PD-L1 Immunoexpression in Selected Cases of Lung Carcinoma: A Retrospective Cross-Sectional Study from a Tertiary Care Center in Bangladesh

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Abstract

Background: Programmed death-ligand 1 (PD-L1) is an important predictive biomarker for immune checkpoint inhibitor therapy in non-small cell lung carcinoma (NSCLC). Immunohistochemical assessment of PD-L1 expression has become an essential component in selecting patients for immunotherapy.

Objective: To evaluate PD-L1 immunoexpression in selected cases of lung carcinoma and determine its distribution among different histological subtypes.

Methods: This retrospective cross-sectional study was conducted in the Department of Pathology, Bangladesh Medical University, from 1 June 2025 to 10 June 2026. Thirty-five histopathologically confirmed cases of lung carcinoma in which PD-L1 immunohistochemistry using the PD-L1 (22C3) monoclonal antibody clone had been performed were included. PD-L1 expression was assessed by Tumor Proportion Score (TPS). Data were analyzed using descriptive statistics.

Results: The age of the patients ranged from 40 to 83 years, with a mean age of 60.8 ± 10.9 years. Among the 35 cases, 24 (68.6%) were male and 11 (31.4%) were female. Adenocarcinoma was the most common histological subtype (57.1%), followed by squamous cell carcinoma (34.3%), NSCLC-NOS (5.7%), and adenosquamous carcinoma (2.9%). PD-L1 positivity was observed in 4 (11.4%) cases. Among the positive cases, three were adenocarcinoma and one was NSCLC-NOS. TPS values were 29%, 30%, and 50% in adenocarcinoma cases and 15% in the NSCLC-NOS case. One adenocarcinoma demonstrated high PD-L1 expression (TPS ≥50%).

Conclusion: PD-L1 expression was identified in a small proportion of selected lung carcinoma cases and was predominantly observed in adenocarcinoma. Routine PD-L1 testing may facilitate identification of patients who are likely to benefit from immune checkpoint inhibitor therapy.

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Introduction

Lung cancer remains the leading cause of cancer-related mortality worldwide and constitutes a major public health challenge. According to GLOBOCAN 2020 estimates, lung cancer is the second most commonly diagnosed cancer and the leading cause of cancer-related death globally[1]. Non-small cell lung carcinoma (NSCLC) accounts for approximately 85% of all lung cancers and includes adenocarcinoma, squamous cell carcinoma, and large cell carcinoma.[2]

Despite advances in surgery, chemotherapy, radiotherapy, and targeted therapy, the prognosis of advanced lung cancer remains poor.[3] Recent advances in cancer immunotherapy have significantly improved outcomes in selected patients with advanced NSCLC.[4]

The programmed death-1 (PD-1)/programmed death-ligand 1 (PD-L1) pathway plays a pivotal role in tumor immune evasion. PD-L1 expressed on tumor cells binds to PD-1 receptors on activated T lymphocytes, leading to suppression of anti-tumor immune responses and facilitating tumor progression[5]. Consequently, blockade of the PD-1/PD-L1 pathway using immune checkpoint inhibitors such as pembrolizumab has emerged as an effective therapeutic strategy in advanced NSCLC.[3,6]

Immunohistochemical assessment of PD-L1 expression has become an important predictive biomarker for selecting patients who are likely to benefit from immune checkpoint inhibitor therapy[5]. Several studies have reported variable rates of PD-L1 expression in lung carcinoma, ranging from approximately 20% to 60%, depending on the study population, histological subtype, antibody clone, and scoring methodology used.[7,9]

Although PD-L1 testing is increasingly performed in routine pathology practice, data regarding PD-L1 expression in lung carcinoma patients in Bangladesh remain limited. Therefore, the present study was undertaken to evaluate PD-L1 immunoexpression in selected cases of lung carcinoma at a tertiary care center in Bangladesh.

Methods

This retrospective cross-sectional study was conducted in the Department of Pathology, Bangladesh Medical University. The study was carried out from 1 June 2025 to 10 June 2026. All histopathologically diagnosed cases of lung carcinoma in which PD-L1 immunohistochemistry had been performed using the PD-L1 (22C3) antibody clone during the study period were considered eligible for inclusion. Demographic and clinicopathological information including age, sex, tumor side, histological subtype, and TPS score were retrieved from pathology requisition forms and departmental records.

Histopathology records and archived formalin-fixed paraffin-embedded tissue blocks were reviewed. Hematoxylin and eosin-stained slides were examined to confirm diagnosis and histological subtype.

PD-L1 immunohistochemical staining archived slides using the PD-L1 (22C3) monoclonal antibody clone according to standard laboratory protocols were collected and reviewed. PD-L1 expression was reevaluated by assessing membranous staining of viable tumor cells and reported as Tumor Proportion Score (TPS).

TPS <1% = Negative
TPS 1–49% = Low expression
TPS ≥50% = High expression

Data were entered and analyzed using SPSS version 26. Descriptive statistics were expressed as frequencies, percentages, means, and standard deviations.

Results

The age of the patients ranged from 40 to 83 years with a mean age of 60.8 ± 10.9 years.

Table I: Sex Distribution of Study Population

Sex	Number (%)
Male	24 (68.6)
Female	11 (31.4)
Total	35 (100)

Among the study population, 24 (68.6%) were male and 11 (31.4%) were female.

Table 11: Distribution of tumor location according to Tumor Side

Side	Number (%)
Right	22 (62.9)
Left	12 (34.3)
Not Mentioned	1 (2.9)
Total	35 (100)

Right-sided tumors were more common than left-sided tumors.

Table III: Histological Subtypes of Lung Carcinoma

Histological Type	Number (%)
Adenocarcinoma	20 (57.1)
Squamous Cell Carcinoma	12 (34.3)
NSCLC-NOS	2 (5.7)
Adenosquamous Carcinoma	1 (2.9)
Total	35 (100)

Among the 35 cases of lung carcinoma, adenocarcinoma was the predominant histological subtype, accounting for 20 cases (57.1%). This was followed by squamous cell carcinoma, which constituted 12 cases (34.3%). Non-small cell lung carcinoma-not otherwise specified (NSCLC-NOS) was identified in 2 cases (5.7%), while adenosquamous carcinoma was observed in 1 case (2.9%).

Table IV: PD-L1 Expression Status

PD-L1 Status	Number (%)
Positive	4 (11.4)
Negative	31 (88.6)
Total	35 (100)

PD-L1 positivity was observed in 4 (11.4%) cases.

Table V: Histological Distribution of PD-L1 Positive Cases

Histological Type	Positive Cases
Adenocarcinoma	3
NSCLC-NOS	1
Squamous Cell Carcinoma	0
Adenosquamous Carcinoma	0

Three of the four positive cases were adenocarcinoma and one case was NSCLC-NOS.

Table VI: Clinicopathological Characteristics of PD-L1 Positive Cases

Age	Sex	Histology	Side	TPS (%)
75	Male	Adenocarcinoma	Right	29
60	Female	Adenocarcinoma	Left	30
67	Male	Adenocarcinoma	Right	50
75	Male	NSCLC-NOS	Left	15

Among the four PD-L1-positive cases, three (75.0%) were adenocarcinoma and one (25.0%) was NSCLC-NOS. The mean age of PD-L1-positive patients was 69.3 years. Two positive tumors were located in the right lung and two in the left lung. One adenocarcinoma case showed high PD-L1 expression (TPS 50%), whereas the remaining cases showed low expression.

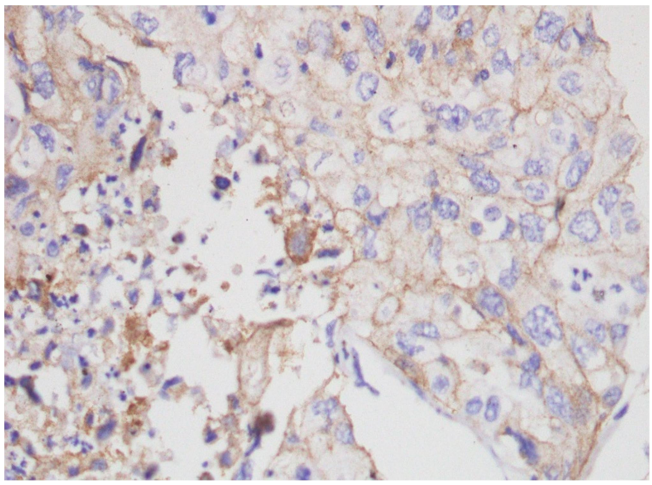

Figure 1. Photomicrograph showing PDL1 immunoexpression, 400X

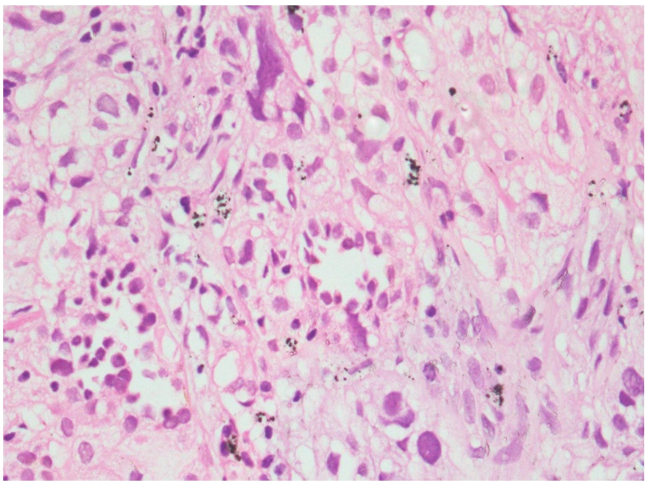

Figure 2. Photomicrograph showing histopathology section of adenocarcinoma, (H&E Stain) 100X

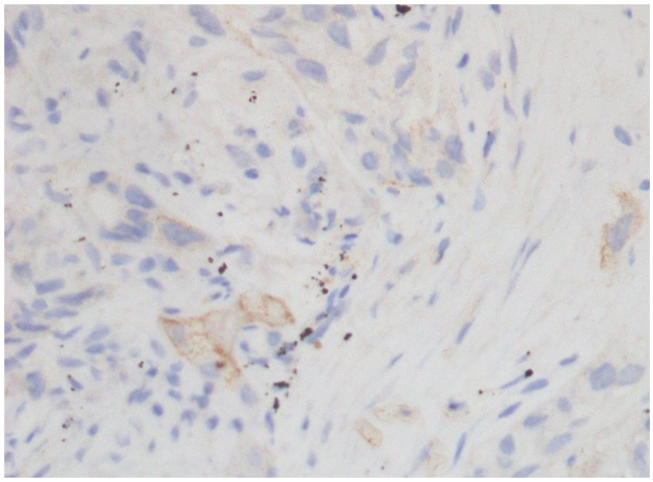

Figure 3. Photomicrograph showing PDL1 immunoexpression, 400X

Discussion

The present study evaluated PD-L1 immunoexpression in 35 selected cases of lung carcinoma using the PD-L1 (22C3) antibody clone. PD-L1 positivity was observed in 11.4% of cases. This prevalence is lower than that reported in most international studies, where PD-L1 positivity rates generally range from 20% to 60%.[5,7,8,9]

Adenocarcinoma was the most common histological subtype in the present study, accounting for 57.1% of all cases and 75% of PD-L1-positive tumors. Among the 20 adenocarcinoma cases, three (15.0%) demonstrated PD-L1 positivity. Similar observations have been reported by Zhou et al.[7] and Song et al.[8] who documented PD-L1 expression across different NSCLC subtypes.

The age of the study population ranged from 40 to 83 years, with a mean age of 60.8 ± 10.9 years. PD-L1-positive patients had a mean age of 69.3 years. Most positive cases occurred in older individuals, which is consistent with the demographic profile of lung carcinoma reported in previous studies.[1,2]

Among the four PD-L1-positive cases, three were male and one was female. Similar male predominance has been reported in many lung cancer cohorts worldwide.[1]

Only one patient demonstrated high PD-L1 expression (TPS ≥50%), while the remaining three cases showed low PD-L1 expression. High PD-L1 expression is clinically significant because patients with TPS ≥50% may be considered for first-line pembrolizumab therapy.[3,6]

The prevalence of PD-L1 positivity observed in this study was lower than that reported by Skov et al., who documented positivity in approximately 30% of NSCLC cases[9] and Zhou et al., who reported positivity rates of approximately 24% in a large Chinese cohort.[7] Differences in sample size, ethnicity, patient selection, tissue sampling, antibody clones, and scoring methodologies may account for these variations.

Table VII: Comparison with International Studies

Study	Country	Sample Size	PD-L1 Positivity (%)
Skov et al.	Denmark	778	30
Zhou et al.	China	1156	24
Song et al.	China	6295	Variable
Russell et al.	Australia	6690	Variable
Present Study	Bangladesh	35	11.4

The present study has several limitations. The sample size was relatively small and the study was conducted at a single center. Clinical information such as smoking history, tumor stage, treatment history, and follow-up data were unavailable because information was obtained from pathology requisition forms. Molecular profiling data were also not available. Because PD-L1 immunohistochemistry had been performed only in selected cases, the possibility of selection bias cannot be excluded. Nevertheless, this study provides preliminary data regarding PD-L1 expression in lung carcinoma patients from Bangladesh and highlights the importance of routine biomarker testing in the era of precision oncology.

Conclusion

PD-L1 immunoexpression was detected in 11.4% of selected lung carcinoma cases. Adenocarcinoma accounted for the majority of PD-L1-positive tumors. Most positive cases demonstrated low PD-L1 expression, while only one case exhibited high expression. Routine PD-L1 assessment using the 22C3 antibody clone may assist in

identifying lung carcinoma patients who are likely to benefit from immune checkpoint inhibitor therapy.

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