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Clinicopathological Profile and Prognostic Factors of Advanced Disease in Patients with Gastric Carcinoma

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Abstract **Original Research Article**

Background: Gastric carcinoma is a major cause of cancer-related morbidity and mortality worldwide. Identification of clinicopathological features and prognostic factors is crucial for early detection and management of advanced disease. This study aimed to assess the clinical features, pathological characteristics, and prognostic factors in patients with gastric cancer who were treated surgically. ***Methods:*** This cross-sectional observational study was conducted in the Department of General Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from January 2023 to December 2023. This study included 28 patients with gastric carcinoma who underwent gastric surgery in the Department of General Surgery at BSMMU. ***Results:*** The mean age was 53.9 ± 13.1 years, with males comprising 71.4% of the study. The most common presenting symptom was weight loss (71.4%), followed by loss of appetite (53.6%) and abdominal pain (42.9%). Subtotal gastrectomy was the most common procedure (57.1%), and peritoneal cytology was positive in 17.9% of patients. Endoscopic Grade II and III tumors predominated (53.6% and 39.3%, respectively), while histopathological Grade III was most frequent (52.4%). Advanced T stage (T3/T4) was observed in 64.3% of patients, lymph node involvement (N1–N3) in 50.0%, and positive peritoneal cytology in 17.9%, indicating key prognostic factors. ***Conclusion:*** Advanced gastric carcinoma in this study was characterized by predominant male patients, antral tumor location, and high frequency of advanced T and N stages. Peritoneal cytology positivity was low and not significantly associated with tumor grade or stage.

Keywords: Gastric carcinoma, Clinicopathological profile, Prognostic factors, Tumor staging, Peritoneal cytology.

INTRODUCTION

Gastric cancer (GC) remains one of the most prevalent and deadly gastrointestinal malignancies worldwide. According to global cancer data from 2020, GC ranks fifth in incidence and fourth in cancer-related mortality [1,2]. Although its overall incidence has declined markedly in recent decades, it continues to pose a significant health burden, particularly in Southeast Asian countries where rates remain comparatively high [1,2]. Gastric cancer most commonly affects middle-aged and elderly individuals, typically between 50 and 70 years of age [3]. More than 95% of new cases occur in patients over 40 years old [4], leading to relatively little focus on younger patients. Despite the gradual global decline in incidence, GC still represents the fourth most common cancer and the second leading cause of cancer-related death worldwide, accounting for approximately 10.4% of all cancer deaths [5]. Each year, around 900,000 new cases are diagnosed and 700,000 deaths occur due to GC, with more than 70% of these cases reported in developing countries [6].

Gastric cancer is believed to result from a complex interplay of environmental exposures and genetic alterations that accumulate over time, predominantly affecting older individuals following chronic atrophic gastritis. Among environmental risk factors, *Helicobacter pylori* infection is the most significant, representing the single most common cause of gastric cancer and classified by the World Health

Organization as a Group I carcinogen [7,8]. The prevalence of infection varies by age, geography, and ethnicity, yet approximately 15–20% of infected individuals develop gastric or duodenal ulcer disease, and fewer than 1% progress to gastric adenocarcinoma [9]. The host's genetic background influences the response to *H. pylori* infection and determines the resulting pattern of gastritis [10]. Multifocal atrophic gastritis, often accompanied by intestinal metaplasia, can progress to dysplasia and subsequently to carcinoma, making intestinal metaplasia a key morphological marker of gastric cancer risk. In contrast, the diffuse type of gastric carcinoma tends to arise directly from chronic inflammation without progressing through these intermediate stages [11].

Younger patients with gastric cancer often display distinct clinicopathological characteristics compared to older individuals. Studies have shown a higher proportion of female patients among younger cases, along with more aggressive biological behavior, including poorly differentiated histology, perineural invasion, lymph node metastasis, and advanced tumor stage at diagnosis [12–14]. These findings suggest a unique biological profile in younger patients, potentially contributing to their poorer outcomes. However, the prognostic implications of young-onset gastric cancer remain controversial: while some studies report better survival outcomes compared to older patients, others have found no significant age-based difference in prognosis [15–18].

A prognostic factor is defined as a clinical or biological characteristic that can be objectively measured to provide information about the likely disease outcome in the absence of treatment [19]. Identifying reliable prognostic markers helps to recognize patients at higher risk for metastasis and tailor adjuvant therapy accordingly. Currently, the prognosis and treatment strategies for gastric cancer primarily rely on clinicopathological staging, with the TNM classification remaining the gold standard for predicting survival outcomes. Nevertheless, survival often varies considerably among patients with the same tumor stage, suggesting that staging alone cannot fully predict prognosis [20]. Previous studies have demonstrated that several variables, such as age at diagnosis, gender, preoperative hemoglobin and albumin levels, tumor localization and size, histological differentiation, type of surgery, lymph node involvement, lymph node ratio, and presence of distant metastasis, significantly influence overall survival in gastric cancer patients [20].

In this study, we aimed to assess the clinical features, pathological characteristics, and prognostic factors in patients with gastric cancer who were treated surgically.

METHODOLOGY & MATERIALS

This cross-sectional observational study was conducted in the Department of General Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from January 2023 to December 2023. In this study, we included 28 patients with gastric carcinoma who underwent gastric surgery in the Department of General Surgery at BSMMU.

These were the following criteria for eligibility as study participants:

Inclusion Criteria

- Patients diagnosed with gastric carcinoma, irrespective of age and sex.
- Patients who underwent surgical intervention (curative or palliative).

Exclusion Criteria

- Patients with recurrent gastric cancer or previous gastric surgery.
- Patients who received neoadjuvant chemotherapy or radiotherapy before surgery.
- Patients who were not willing to participate in the study.

Data Collection Procedure:

All patients with carcinoma of the stomach who met the inclusion criteria and underwent surgery during this period were enrolled in the study. Informed written consent was obtained from the study participants. Data were collected using a structured data sheet. Variables included demographic details (age, sex), clinical presentation, endoscopic findings, CT scan reports, type of surgical procedure, peritoneal cytology, per-operative observations, and histopathological grading. Tumor staging was performed according to the TNM classification.

Surgical Procedure:

During surgery, following thorough exploration of the abdominal cavity, 100 mL of sterile normal saline was instilled into the peritoneal cavity. After gentle agitation for approximately five minutes, 50 mL of peritoneal lavage fluid was aspirated and collected for cytological examination. In patients with pre-existing ascites, 50 mL of ascitic fluid was collected directly for cytological analysis, without performing lavage. The operability of the tumour was determined intraoperatively by the attending surgeon based on the extent of local invasion, nodal involvement, and presence of distant metastasis. Depending on the findings, the appropriate surgical procedure, such as subtotal or total gastrectomy, palliative gastrojejunostomy, feeding jejunostomy, or diagnostic laparoscopy, was performed. All intraoperative observations, including tumour location, local spread, lymph node status, and presence of ascites, were meticulously recorded. The resected specimens were sent for histopathological examination, and the peritoneal cytology results were documented for all

patients. Among the 28 patients included in this study, gastrectomy could not be performed in seven cases due to unresectable or advanced disease; consequently, histopathology reports were unavailable for these patients. All collected data were reviewed, checked, and validated for completeness and accuracy before analysis.

Statistical Analysis:

Descriptive statistics were expressed as frequency and percentage for categorical variables and mean ± standard deviation (SD) for continuous variables. Associations between categorical variables were assessed using the Chi-square test. A p-value of <0.05 was considered statistically significant. Statistical analysis was performed by using SPSS 26 (Statistical Package for Social Sciences). This study was ethically approved by the Institutional Review Board of Bangabandhu Sheikh Mujib Medical University (BSMMU).

RESULTS

Table 1: Distribution of Study Participants by Age, Sex and Clinical presentation (n = 28)

Age	**Number**	**Percentage (%)**
≤30 years	1	3.6
31–40 years	4	14.3
41–50 years	5	17.9
51–60 years	10	35.7
>60 years	8	28.6
Mean (±SD)	53.89 ± 13.11	
Sex		
Male	20	71.4
Female	8	28.6
Clinical Presentation		
Weight loss	20	71.4
Abdominal pain	12	42.9
Vomiting	12	42.9
Loss of appetite	15	53.6
Hematemesis	5	17.9
Melena	5	17.9

Table 1 presents the distribution of study participants (n = 28) according to age, sex and clinical presentation. The majority of participants were aged 51–60 years (35.7%) and over 60 years (28.6%), with a mean age of 53.89 ± 13.11 years. Male participants predominated, comprising 71.4% of the study population, while females accounted for 28.6%. The most common presentation was weight loss, reported in 71.4% of patients, followed by loss of appetite (53.6%) and abdominal pain (42.9%). Vomiting was observed in 42.9% of cases, while melena and hematemesis were less frequent, each occurring in 17.9% of patients.

Table 2: Distribution of Patients According to Endoscopic Location and CT Scan Findings (n = 28)

Variables	**Number**	**Percentage (%)**
Endoscopic Location of Growth in Stomach*		
Fundus	2	7.1
Body	11	39.3
Antrum	18	64.3
Pylorus	5	17.9
CT Scan Findings		
Peri-gastric Fat Plane		
Intact	20	71.4
Not intact	8	28.6
Lymph Node		
Enlarged	11	39.3
Not enlarged	17	60.7
Lymph Node Location (n = 11)*		
Left paraaortic	5	45.4
Peripancreatic	1	9.1
Perigastric	8	72.7
Ascites	2	7.1

*Multiple responses present

Table 2 showed that in endoscopic evaluation the most common tumor location was the antrum (64.3%), followed by the body (39.3%), pylorus (17.9%), and fundus (7.1%) of the stomach. CT scan findings revealed that the peri-gastric fat plane was intact in 71.4% of participants and not intact in 28.6%. Lymph node enlargement was observed in 39.3% of patients, with locations including left paraaortic (45.4%), peripancreatic (9.1%), and perigastric (72.7%). Ascites was present in 7.1% of participants.

Table 3: Distribution of Patients According to Surgical Procedures, Peritoneal Cytology and Per-Operative Findings (n = 28)

Variables	Number	Percentage (%)
Type of Surgical Procedure		
Palliative Gastrojejunostomy	3	10.7
Feeding Jejunostomy	3	10.7
Diagnostic Laparoscopy	1	3.6
Subtotal Gastrectomy	16	57.1
Total Gastrectomy	5	17.9
Peritoneal Cytology Positivity		
Positive	5	17.9
Negative	23	82.1
Location of Growth*		
Fundus	4	14.3
Body	11	39.3
Antrum	22	78.6
Pylorus	12	42.9
Per-Operative Ascites	3	10.7

*Multiple responses present.

Table 3 summarizes the surgical procedures, peritoneal cytology findings, and per-operative observations of study participants (n = 28). Subtotal gastrectomy was the most frequently performed procedure (57.1%), followed by total gastrectomy (17.9%), palliative gastrojejunostomy (10.7%), feeding jejunostomy (10.7%), and diagnostic laparoscopy (3.6%). Peritoneal cytology was positive in 17.9% of participants and negative in 82.1%. Per-operative findings showed that the most common tumor location was the antrum (78.6%), followed by pylorus (42.9%), body (39.3%) and fundus (14.3%). Per-operative ascites was observed in 10.7% of patients.

Table 4: Distribution of Patients by Endoscopic Grading and Post-operative Histopathological Grading of Tumor (n = 28)

Grading Type	Number	Percentage (%)
Endoscopic Grading		
Grade I	2	7.1
Grade II	15	53.6
Grade III	11	39.3
Post-operative Histopathological Grading	**N=21**	
Grade I	2	9.5
Grade II	8	38.1
Grade III	11	52.4

In Table 4, endoscopic grading (n = 28) showed that most tumors were Grade II (53.6%), followed by Grade III (39.3%) and Grade I (7.1%). Post-operative histopathological grading was available for 21 participants, with Grade III tumors being most common (52.4%), followed by Grade II (38.1%) and Grade I (9.5%).

Table 5: Relation of Peritoneal Cytology Positivity with Endoscopic Tumor Grading (n = 28)

Endoscopic Grading	Peritoneal Cytology		P value
	Positive	Negative	
Grade I (n = 2)	0	2 (100.0%)	0.786
Grade II (n = 15)	3 (20.0%)	12 (80.0%)	
Grade III (n = 11)	2 (18.2%)	9 (81.8%)	

This table shows the relationship between endoscopic tumor grading and peritoneal cytology positivity among study participants (n = 28). Among Grade I tumors (n = 2), none were cytology-positive, while all were negative (100.0%). For Grade II tumors (n = 15), 20.0% were cytology-positive and 80.0% were negative. Grade III tumors (n = 11) had 18.2% positivity and 81.8% had negativity. The association between endoscopic grading and peritoneal cytology was not statistically significant (P = 0.786).

Table 6: Association of Post-operative Histopathological Grading, Tumor Staging, and Metastatic Lymph Nodes with Peritoneal Cytology Positivity (n=21)

Variables	Peritoneal Cytology		P-value
	Positive (n=3)	Negative (n=18)	
Post-operative Histopathology Grading			
Grade I (n = 2)	0 (0%)	2 (100%)	0.269
Grade II (n = 8)	1 (12.5%)	7 (87.5%)	
Grade III (n = 11)	2 (18.2%)	9 (81.8%)	
Tumor Staging: Depth of Invasion			
T2 (n = 3)	0 (0%)	3 (100%)	0.385
T3 (n = 11)	1 (9.1%)	10 (90.9%)	
T4 (n = 7)	2 (28.6%)	5 (71.4%)	
Metastatic Lymph Node			
N0 (n = 7)	2 (28.6%)	5 (71.4%)	0.423
N1 (n = 5)	0 (0%)	5 (100%)	
N2 (n = 5)	1 (20.0%)	4 (80.0%)	
N3 (n = 4)	0 (0%)	4 (100%)	

Table 6 shows that among patients with Grade I tumors (n = 2), none were cytology-positive, while Grade II tumors (n = 8) showed 12.5% positivity, and Grade III tumors (n = 11) had 18.2% positivity; the association was not statistically significant (P = 0.269). Regarding tumor depth of invasion, cytology positivity was observed in 9.1% of T3 (n = 11), and 28.6% of T4 (n = 7) tumors, with no significant association (P = 0.385). For metastatic lymph nodes, cytology positivity was 28.6% in N0 (n = 7), 20.0% in N2 (n = 5), showing no statistically significant correlation (P = 0.423).

Table 7: Prognostic Factors in Patients with Gastric Carcinoma (n = 28)

Variables	Number	Percentage (%)
Advanced T stage (T3/T4)	18	64.3
Lymph node involvement (N1–N3)	14	50.0
Peritoneal cytology positive	5	17.9

Table 7 shows the prognostic factors among 28 patients with gastric carcinoma. An advanced T stage (T3/T4) was observed in 64.3% of patients, lymph node involvement (N1–N3) in 50.0%, and positive peritoneal cytology in 17.9%, highlighting the key prognostic indicators in this study.

DISCUSSION

In the present study, the majority of patients with gastric carcinoma were aged between 51–60 years (35.7%) and above 60 years (28.6%), with a mean age of 53.89 ± 13.11 years. Similarly, Zhou *et al.*, reported a median age of 61 years (range: 18–90) among 2,022 patients, who were divided into young (18–40 years) and older (>40 years) groups, with mean ages of 35.6 ± 4.5 and 61.1 ± 9.2 years, respectively [21]. Zhong et al. also found a median age of 23 years (range: 15–30), with 96.0% of patients aged 19–60 years [22].

In the current study, males constituted 71.4%, and females 28.6% of the participants. Zhou *et al.*, reported a female predominance (51.2% vs. 25.9%, p < 0.001) in the young group compared with older patients [21]. Similarly, Zhong *et al.*, found a higher proportion of female patients, with a male-to-female ratio of 1:2.7, consistent with prior reports [21,23]. The predominance of females in younger gastric cancer patients has been attributed to hormonal influences, particularly estrogen, which may contribute to tumorigenesis in younger individuals [24].

In the present study, the most common presentation was weight loss, reported in 71.4% of patients, followed by loss of appetite (53.6%) and abdominal pain (42.9%). Vomiting was observed in 42.9% of cases. These findings are consistent with those of Kapoor *et al.*, [25], who observed that the most common presenting complaints were loss of appetite and weight loss in 68.5% of patients, followed by abdominal pain (58.3%) and nausea and vomiting (42.9%). Similarly, Hasan *et al.*, [26] reported weight loss and anorexia (34.4%) as the most prevalent symptoms, followed by dyspepsia (24.9%), vomiting (15.8%), and abdominal pain (13.8%). Other studies have also highlighted weight loss, anorexia, abdominal pain, and

dysphagia as the predominant symptoms of gastric carcinoma [27,28].

In our study, lymph node enlargement was observed in 39.3% of patients, involving the left paraaortic (45.4%), peripancreatic (9.1%), and perigastric (72.7%) regions. Cytology positivity was found in 9.1% of T3 and 28.6% of T4 tumors, though the association was not statistically significant (p = 0.385). Zhou *et al.*, similarly observed a higher prevalence of T3–T4 tumors (59.1% vs. 70.9%, p = 0.002) and a greater number of retrieved lymph nodes (23.9 ± 11.2 vs. 21.6 ± 10.9, p = 0.009) in the younger group [21].

Regarding endoscopic evaluation, the most common tumor location was the antrum (64.3%), followed by the body (39.3%), pylorus (17.9%), and fundus (7.1%). Zhou *et al.*, reported that younger patients had a lower proportion of tumors in the upper third of the stomach (3.0% vs. 13.6%, p = 0.001) compared with older individuals [21]. Zhong *et al.*, also found the antrum (38.0%) and body (37.0%) as the most frequent sites [22].

In this study, based on post-operative histopathological grading, none of the Grade I tumors were cytology-positive, whereas Grade II and Grade III tumors showed positivity rates of 12.5% and 18.2%, respectively (p = 0.269). Additionally, cytology positivity showed no significant association with lymph node status (p = 0.423). Zhong *et al.*, reported that most patients were diagnosed at locally advanced stage III (41%) or metastatic stage IV (41%), with recurrence or metastasis observed in 35 stage II/III cases. Common metastatic sites included the ovary (39.5%), peritoneum (27.6%), liver (15.8%), and bone (11.8%) [22].

In this study of 28 patients, age was not a prognostic factor. However, Nakamura et al. reported that patients younger than 34 years had significantly poorer outcomes compared with older patients [29]. Similarly, Lai *et al.*, found young age to be an independent negative prognostic factor, suggesting that gastric cancers in very young patients may display biologically aggressive behavior [30]. Conversely, Hsu *et al.*, found older age associated with higher perioperative complication (p = 0.035) and mortality rates (p = 0.015) [31]. Oya *et al.*, also demonstrated that advanced age (≥80 years) adversely affects survival, complications, and postoperative outcomes [32].

Several key prognostic factors were identified in the present study. Advanced tumor stage (T3/T4) was observed in 64.3% of patients, lymph node involvement (N1–N3) in 50.0%, and positive peritoneal cytology in 17.9% of patients. Zhong *et al.*, reported that fundic tumor location (p = 0.019), advanced stage (p < 0.001), and absence of radical surgery (p < 0.001) were significantly associated with poor survival outcomes. Their multivariate analysis further identified TNM stage (p = 0.005) as an independent prognostic factor. [22]. Zhou *et al.*, similarly found that tumor size, location, resection extent, lymphovascular invasion, depth of invasion (p < 0.001), and lymph node metastasis (p < 0.001) were associated with survival. Multivariate analysis identified T3–T4 depth (HR: 5.791, 95% CI: 2.908–11.533, p < 0.001), lymph node metastasis (HR: 2.500, p = 0.006), and lymphovascular invasion (HR: 2.191, p = 0.003) as independent predictors of poor prognosis [21].

Limitations of the study

This study was conducted at a single tertiary care center, which may limit the generalizability of the findings to the broader population. The cross-sectional design precluded long-term follow-up and survival analysis, restricting assessment of prognostic outcomes over time. Additionally, histopathological grading was not available for patients who did not undergo gastrectomy, which limited the completeness of the clinicopathological analysis.

CONCLUSION AND RECOMMENDATIONS

The present study highlights the clinicopathological characteristics and prognostic indicators among patients with advanced gastric carcinoma. Most patients presented with non-specific symptoms, such as weight loss and loss of appetite, often at a late stage of the disease. Advanced T stage, lymph node involvement, and peritoneal cytology positivity emerged as key prognostic factors associated with disease progression. Early detection through clinical evaluation and incorporation of peritoneal cytology during surgery may provide valuable prognostic insight and guide appropriate management strategies for patients with gastric carcinoma.

Further study with a prospective and longitudinal study design, including a larger sample size, needs to be done to validate the findings of our study.

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REFERENCES

1. Ferlay J, Colombet M, Soerjomataram I, et al. Cancer statistics for the year 2020: an overview. Int J Cancer. 2021.
2. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394–424.
3. Machlowska J, Baj J, Sitarz M, Maciejewski R, Sitarz R. Gastric cancer: epidemiology, risk factors,

classification, genomic characteristics and treatment strategies. Int J Mol Sci. 2020;21(11):4012.
4. Sites AJB. SEER Cancer Statistics Review 1975–2011. National Cancer Institute, MD; 2014.
5. Parkin DM. International variation. Oncogene. 2004; 23:6329–6340.
6. Parkin DM, Bray FI, Devesa SS. Cancer burden in the year 2000, the global picture. Eur J Cancer. 2001;37(Suppl 8): S4–S66.
7. Forman D, Newell DG, Fullerton F, et al. Association between infection with Helicobacter pylori and risk of gastric cancer: evidence from a prospective investigation. BMJ. 1991; 302:1302–1305.
8. Parsonnet J, Friedman GD, Vandersteen DP, et al. Helicobacter pylori infection and the risk of gastric carcinoma. N Engl J Med. 1991; 325:1127–1131.
9. Milne AN, Sitarz R, Carvalho R, Carneiro F, Offerhaus GJ. Early onset gastric cancer: on the road to unraveling gastric carcinogenesis. Curr Mol Med. 2007; 7:15–28.
10. El-Omar EM, Carrington M, Chow WH, et al. Interleukin-1 polymorphisms associated with increased risk of gastric cancer. Nature. 2000; 404:398–402.
11. Milne AN, Offerhaus GJ. Early-onset gastric cancer: learning lessons from the young. World J Gastrointest Oncol. 2010;2(2):59–64.
12. Takatsu Y, Hiki N, Nunobe S, et al. Clinicopathological features of gastric cancer in young patients. Gastric Cancer. 2016;19(2):472–478.
13. Hsieh FJ, Wang YC, Hsu JT, et al. Clinicopathological features and prognostic factors of gastric cancer patients aged 40 years or younger. J Surg Oncol. 2012;105(3):304–309.
14. Kim KH, Kim YM, Kim MC, Jung GJ. Analysis of prognostic factors and outcomes of gastric cancer in younger patients: a case-control study using propensity score methods. World J Gastroenterol. 2014;20(12):3369–3375.
15. Wang Z, Xu J, Shi Z, et al. Clinicopathologic characteristics and prognosis of gastric cancer in young patients. Scand J Gastroenterol. 2016;51(9):1043–1049.
16. Kong X, Wang JL, Chen HM, Fang JY. Comparison of the clinicopathological characteristics of young and elderly patients with gastric carcinoma: a meta-analysis. J Surg Oncol. 2012;106(3):346–352.
17. Zhang J, Gan L, Xu MD, et al. The prognostic value of age in non-metastatic gastric cancer after gastrectomy: a retrospective study in the U.S. and China. J Cancer. 2018;9(7):1188–1199.
18. Tekesin K, Gunes ME, Tural D, et al. Clinicopathological characteristics, prognosis and survival outcome of gastric cancer in young patients: a large cohort retrospective study. J BUON. 2019;24(2):672–678.
19. Italiano A. Prognostic or predictive? It's time to get back to definitions. J Clin Oncol. 2011;29(35):4718.
20. Angelov KG, Vasileva MB, Grozdev KS, Sokolov MB, Todorov G. Clinical and pathological characteristics and prognostic factors for gastric cancer survival in 155 patients in Bulgaria. Hepatogastroenterology. 2014;61(136):2421–2424.
21. Zhao B, Mei D, Lv W, et al. Clinicopathologic features, survival outcome, and prognostic factors in gastric cancer patients 18–40 years of age. J Adolesc Young Adult Oncol. 2020;9(4):514–521.
22. Zhong N, Yu Y, Chen J, et al. Clinicopathological characteristics, survival outcome and prognostic factors of very young gastric cancer. Clin Exp Med. 2023;23(2):437–445.
23. Zhou L, Jiang Z, Gu W, Han S. Clinical characteristics and prognosis factors of gastric cancer in young patients aged ≤30 years. Medicine (Baltimore). 2021;100(26): e26336.
24. Derakhshan M, Liptrot S, Paul J, et al. Oesophageal and gastric intestinal-type adenocarcinomas show the same male predominance due to a 17-year delayed development in females. Gut. 2009;58(1):16–23.
25. Kapoor R, Mukherjee A, Srinivasa G, Gupta R. Demography and clinicopathological characteristics of primary gastric cancers in Northern India. Clin Cancer Investig J. 2017;6(3):149–152.
26. Hasan SN, Afroje N, Rahman MM, Howlader MH, Islam MR, Millat MK, et al. Clinical profile of patients presenting with gastric carcinoma in Kishoreganj District of Bangladesh. Shaheed Syed Nazrul Islam Med Coll J. 2022 Jul;7(2):155–163.
27. Safaee A, Moghimi-Dehkordi B, Fatemi SR, Ghiasi S, Pourhoseingholi MA, Zali MR. Clinicopathological features of gastric cancer: a study based on cancer registry data. Iran J Cancer Prev. 2009; 2:67–70.
28. Maconi G, Manes G, Porro GB. Role of symptoms in diagnosis and outcome of gastric cancer. World J Gastroenterol. 2008;14(8):1149–1155.
29. Nakamura R, Saikawa Y, Takahashi T, et al. Retrospective analysis of prognostic outcome of gastric cancer in young patients. Int J Clin Oncol. 2011;16(4):328–334.
30. Lai JF, Kim S, Li C, et al. Clinicopathologic characteristics and prognosis for young gastric adenocarcinoma patients after curative resection. Ann Surg Oncol. 2008;15(5):1464–1469.
31. Hsu JT, Liu MS, Wang F, et al. Standard radical gastrectomy in octogenarians and nonagenarians with gastric cancer: are short-term surgical results and long-term survival substantial? J Gastrointest Surg. 2012;16(4):728–737.
32. Oya H, Komatsu Y, Shimizu D, et al. Curative surgery for gastric cancer of the elderly in a Japanese regional hospital. Hepatogastroenterology. 2013;60(127):1673–1680.