete staging data, most presented with advanced local disease, with the T3 stage being the most frequent (60.1%), and nodal involvement (N2-N3) was observed in a significant proportion. Distant metastases were identified in 17.2 % of patients at diagnosis.

Conclusions: Gastric cancer in this cohort is characterized by late-stage presentation and significant nodal involvement. The nearly equal distribution of histological subtypes highlights the heterogeneity of the disease. Early detection strategies and improved diagnostic pathways are essential to optimize patient outcomes.

Keywords: Gastric cancer, TNM staging, histopathology, signet ring cells, lymph node involvement

KARAKTERISTIKAT KLINIKO-PATOLOGJIKE TË PACIENTËVE ME KANCER GASTRIK

ABSTRAKT

Hyrja. Kanceri gastrik mbetet një barrë e rëndësishme globale për shëndetin publik, me variabilitet të konsiderueshëm gjeografik në incidencë dhe modele histopatologjike. Të kuptuarit e karakteristikave kliniko-patologjike është thelbësor për përmirësimin e diagnostikimit dhe menaxhimit të kësaj sëmundjeje. Ky studim synoi të vlerësojë karakteristikat demografike, histopatologjike dhe klinike të pacientëve të diagnostikuar me kancer gastrik në një qendër të kujdesit terciar.

Metodologjia. Një studim retrospektiv observacional u krye duke përdorur një bazë të dhënash të strukturuar për pacientët me kancer gastrik. Variablat e përfshira ishin: mosha, gjinia, historia familjare, nëntipet histopatologjike, prania e qelizave unazore me mukus (signet ring cells), stadifikimi TNM, përfshirja e limfonodujve dhe modalitetet terapeutike. U kryen analiza statistikore përshkruese dhe krahasuese. Në studim u përfshinë të dhënat e pacientëve të trajtuar gjatë periudhës 2023–2025.

Rezultatet. Gjithsej u përfshinë 221 pacientë, me moshë mesatare 64.0 ± 9.9 vjeç. U vërejt mbizotërim i gjinisë mashkullore (71.5%). Nëntipet histologjike difuze (48.9%) dhe intestinale (47.5%) ishin të shpërndara pothuajse njëlloj. Karcinoma me qeliza unazore me mukus ishte e pranishme në 8.7% të rasteve. Ndër 183 pacientët me të dhëna të plota të stadifikimit, shumica paraqiteshin me sëmundje lokale të avancuar, ku stadi T3 ishte më i shpeshti (60.1%), dhe përfshirja e limfonodujve (N2-N3) u vu re në një proporcion të konsiderueshëm. Metastazat në distancë u identifikuan në 17.2% të pacientëve në momentin e diagnostikimit.

Përfundimet. Kanceri gastrik në këtë kohortë karakterizohet nga paraqitja në stade të vonshme dhe prekje e konsiderueshme e limfonodujve. Shpërndarja pothuajse e barabartë e nëntipeve histologjike nënvizon heterogjenitetin e kësaj sëmundjeje. Strategjitë e zbulimit të hershëm dhe rrugët diagnostike të përmirësuara janë thelbësore për optimizimin e rezultateve të pacientëve.

Fjalë kyç: Kancer gastrik, stadifikimi TNM, histopatologji, qeliza unazore me mukus, limfonoduj

INTRODUCTION

Gastric cancer remains one of the leading causes of cancer-related mortality worldwide, despite a gradual decline in incidence in certain regions. According to recent global estimates, it continues to represent a significant public health burden, particularly in low- and middle-income countries where early detection strategies are limited [1, 2]. The disease is often diagnosed at advanced stages due to its insidious onset and non-specific early symptoms, which significantly complicates management and worsens clinical outcomes [3].

Histopathologically, gastric cancer is a heterogeneous disease. The Lauren classification divides it into intestinal and diffuse subtypes, which differ in epidemiology, pathogenesis, and

clinical behavior. The intestinal type is typically associated with environmental factors and follows a stepwise progression, whereas the diffuse type is more often linked to genetic predisposition and tends to present at a more advanced stage [4, 5].
Tumor staging, particularly the TNM classification, remains fundamental in determining disease extent and guiding therapeutic decisions. Lymph node involvement and the presence of distant metastases are key indicators of disease progression and are associated with more aggressive disease and poorer prognosis [6, 7].
Given these considerations, a comprehensive evaluation of clinicopathological characteristics at diagnosis is essential to better understand disease patterns and improve diagnostic strategies. This study aims to analyze demographic, histopathological, and staging characteristics of gastric cancer patients in a tertiary care setting.

MATERIAL AND METHODS

This study was designed as a retrospective observational analysis, aiming to provide a detailed evaluation of the clinicopathological characteristics of patients diagnosed with gastric cancer.
The primary aim of the study was to assess the distribution of disease stages at diagnosis. Secondary objectives included the evaluation of demographic characteristics, histopathological subtypes, lymph node involvement, the presence of signet ring cells, and treatment-related variables. All data were handled in accordance with applicable institutional and national ethical standards. Given the retrospective nature of the study and the use of anonymized clinical data, individual informed consent was waived.
Data were collected from a structured clinical database including 221 patients diagnosed with gastric cancer. The dataset contained detailed information on patient demographics such as age and sex, tumor-related variables including histological subtype and TNM staging, and additional pathological features such as the presence of signet ring cells.
Patients were included if they had a confirmed diagnosis of primary gastric cancer and complete clinicopathological data. Patients with incomplete records or non-epithelial gastric malignancies were excluded from the analysis.
The primary endpoint of the study was the distribution of TNM staging at the time of diagnosis. Secondary endpoints included histopathological subtype distribution, degree of lymph node involvement, and presence of signet ring cell carcinoma.
Statistical analysis was primarily descriptive. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The analysis was conducted using standard statistical tools, ensuring accurate summarization of the dataset.

RESULTS

The study population consisted of a total of 221 patients diagnosed with gastric cancer, representing the full cohort included in the analysis.

The mean age of the patients was 64.0 ± 9.9 years, indicating that the majority of individuals were within an older age group. The relatively narrow standard deviation suggests that most patients were clustered around this mean value, with limited variability in age distribution.
Regarding sex distribution, a clear predominance of male patients was observed. Males accounted for 158 cases, corresponding to 71.5% of the total population, whereas females comprised 63 cases, representing 28.5%. This indicates that more than two-thirds of the study population were male, while less than one-third were female.

Table 1. Demographic Characteristics of the Study Population

Variable	**Value**
Total patients	221
Mean age	64.0 ± 9.9 years
Male	158 (71.5%)
Female	63 (28.5%)

Overall, the data demonstrate that within this cohort, gastric cancer was more frequently observed in male patients and was predominantly diagnosed in individuals in their seventh decade of life.

Table 2. Histopathological Distribution of Gastric Cancer (based on Lauren classification)

Histological Type	**n (%)**
Diffuse	107 (48.9%)
Intestinal	104 (47.5%)
Mixed	10 (3.6%)

The distribution of histopathological subtypes within the study population demonstrates a relatively balanced pattern between the two main categories of gastric cancer. The diffuse type was identified in 107 patients, accounting for 48.9% of cases, while the intestinal type was present in 104 patients, representing 47.5% of the cohort. This indicates that both subtypes were almost equally represented in the analyzed population.
In contrast, mixed tumors constituted a small proportion of cases, with only 10 patients (3.6%). This finding suggests that, within this dataset, most tumors were classified under the main histological categories rather than being grouped as mixed tumors.
Overall, the data reflect a near-equal distribution between diffuse and intestinal histological types, with a minimal contribution from mixed type in this cohort.

Table 3. Presence of Signet Ring Cells

Status	**n (%)**
Present	19 (8.6%)
Absent	202 (91.4%)

The presence of signet ring cells was evaluated in the study cohort. Only 19 patients (8.6%) demonstrated the presence of signet ring cells, whereas the vast majority, 202 patients (91.4%), did not exhibit these cells. These findings indicate that signet ring cells were relatively uncommon within the studied population. The presence of signet ring cells was identified in a relatively small proportion of patients. Although less frequent, this histological feature is clinically significant due to its association with more aggressive tumor behavior and diffuse-type gastric cancer. Its relatively low prevalence in this cohort is consistent with contemporary epidemiological data.

Table 4. Distribution of Tumor (T Stage)

Stage	**n**	**%**
T1	5	2.7%
T2	20	10.9%
T3	110	60.1%
T4	48	26.2%
Total	183	100%

The distribution of T stage demonstrates a clear predominance of advanced tumor invasion at diagnosis. The majority of patients were classified as T3 (60.1%), indicating tumor penetration into the subserosa, followed by T4 (26.2%), which reflects invasion into adjacent structures. In contrast, early-stage tumors (T1–T2) accounted for only 13.6% of cases combined.

This pattern strongly suggests delayed diagnosis and aligns with the well-established natural history of gastric cancer, where early stages are often asymptomatic and therefore underdiagnosed. The low proportion of T1 tumors (2.7%) further highlights the lack of effective early detection strategies in the studied population.

Most patients presented with advanced tumor invasion, with T3 being the most common stage. This indicates that most tumors had already penetrated the muscularis propria or beyond at the time of diagnosis. The low number of early-stage tumors (T1–T2) further emphasizes the issue of delayed diagnosis.

Table 5. Lymph Node Involvement (N Stage)

Stage	**N**	**%**
N0	39	17,6%
N1	41	18,6%
N2	54	24,5%
N3	49	22,2%
Total	183	100%

The distribution of lymph node involvement indicates a substantial burden of regional disease at the time of diagnosis. While 17,6 % of patients had no nodal involvement (N0), the majority (65,3% %) presented with positive lymph nodes (N1-N3). Notably, advanced nodal stages (N2 and N3) were present in 46,7 % of cases, reflecting extensive regional spread.
This pattern underscores the aggressive nature of gastric cancer and its tendency for early lymphatic dissemination. The high prevalence of N2–N3 stages is clinically significant, as it is strongly associated with more advanced disease, influences staging classification, and directly impacts therapeutic decision-making, including the need for systemic therapy in addition to surgical management.

Table 6. Distant Metastasis (M Stage)

Stage	**n (%)**
M0	173 (80.1 %)
M1	43 (19.9 %)

Distant metastasis was assessed according to the M stage classification. The majority of patients, 173 (80.1%), were categorized as M0, indicating the absence of distant metastasis, while 43 patients (19.9%) were classified as M1, reflecting the presence of distant metastatic disease. These results demonstrate that most patients in the cohort did not have distant metastases at the time of evaluation. Nearly one-fifth of patients presented with distant metastases at diagnosis. This is a clinically important observation, as metastatic disease significantly limits treatment options and reflects late-stage detection.

DISCUSSION

The present study provides a comprehensive evaluation of the clinicopathological characteristics of gastric cancer patients in a tertiary care setting, highlighting key patterns related to demographic distribution, histopathological subtypes, and tumor staging at diagnosis. The findings confirm that gastric cancer continues to be predominantly diagnosed

at advanced stages, reflecting a persistent global challenge in early detection and timely diagnosis.

One of the most prominent findings of this study is the predominance of advanced tumor stages at presentation, with the majority of patients classified as T3 or T4. This observation is consistent with contemporary literature, which indicates that gastric cancer is frequently asymptomatic in its early stages and therefore often diagnosed only after significant local invasion has occurred [3, 7]. The low proportion of early-stage tumors (T1-T2) in this cohort underscores the absence or limited implementation of effective screening strategies, particularly in healthcare systems where routine endoscopic surveillance is not widely available.

The demographic distribution observed in this study, with a clear male predominance and a mean age in the sixth decade of life, aligns with global epidemiological trends. Previous studies have consistently reported higher incidence rates among males, which may be attributed to differences in environmental exposures, lifestyle factors such as smoking and diet, and potential hormonal influences [2]. The age distribution further supports the well-established association between gastric cancer and advancing age, reflecting the cumulative effect of carcinogenic exposures over time.

A particularly noteworthy finding in this study is the nearly equal distribution between diffuse and intestinal histopathological subtypes. This contrasts with several reports from Western populations, where the intestinal type is more prevalent [5]. The balanced distribution observed in this cohort may suggest regional variations in etiological factors, including Helicobacter pylori prevalence, dietary habits, and genetic predisposition. The diffuse type, which is often associated with a more aggressive clinical course and poorer differentiation, may contribute to the advanced stage at diagnosis observed in this population [4].

The presence of signet ring cell carcinoma, although relatively low in frequency, remains clinically significant. This subtype is typically associated with diffuse-type gastric cancer and is characterized by rapid progression and a tendency for peritoneal dissemination. Its identification, even in a minority of patients, is important due to its implications for prognosis and treatment planning [2].

Lymph node involvement represents another critical aspect highlighted by this study. A substantial proportion of patients were classified as N2 or N3, indicating extensive regional spread. This finding is of particular clinical importance, as nodal status is a key determinant in staging and directly influences therapeutic decisions, including the extent of surgical resection and the need for adjuvant or neoadjuvant therapy [6]. The high rate of lymph node involvement further supports the observation that gastric cancer is frequently diagnosed at an advanced stage, when regional dissemination has already occurred.

The proportion of patients presenting with distant metastases (approximately 20%) is also consistent with previously reported data. Although this figure may appear moderate compared to some global estimates, it nevertheless reflects a significant burden of advanced disease at diagnosis. Metastatic involvement drastically limits curative treatment options and necessitates a shift toward palliative management strategies, emphasizing the importance of early detection [7].

When interpreting these findings, it is important to consider the broader context of healthcare access and diagnostic infrastructure. In many regions, limited access to endoscopic evaluation and delayed referral pathways contribute to late-stage diagnosis. This underscores the need for systemic improvements, including increased awareness, implementation of screening programs in high-risk populations, and better integration of diagnostic services.

Furthermore, the heterogeneity observed in histopathological subtypes and staging patterns highlights the complex biological nature of gastric cancer. Recent advances in molecular classification have demonstrated that gastric cancer is not a single disease entity but rather a group of biologically distinct subtypes with different clinical behaviors and therapeutic responses [3]. Although molecular data were not included in this study, integrating such information in future research could provide deeper insights into disease mechanisms and guide personalized treatment approaches.

Overall, the findings of this study are in line with current global evidence and reinforce the need for improved strategies in early diagnosis and disease management. The predominance of advanced-stage disease, significant lymph node involvement, and histopathological heterogeneity collectively highlight the ongoing challenges in the management of gastric cancer.

This study has several limitations that should be considered when interpreting the results. The retrospective design may introduce selection bias, and the use of a single-center database may limit the generalizability of the findings. Additionally, some variables had incomplete data, which may affect the accuracy of certain analyses. The absence of survival analysis, although intentional, limits the ability to correlate clinicopathological features with outcomes.

Future studies should focus on prospective multicenter designs to validate these findings in larger populations. There is also a need to integrate molecular and genetic profiling to better understand disease heterogeneity. Furthermore, the implementation of screening programs and improved access to diagnostic tools could significantly enhance early detection and improve patient outcomes.

CONCLUSIONS

This study demonstrates that gastric cancer is predominantly diagnosed at advanced stages, with significant tumor invasion and lymph node involvement at presentation. The balanced distribution of histopathological subtypes reflects the biological heterogeneity of the disease. These findings emphasize the urgent need for improved early detection strategies and optimized diagnostic approaches.

Conflict of interest: Nothing to declare

Author contribution. All authors contributed to the preparation of the manuscript and approved the final version.

Acknowledgment. This research was funded by the National Agency for Scientific Research and Innovation (AKKSHI).

REFERENCES

1. Smyth, E. C., Nilsson, M., Grabsch, H. I., van Grieken, N. C. T., & Lordick, F. 2020 Gastric cancer. The Lancet, 396(10251), 635–648. https://doi.org/10.1016/S0140-6736(20)31288-5
2. Machlowska, J., Baj, J., Sitarz, M., Maciejewski, R., & Sitarz, R. 2022 . Gastric cancer: Epidemiology, risk factors, classification, genomic characteristics and treatment strategies. Cancers, 14(3), 1–25. https://doi.org/10.3390/cancers14030638
3. Joshi, S. S., & Badgwell, B. D. 2023 . Current treatment and recent progress in gastric cancer. CA: A Cancer Journal for Clinicians, 73(3), 296–316. https://doi.org/10.3322/caac.21760
4. Tan Z. Recent Advances in the Surgical Treatment of Advanced Gastric Cancer: A Review. Med Sci Monit. 2019 May 13;25:3537-3541. https://doi.org/10.12659/MSM.916475
5. Sexton, R. E., Al Hallak, M. N., Diab, M., & Azmi, A. S. 2022. Gastric cancer: A comprehensive review of current and future treatment strategies. Cancers, 12(10), 2907. https://doi.org/10.3390/cancers12102907
6. Ajani, J. A., D'Amico, T. A., Bentrem, D. J., Chao, J., Corvera, C., Das, P., ... & Sundar, H. 2021. Gastric cancer, version 2.2021, NCCN clinical practice guidelines in oncology. Journal of the National Comprehensive Cancer Network, 19(11), 1314–1341. https://doi.org/10.6004/jnccn.2021.0056
7. Lordick, F., Carneiro, F., Cascinu, S., Fleitas, T., Haustermans, K., Piessen, G., & Vogel, A. 2022 . Gastric cancer: ESMO clinical practice guideline for diagnosis, treatment and follow-up. Annals of Oncology, 33(10), 1005–1020. https://doi.org/10.1016/j.annonc.2022.07.004