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Relation of Peritoneal Cytology with Tumour Grade and Lymph Node Status in Gastric Carcinoma

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Abstract | **Original Research Article**

Background: Gastric carcinoma remains a major global health concern, exhibiting diverse clinical presentations and prognostic outcomes. Peritoneal cytology serves as an important method for detecting microscopic peritoneal dissemination; however, its relationship with tumour characteristics in gastric carcinoma remains inadequately explored. This study aimed to evaluate the relationship between peritoneal cytology with tumour grade, and lymph node status in patients with gastric carcinoma. ***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 stomach cancer who underwent gastric surgery in the Department of General Surgery at BSMMU within study period. ***Results:*** The mean age of the study participants was 53.89 ± 13.11 years, with a male predominance (71.4%). The antrum was the most common site of tumour involvement (64.3%), followed by the body of the stomach (39.3%). On CT scan, intact perigastric fat planes were observed in 71.4% of cases, while lymph node enlargement was present in 39.3%. Subtotal gastrectomy was the most frequently performed procedure (57.1%). Peritoneal cytology positivity was found in 17.9% of cases and showed no significant association with either endoscopic or histopathological tumour grading. None of the Grade I tumours tested positive, while 12.5% of Grade II and 18.2% of Grade III tumours were cytology-positive. Metastatic lymph nodes were identified in 14 patients (66.7%), of whom only one showed positive peritoneal cytology. ***Conclusion:*** The study found no statistically significant association between peritoneal cytology positivity and either tumour grade or lymph node status. However, its higher prevalence in advanced tumour stages suggests that it may have a potential prognostic role in evaluating disease progression in gastric carcinoma.

Keywords: Gastric Carcinoma, Peritoneal Cytology, Peritoneal Metastasis, Tumour Grade, Lymph Node Status.

INTRODUCTION

Gastric carcinoma, commonly known as stomach cancer, remains a major global health concern, contributing substantially to worldwide morbidity and mortality. It is recognized as the third leading cause of cancer-related deaths among men and the fifth leading cause among women globally [1]. Among the common metastatic sites, the peritoneum is particularly significant, as peritoneal involvement frequently occurs in advanced disease [2]. Despite continuous progress in medical science and technology, the prognosis for gastric carcinoma remains poor, particularly when peritoneal metastasis develops [1].

Peritoneal metastasis, defined as the dissemination of malignant cells within the peritoneal cavity, poses one of the most formidable challenges in the management of gastric carcinoma, drastically affecting patient outcomes and overall survival. Over the years, clinicians and researchers have sought to better understand the complex relationship between peritoneal cytology findings and key clinicopathological

parameters, such as tumour grade and lymph node status, in order to enhance prognostic accuracy and inform therapeutic decision-making. The use of intraoperative peritoneal lavage cytology has emerged as a valuable tool for detecting microscopic peritoneal dissemination in the absence of visible metastatic lesions [3]. In patients with gastric carcinoma, the detection of free cancer cells in peritoneal washings is considered a significant risk factor for peritoneal metastasis and postoperative recurrence [4]. A positive peritoneal cytology result, therefore, serves as an important prognostic marker, indicating peritoneal dissemination and correlating with poorer clinical outcomes [5].

Multiple studies have demonstrated that patients with positive peritoneal cytology exhibit significantly reduced survival rates, even in the absence of gross metastatic disease at the time of surgery [6–8]. Consequently, identifying such cases is crucial for guiding appropriate management, as these patients may benefit more from palliative approaches aimed at symptom relief and avoiding unnecessary surgical morbidity.

The primary objective of this thesis is to explore the relationship between peritoneal cytology findings, tumour grade, and lymph node status in patients with gastric carcinoma. High-grade tumours are often characterized by greater cellular proliferation and metastatic potential, complicating disease management and worsening prognosis [9]. By evaluating the association between peritoneal cytology results and tumour grade, this study aims to determine whether peritoneal metastasis is more prevalent in higher-grade, more aggressive tumours. Such insights could help identify patients at greater risk of recurrence and support the development of tailored therapeutic strategies for managing peritoneal metastasis in gastric carcinoma [10].

Furthermore, lymph node involvement represents a vital prognostic factor and staging component in gastric carcinoma. The presence of nodal metastasis generally signifies an advanced disease stage and correlates with reduced survival [11]. By examining the relationship between peritoneal cytology positivity and lymph node metastasis, this study seeks to determine whether cytological evidence of peritoneal spread can serve as a predictor of nodal involvement and disease advancement.

Therefore, in this study we aimed to evaluate the relationship between peritoneal cytology and tumour characteristics, including endoscopic grade, histopathological grade, and lymph node status, in patients with gastric carcinoma.

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 stomach cancer who underwent gastric surgery in the Department of General Surgery at BSMMU.
These were the following criteria for eligibility as study participants:

Inclusion Criteria:

- All patients diagnosed with carcinoma of the stomach, irrespective of age and sex
- Patients who gave written informed consent were included in this study.

Exclusion Criteria:

- Patients with carcinoma of the stomach who had received neoadjuvant chemotherapy prior to surgery.
- Patients with carcinoma of the stomach associated with other concurrent malignancies.

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. A structured checklist was developed as the primary data collection tool. It included variables such as age, sex, clinical findings, and relevant investigations, including upper gastrointestinal (GIT) endoscopy with biopsy for histopathological confirmation and contrast-enhanced CT scans of the abdomen and chest when indicated.

Prior to surgery, all patients underwent thorough preoperative preparation, which included improvement of nutritional status, correction of anaemia, dehydration, and electrolyte imbalances, as well as assessment of anaesthetic fitness. During surgery, after exploration of the abdomen, 100 ml of sterile normal saline was instilled into the peritoneal cavity. After gentle mixing for five minutes, 50 ml of lavage fluid was aspirated and collected for cytological examination. In cases where ascitic fluid was present, 50 ml of the ascitic fluid was collected directly without lavage. The operability of the tumour was assessed by the operating surgeon, and the appropriate surgical procedure for gastric carcinoma was performed accordingly. All intraoperative findings were recorded, and both the histopathological reports and peritoneal cytology results were documented. Among the 28 patients included in the study, gastrectomy could not be performed in 7 patients, and hence, histopathology reports were unavailable for these cases. All collected data were carefully compiled, checked, and edited for completeness and accuracy.

Statistical Analysis:

All data were recorded systematically in a pre-formatted data collection form. Quantitative data were expressed as mean and standard deviation, and qualitative data were expressed as frequency distribution and percentage. The data were analyzed using the chi-

square test. A p-value <0.05 was considered significant. Statistical analysis was performed by using SPSS 26 (Statistical Package for Social Sciences) for Windows version 10. This study was ethically approved by the Institutional Review Board of Bangabandhu Sheikh Mujib Medical University (BSMMU).

RESULTS

Table 1: Distribution of the study patients by demographic characteristics (n=28).

Variables	Frequency (n)	Percentage (%)
Age		
≤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	
Range (min-max)	(19-76)	
Sex		
Male	20	71.4
Female	8	28.6

Table 1 presents the distribution of the study participants according to their demographic characteristics. The majority of patients (35.7%) were in the 51–60-year age group, followed by 28.6% who were older than 60 years. The mean age of the participants was 53.89 ± 13.11 years, ranging from 19 to 76 years. Regarding gender distribution, 71.4% of the participants were male and 28.6% were female. The male-to-female ratio was 2.5:1 in this study.

Table 2: Distribution of the Study Population by Tumor Location and CT Scan Findings (n=28)

Endoscopic location of growth in stomach*	Frequency (n)	Percentage (%)
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		
Enlarge	11	39.3
Not enlarge	17	60.7
Lymph node location (n=11)*		
Left paraaortic	5	45.5
Peri pancreatic	1	9.1
Peri gastric	8	72.7
Ascites	2	7.1

*Multiple response

In Table 2 endoscopic evaluation of the 28 study patients revealed that the antrum was the most common site of tumor growth, observed in 64.3% of cases. The body of the stomach was the next most frequent location, accounting for 39.3% of cases. Other sites included the pylorus in 17.9% and the fundus in 7.1% of patients. Based on CT scan findings, the peri-gastric fat plane was intact in 71.4% of patients, while it was disrupted in 28.6%. Lymph node enlargement was noted in 39.3% of cases, whereas 60.7% showed no lymphadenopathy. Among patients with enlarged lymph nodes (n = 11), the most frequently involved regions were peri-gastric (72.7%), followed by left para-aortic (45.5%) and peri-pancreatic (9.1%). Ascites was detected in 7.1% of the study population.

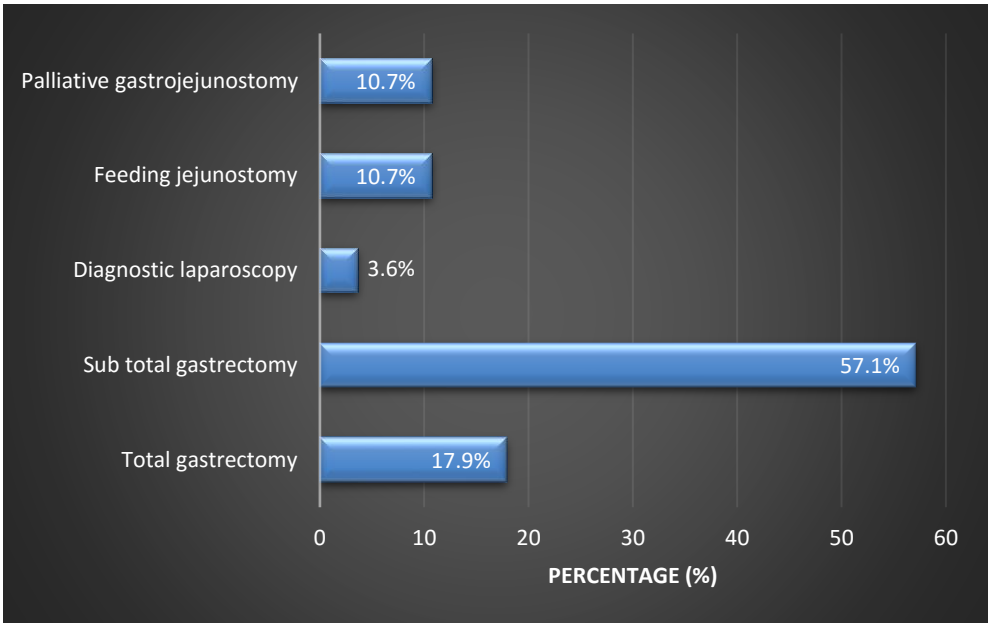
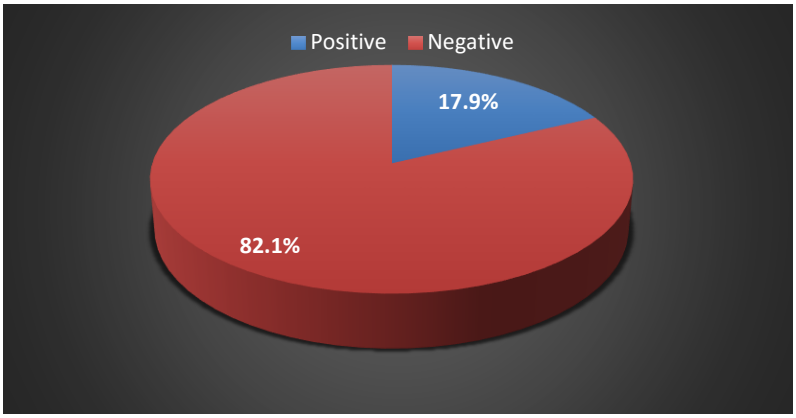


Figure 1: Types of Surgical Procedures Performed in Patients with Carcinoma of the Stomach (n = 28)

Figure 1 shows that among the surgical procedures performed in the study population, sub-total gastrectomy was the most common, conducted in 57.1% of cases. This was followed by total gastrectomy in 17.9% of patients. Other procedures included feeding jejunostomy and palliative gastrojejunostomy, each performed in 10.7% of cases, while diagnostic laparoscopy was carried out in 3.6% of patients.



The pie chart shows that among the study population, peritoneal cytology was positive in 5 patients (17.9%), while the majority, 23 patients (82.1%), showed negative cytology results.

Table 3: Per operative findings in the study population (n=28).

Per operative Findings	Frequency (n)	Percentage (%)
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 response

In Table 3, per-operative findings revealed that, tumour growth was most commonly located in the antrum, accounting for 78.6% of cases, followed by the body at 39.3%. The pylorus and fundus were also sites of tumour growth, with percentages of 42.9% and 14.3%, respectively. Ascites was present in 10.7% of individuals undergoing surgery.

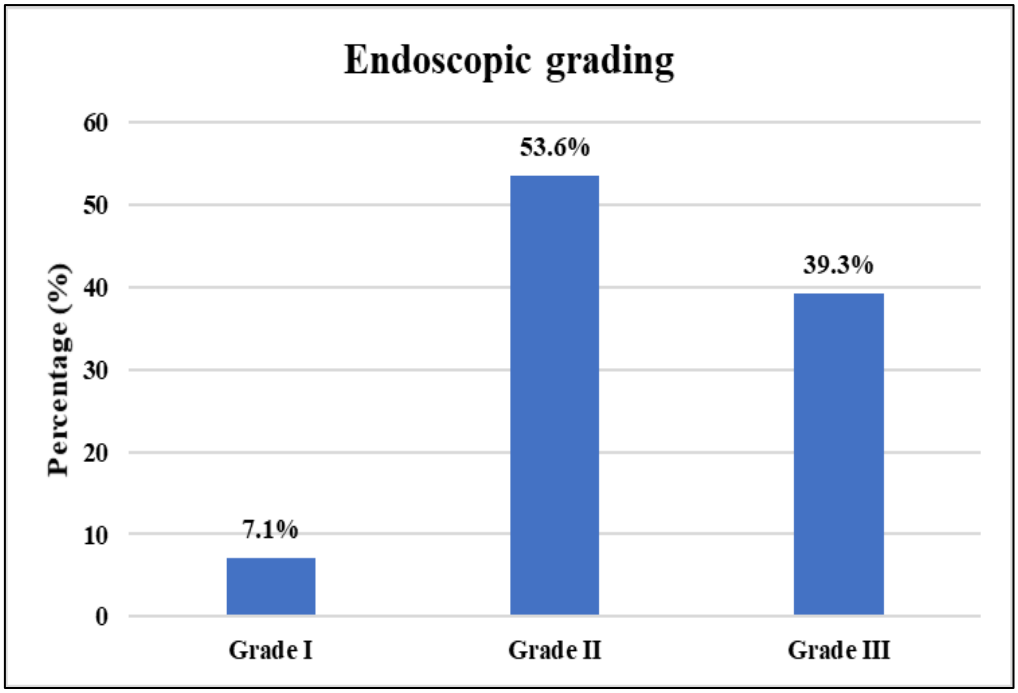


Figure 3: Distribution of the study population according to endoscopic tumour grading (n=28)

Figure 3 shows that endoscopic tumor grading among the 28 patients revealed that the majority were classified as Grade II (53.6%), followed by Grade III (39.3%).

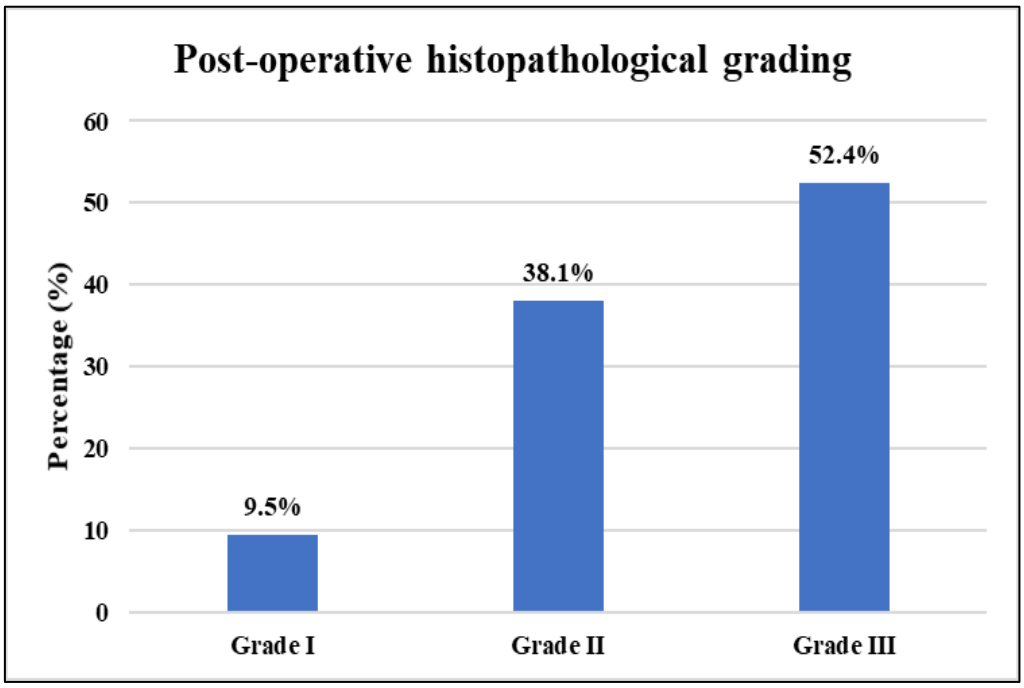


Figure 4: Distribution of the study population according to post-operative histopathological tumour grading (n=21)

Figure 4 shows that post-operative histopathological grading was available for only 21 patients, as the remaining seven underwent palliative or diagnostic procedures without resected tumor specimens. Among these 21 patients, the majority of tumors were Grade III (52.4%), followed by Grade II (38.1%), indicating an upgradation of tumor grade compared to the initial endoscopic assessment.

Table 4: Relation of post-operative histopathological tumour grading and staging with peritoneal cytology (n=21).

Post-operative histopathology grading	Total	Peritoneal cytology		P-value
		Positive (n=3)	Negative (n=18)	
Grade I	2 (9.5%)	0	2 (100.0%)	0.269
Grade II	8 (38.1%)	1 (12.5%)	7 (87.5%)	
Grade III	11 (52.4%)	2 (18.2%)	9 (81.8%)	
Tumour staging				
Depth of invasion				
T2	3 (14.3%)	0	3 (16.7%)	0.385
T3	11 (52.4%)	1 (33.3%)	10 (55.6%)	
T4	7 (33.3%)	2 (66.7%)	5 (27.8%)	
Metastatic lymph node				
N0	7 (33.3%)	2 (66.7%)	5 (27.8%)	0.423
N1	5 (23.8%)	0	5 (27.8%)	
N2	5 (23.8%)	1 (33.3%)	4 (22.2%)	
N3	4 (19.0%)	0	4 (22.2%)	

Table 4 shows the relationship between peritoneal cytology positivity and post-operative histopathological tumor grading and staging. None of the Grade I tumors were cytology positive. Among Grade II tumors, 1 case (12.5%) was cytology positive, while 7 cases (87.5%) were negative. For Grade III tumors, 2 cases (18.2%) were cytology positive and 9 cases (81.8%) were negative. Regarding tumor stage, among cytology-positive patients, 66.7% were T4 and 33.3% were T3, whereas among cytology-negative patients, 55.6% were T3, 27.8% T4, and 16.7% T2. For lymph node involvement, 66.7% of cytology-positive patients were N0 and 33.3% were N2. Chi-square analysis showed no significant association between peritoneal cytology and tumor grade ($p = 0.269$), depth of invasion ($p = 0.385$), or nodal status ($p = 0.423$).

DISCUSSION

In this study, the peak incidence of gastric carcinoma was observed in the 51–60-year age group (35.7%), followed by patients older than 60 years (28.6%), with a mean age of 53.89 ± 13.11 years. A clear male predominance was noted, with a male-to-female ratio of 2.5:1. These findings are consistent with previous reports [12–14]. An Indian study reported a mean age of 56.0 ± 11.96 years, closely aligning with our results [15], while other studies have reported higher mean ages of 62.21 years [16] and 63 years [17]. Such variations may reflect geographical, racial, ethnic, and genetic differences that influence the incidence and characteristics of gastric carcinoma [18]. The observed male predominance may be attributed to greater and more prolonged exposure to environmental carcinogens, although further research is needed to fully elucidate the gender disparity in gastric cancer incidence [19].

Tumour localization within the stomach carries important clinical and prognostic implications. In our study, the antrum was the most frequent site of tumour growth (64.3%), followed by the body (39.3%), consistent with previous literature suggesting that early gastric cancer commonly originates in the antral region [19]. The antrum's high glandular density and increased exposure to carcinogens may contribute to this predilection. Tumours were less commonly observed in the pylorus (17.9%) and fundus (7.1%), with involvement of the pylorus potentially causing gastric outlet obstruction, while fundal tumours, although rare, highlight the heterogeneous anatomical distribution of gastric carcinoma and the importance of thorough endoscopic evaluation [20].

CT scan findings revealed that the perigastric fat plane was intact in 71.4% of patients, indicating localized disease amenable to curative resection. In contrast, 28.6% of patients showed disrupted fat planes, suggestive of more advanced disease with possible invasion into adjacent structures. Lymph node enlargement was observed in 39.3% of patients, predominantly in peri-gastric (72.7%) and left para-aortic (45.5%) regions, reflecting the typical lymphatic spread of gastric cancer. Ascites was detected in 7.1% of patients, indicating potential peritoneal involvement and a poorer prognosis [21, 22].

Regarding surgical management, subtotal gastrectomy was the most frequently performed procedure (57.1%), followed by total gastrectomy (17.9%). Feeding jejunostomy and palliative gastrojejunostomy were performed in 10.7% of cases each, and diagnostic laparoscopy in 3.6%. Subtotal gastrectomy is preferred for distal stomach tumours, offering adequate oncologic resection while preserving gastric function and achieving favorable survival outcomes compared to total gastrectomy, particularly in early-stage disease [23, 24].

In this study, 5 out of 28 patients (17.9%) demonstrated positive peritoneal cytology. By comparison, the Dutch Gastric Cancer Trial reported positive cytology in only 7.1% of gastric cancer patients and 12% of cases with serosal invasion [25]. Literature indicates that peritoneal metastasis is among the most

common types of metastatic spread in gastric cancer, occurring in approximately 10–20% of patients [26–28].

Endoscopic tumour grading revealed a predominance of Grade II tumours (53.6%), followed by Grade III (39.3%). Preoperative endoscopic grading often underestimates tumour aggressiveness, as histopathological confirmation remains essential for accurate assessment. Postoperative histopathology showed Grade III tumours (52.4%) outnumbering Grade II (38.1%), reflecting upgrading of tumour grade after definitive tissue evaluation. Grade III tumours are associated with aggressive behavior and poorer prognosis, emphasizing the need for careful postoperative surveillance and management [29].

When analyzing the relationship between peritoneal cytology and tumour grade, none of the Grade I tumours tested positive. Among Grade II tumours, 12.5–20% were cytology-positive, while 18.2% of Grade III tumours showed positive cytology. However, chi-square analysis revealed no statistically significant association between peritoneal cytology and endoscopic grade ($p = 0.786$) or postoperative histopathological grade ($p = 0.269$). Similarly, peritoneal cytology positivity was not significantly associated with tumour stage ($p = 0.385$) or lymph node involvement ($p = 0.423$). These findings suggest that peritoneal cytology positivity may not be directly related to tumour grade or nodal status, and other factors, such as tumour biology and stage, may play a more critical role [30].

Peritoneal cytology remains an important prognostic marker, as highlighted by the Japanese Gastric Cancer Association (JGCA, 1998), which classifies cytology-positive patients as Stage IV in the UICC gastric cancer system [31]. Prior studies have demonstrated that peritoneal metastasis is the most frequent site of recurrence in stage III and IV patients, occurring in 61.2% and 65.2% of cases, respectively, with overall peritoneal involvement in 81.1% of patients [32].

Overall, these findings indicate that peritoneal cytology positivity did not have a significant correlation with tumour grade or lymph node status; however, its presence in advanced stages suggests a potential prognostic value.

Limitations of the study

The study was conducted at a single center, which may limit the generalizability of the findings to the entire country.

Conclusion and Recommendations

This study explored the relationship between peritoneal cytology with endoscopic and post-operative histopathology in gastric cancer patients. While no significant relation was found between peritoneal cytology positivity and tumour grading, though its prevalence was higher in advanced tumour stages, suggesting potential prognostic value.

Further large-scale studies involving diverse patient populations need to be conducted to improve the generalizability of the findings and provide stronger evidence on the relationship between peritoneal cytology, tumor grade, and lymph node status in gastric carcinoma.

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Conflict of interest: None declared
Ethical approval: This study was ethically approved

References

1. Yepuri N, Bahary N, Jain A, Dhir M. Review and Update on the Role of Peritoneal Cytology in the Treatment of Gastric Cancer. J Surg Res. 2019; 235:607–14.
2. Allen CJ, Blumenthaler AN, Das P, Minsky BD, Blum M, Roy-Chowdhuri S, *et al.,* Staging laparoscopy and peritoneal cytology in patients with early-stage gastric adenocarcinoma. World J Surg Oncol. 2020;18(1):39.
3. Higaki E, Yanagi S, Gotohda N, Kinoshita T, Kuwata T, Nagino M, *et al.,* Intraoperative peritoneal lavage cytology offers prognostic significance for gastric cancer patients with curative resection. Cancer Sci. 2017;108(5):978–86.
4. Kang WZ, Zhong YX, Ma FH, Xue LY, Xiong JP, Ma S, *et al.,* Survival outcomes and prognostic indicators for gastric cancer patients with positive peritoneal wash cytology but no peritoneal metastasis after radical gastrectomy. World J Gastrointest Oncol. 2021;13(1):24–36.
5. Kanda M, Kodera Y. Molecular mechanisms of peritoneal dissemination in gastric cancer. World J Gastroenterol. 2016;22(30):6829–40.
6. Mezhir JJ, Shah MA, Jacks LM, Brennan MF, Coit DG, Strong VE. Positive peritoneal cytology in patients with gastric cancer: Natural history and outcome of 291 patients. Ann Surg Oncol. 2010;17(12):3173–80.
7. Bando E, Yonemura Y, Taniguchi K, Yasui T, Fushida S, Fujimura T, *et al.,* Intraoperative lavage for cytological examination in 1,297 patients with gastric carcinoma. Am J Surg. 1999;178(3):256–62.
8. Rosenberg R, Nekarda H, Bauer P, Schenck U, Hoefler H, Siewert JR. Free peritoneal tumour cells are an independent prognostic factor in curatively resected stage IB gastric carcinoma. Br J Surg. 2006;93(3):325–31.
9. Dobrițoiu M, Stepan AE, Vere CC, Simionescu CE. Evaluation of Gastric Carcinomas Histological Patterns in Relation to Tumors Aggressiveness Parameters. Curr Health Sci J. 2017;44(4):342–6.
10. Wang J, Huang J, Wang H, Yang W, Bai Q, Yao Z, *et al.,* Personalized Treatment of Advanced Gastric

Cancer Guided by the MiniPDX Model. J Oncol. 2022; 2022:1–12.
11. Kinami S, Saito H, Takamura H. Significance of Lymph Node Metastasis in the Treatment of Gastric Cancer and Current Challenges in Determining the Extent of Metastasis. Front Oncol. 2022; 11:1–14.
12. Yao JC, Tseng JF, Worah S, Hess KR, Mansfield PF, Crane CH, *et al.,* Clinicopathologic Behavior of Gastric Adenocarcinoma in Hispanic Patients: Analysis of a Single Institution's Experience Over 15 Years. J Clin Oncol. 2005;23(13):3094–103.
13. Sarker MAK, Rahman MM, Islam MJ, Nuruzzaman A, Sultana M. Socio-Demographic and Clinicopathological Features of Gastric Cancer: A Study of 114 Cases. J Chittagong Med Coll Teach Assoc. 2016;27(1):51–4.
14. Sasagawa T, Solano H, Mena F. Gastric Cancer in Costa Rica. Gastrointest Endosc. 1999;50(4):594–5.
15. Yogaraj S, Kumar MS. 128 slices multidetector CT evaluation of Gastric carcinoma - Imaging and histopathological correlation. Int Arch Integr Med. 2019;6(4):60–3.
16. Wani AH, Parry AH, Feroz I, Choh NA. Preoperative Staging of Gastric Cancer Using Computed Tomography and Its Correlation with Histopathology with Emphasis on Multi-planar Reformations and Virtual Gastroscopy. J Gastrointest Cancer. 2021;52(2):606–15.
17. Sooraj R, Thomas T, Moorthy S, Karumathil Pullara S, Rajesh Kannan R, Kumar Prabhu N, *et al.,* Validity of Computed Tomographic Study in Preoperative Staging of Gastric Cancer with Reference to Surgical and Histopathologic Results. J Evol Med Dent Sci. 2017;6(11):891–6.
18. Cao J, Chen J, Zhang Q, Wu J, Wang W, Zhang X, *et al.,* Ethnic disparities in demographic, clinicopathologic and biological behaviours and prognosis of gastric cancer in northwest China. Cancer Med. 2020;9(24):9353–64.
19. Kim DY, Joo JK, Ryu SY, Park YK, Kim YJ, Kim SK. Clinicopathologic characteristics of gastric carcinoma in elderly patients: A comparison with young patients. World J Gastroenterol. 2005;11(1):22–6.
20. Troncone E, Fugazza A, Cappello A, Del Vecchio Blanco G, Monteleone G, Repici A, *et al.,* Malignant gastric outlet obstruction: Which is the best therapeutic option? World J Gastroenterol. 2020;26(16):1847–60.
21. Küpeli A, Bulut E, Cansu A, Güner A, Soytürk M, Danişan G. Contribution of DECT in detecting serosal invasion of gastric cancer. Turk J Med Sci. 2019;49(3):782–8.
22. Lee JH, Kwon SJ, Kim M, Kang BK. Prevalence and clinical implications of ascites in gastric cancer patients after curative surgery. J Clin Med. 2021;10(16):1–10.
23. Beyer K. Surgery Matters: Progress in Surgical Management of Gastric Cancer. Curr Treat Options Oncol. 2023;24(2):108–29.
24. Santoro R, Ettorre GM, Santoro E. Subtotal gastrectomy for gastric cancer. World J Gastroenterol. 2014;20(38):13667–80.
25. Bonenkamp JJ, Songun I, Hermans J, Van De Velde CJH. Prognostic value of positive cytology findings from abdominal washings in patients with gastric cancer. Br J Surg. 1996;83(5):672–4.
26. Braam HJ, Schellens JH, Boot H, van Sandick JW, Knibbe CA, Boerma D, *et al.,* Selection of chemotherapy for hyperthermic intraperitoneal use in gastric cancer. Crit Rev Oncol Hematol. 2015;95(3):282–96.
27. Lehmann K, Eshmuminov D, Bauerfeind P, Gubler C, Veit-Haibach P, Weber A, *et al.,* 18FDG-PET-CT improves specificity of preoperative lymph-node staging in patients with intestinal but not diffuse-type esophagogastric adenocarcinoma. Eur J Surg Oncol. 2017;43(1):196–202.
28. Klos D, Riško J, Loveček M, Skalický P, Svobodová I, Krejčí D, *et al.,* Trends in peritoneal surface malignancies: Evidence from a Czech nationwide population-based study. World J Surg Oncol. 2019;17(1):1–9.
29. Wu Y, Sang J, Zhou J, Fang Y. Comparative analysis of differences between preoperative endoscopic biopsy and postoperative pathological examination for diagnosis of gastric intraepithelial neoplasia. J Int Med Res. 2021;49(3):1–9.
30. Koganti SB, Boddepalli S, Nambada M, Thumma V, Madhav Nagari B, Sastry RA. Positive Peritoneal Lavage Cytology – Implications for Staging and Management of Gastric Cancer. Indian J Surg Oncol. 2016;7(4):430–5.
31. Sobin LH, Fleming ID. TNM classification of malignant tumors, Fifth edition (1997). Cancer. 1997;80(9):1803–4.
32. Wei J, Yang Y, Du J, Zou Z, Zhang Y, Wu N, *et al.,* Peritoneal metastasis in relation to outcome and therapeutic strategy in gastric cancer. Transl Cancer Res. 2017;6(1):149–56.