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Underutilization of adjuvant therapy in resected IB-III non-small-cell lung cancer risk model - analysis from the Brazilian registry of lung cancer

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Introduction: Despite the proven survival benefits of adjuvant systemic therapy (AT) in resected non-small-cell lung cancer (NSCLC), its underutilization remains a concern.[1-3]

Objecitve: This study aims to explore the extent to which socioeconomic disparities influence AT underutilization.

Methods: Data from the Brazilian Registry of Lung Cancer (2009-2023), was queried for patients with complete surgical resected stage IB-III and stratified based on AT delivery. Demographic, clinical, and pathological variables were evaluated. Logistic regression model was performed. The model's performance was assessed through detailed analyses of sensitivity, specificity, and the Area under the Receiver Operating Characteristic (AUC-ROC) curve, complemented by the Hosmer–Lemeshow test for evaluating its fit and accuracy.

Results: Among 427 patients with resected stage IB–III NSCLC eligible for AT, only 38.4% received it. Higher AT delivery rates were observed in stages III/II compared to IB ($p<0.001$). Factors such as age, insurance, histology, lymphovascular invasion, TNM pathological stage, and pathological node (pN) status were independently associated with AT delivery in univariable analysis ($p<0.005$). Multivariable logistic regression model revealed that older age, public healthcare system, specific histological types, pneumonectomy, and stage IB were significantly associated with non-receipt of AT ($p<0.05$), see table 1. The final Multiple Binary Logistic Regression model presents an equation to estimate the likelihood of a patient undergoing solely surgical treatment. This equation is formulated as $-5.703 + 0.058\times\text{Age} + 0.974\times\text{PublicHealthSystem} + 0.241\times\text{CEC} + 3.059\times\text{LargeCells+Others} + 0.868\times\text{Pneumonectomy} + 0.657\times\text{Sublobar} + 2.089\times\text{StageIB} + 0.867\times\text{StageIIA} + 0.386\times\text{StageIIB} - 0.251\times\text{StageIIIA} + 1.207\times\text{pNNegative}$. A calculated probability above 42.5% categorizes a patient for exclusive surgical intervention. The model demonstrates robust discriminative ability, evidenced by an AUC of 0.833 (Figure 1), high sensitivity at 90.2%, and moderate

specificity of 60.0%. The model's fit was confirmed through the Hosmer-Lemeshow test, with a p≥0.05.

Conclusion: Underutilization of AT in patients with resected stage IB-III NSCLC is linked to patient, institutional, and pathological factors. Addressing these disparities is crucial, particularly with the advent of new adjuvant therapy options that promise enhanced survival outcomes.

Keywords: Adjuvant therapy; Socioeconomic disparities; Immunotherapy; Non-small-cell lung cancer; Systemic therapy

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RECOMMENDED BIBLIOGRAPHY

1. Burdett S, Pignon JP, Tierney J, Tribodet H, Stewart L, Le Pechoux C, Aupérin A, Le Chevalier T, Stephens RJ, Arriagada R, Higgins JP, Johnson DH, Van Meerbeeck J, Parmar MK, Souhami RL, Bergman B, Douillard JY, Dunant A, Endo C, Girling D, Kato H, Keller SM, Kimura H, Knuuttila A, Kodama K, Komaki R, Kris MG, Lad T, Mineo T, Piantadosi S, Rosell R, Scagliotti G, Seymour LK, Shepherd FA, Sylvester R, Tada H, Tanaka F, Torri V, Waller D, Liang Y; Non-Small Cell Lung Cancer Collaborative Group. Adjuvant chemotherapy for resected early-stage non-small cell lung cancer. Cochrane Database Syst Rev. 2015;2015(3):CD011430. Review.
2. Kehl KL, Zahrieh D, Yang P, Hillman SL, Tan AD, Sands JM, et al. Rates of Guideline-Concordant Surgery and Adjuvant Chemotherapy Among Patients With Early-Stage Lung Cancer in the US ALCHEMIST Study (Alliance A151216). JAMA Oncol. 2022;8(5):717-28.
3. Rodriguez-Quintero JH, Kamel MK, Jindani R, Zhu R, Friedmann P, Vimolratana M, et al. Is underutilization of adjuvant therapy in resected non-small-cell lung cancer associated with socioeconomic disparities? Eur J Cardiothorac Surg. 2023;64(6):ezad383. Erratum in: Eur J Cardiothorac Surg. 2024;65(5).

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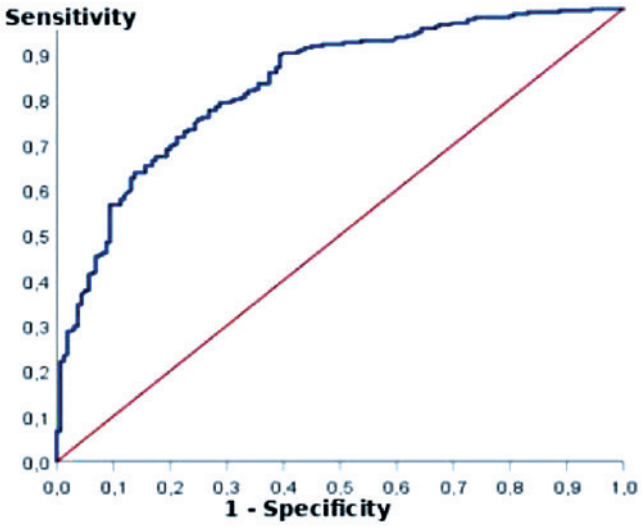
Table 1. Multiple Binary Logistic Regression Analysis to Identify Risk Factors Associated with adjuvant therapy not delivery

		- Final model -			
Risk Factors	**β**	**Wald Chi-Squared test**			**O.R (C.I 95%)**
Intercept (β0)	-5,703	24,689	< 0,001	-	-
Age at surgery	**0,058**	**16,669**	**< 0,001**	**1,06**	**(1,03; 1,09)**
Health care system					
Public	0,974	7,58	**0,006**	**2,65**	**(1,32; 5,30)**
Private	0				
Type of histology					
Adenocarcinoma	0				
Squamous	0,241	0,73	0,393	1,27	(0,73; 2,21)
Large cells and others	3,059	16,486	**< 0,001**	**21,3**	**(4,9; 93,3)**
Type of ressection					
Lobectomy	0				
Pneumonectomy	0,868	3,652	0,056	2,38	(0,98; 5,80)
Sublobar	0,657	0,361	0,548	1,93	(0,23; 16,47)
Pathological stage (TNM 8th)					
I-B	2,089	9,768	**0,002**	**8,1**	**(2,2; 29,9)**
II-A	0,867	1,597	0,206	2,38	(0,62; 9,13)
II-B	0,386	0,51	0,475	1,47	(0,51; 4,25)
III-A	-0,251	0,222	0,637	0,78	(0,27; 2,21)
III-B	0				
Pathological node status (pN)					
positive	0				
negative	1,207	15,766	**< 0,001**	3,34	**(1,84; 6,07)**

Note: Pseudo R2 (Cox & Snell) = 0,300 // Pseudo R2 (Nagelkerke) = 0,408
The p-value refers to the probability of significance for the Wald Chi-Squared test.
Hosmer-Lemeshow Test p = 0,234
ß = Regression Coefficient
95% Confidence Interval for the Odds Ratio = 95% C.I for O.R.



NOTE: - AUC (Area Under the Curve) = 0.83 and 95% CI AUC = (0.79; 0.87).

Figure 1. AUC-ROC Curve to detect the cutoff point based on the probability of a patient receiving "Surgical Only" treatment estimated by the Multiple Binary Logistic Regression Model