Seven Tumor-Associated Autoantibodies as a Serum Biomarker for Primary Screening of Non-Small Cell Lung Cancer

Chen Tingting

Zhejiang University of Traditional Chinese Medicine First Affiliated Hospital: Zhejiang Hospital of Traditional Chinese Medicine

Lu Wei

Zhejiang University of Traditional Chinese Medicine First Affiliated Hospital: Zhejiang Hospital of Traditional Chinese Medicine

Chen Ping (✉ ctt3034@zcmu.edu.cn)

Zhejiang University of Traditional Chinese Medicine First Affiliated Hospital: Zhejiang Hospital of Traditional Chinese Medicine

Research

Keywords: Tumor-associated autoantibodies, NSCLC, screening method, sensitivity

Posted Date: March 17th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-321719/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Objective: Tumor-associated autoantibodies (TAAbs) are produced by the organism in response to peptides at the surface of tumor cells or proteins released by tumors. The purpose of this study is to analyze the expression of TAAbs in different pathological stages and determine their diagnostic value in early non-small cell lung cancer (NSCLC).

Methods: We retrospectively analyzed the expression of 7-TAAbs in 216 newly diagnosed NSCLC patients, 202 patients with lung benign diseases and 137 healthy cases. The expression of a panel of 7-TAAbs, including p53, GAGE7, PGP9.5, CAGE, MAGE A1, SOX2, GBU4-5, was measured by ELISA.

Results: The serum levels of p53, GAGE7, PGP9.5, CAGE, MAGE A1, SOX2 and GBU4-5 were not statistically significant ($P>0.05$) in NSCLC, benign and healthy groups. The area under the curve (AUC) of 7-TAAbs were all lower than 0.70. The sensitivity of combined detection was the highest (26.39%), while the specificity was the lowest (88.62%). PGP9.5, SOX2, GAGE7, MAGE A1 and combined detection were significantly different among the three groups ($P < 0.05$). PGP9.5, GAGE7, MAGE A1 and combined detection were significantly different between the NSCLC and benign groups ($P < 0.05$). PGP9.5, SOX2, GAGE7 and combined detection were significantly different between the NSCLC and healthy groups ($P < 0.05$). The positive rate of the combined detection of 7-TAAbs was 44.44% in NSCLC stage IV, while that in the other three stages was less than 30.00%.

Conclusions: The sensitivity of 7-TAAbs in early NSCLC was not high, so it cannot be used alone as a screening method for NSCLC. In view of the differences of positive rate between the NSCLC and non-NSCLC groups, 7-TAAbs can be used as a supplementary mean of NSCLC screening.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the latest manuscript can be downloaded and [accessed as a PDF](#).

Tables

Table 1. The clinical features of the NSCLC group

group		NSCLC group %n
Pathological classification	Adenocarcinoma	83.56183
	Squamous carcinoma	13.8930
	Adenosquamous carcinoma	1.39 (3)
Pathological stage	Stage I	75.46163
	Stage II	6.4814
	Stage III	5.4612
	Stage IV	12.5027
Typical respiratory symptoms	Cough	17.5938
	Expectoration	9.2620
	Chest pain	4.179
	Chest tightness	8.3318
Regional lymph node status	N0	81.48176
	N1	3.708
	N2	4.6310
	N3	10.1922
Distant metastasis status	No distant metastasis	87.04 (188)
	Distant metastasis	12.50 (27)
	Unable to evaluate	0.46 (1)

Table 2. The diagnostic efficiency of 7-TAABs in NSCLC								
	p53	PGP9.5	SOX2	GAGE7	GUB4-5	MAGE A1	CAGE	Combined
Sen (%)	2.31	3.24	3.70	7.87	10.65	4.17	2.78	26.39
Spe (%)	98.50	100.00	99.10	98.20	92.81	99.40	98.80	88.62
PPV (%)	50.00	100.00	72.73	73.91	48.94	81.82	60.00	60.00
NPV (%)	60.93	61.51	61.41	62.24	61.63	61.60	61.11	65.05
Sen: Sensitivity; Spe: Specificity; PPV: positive predictive value; NPV: negative predictive value.								

Table 3. Comparison of positive rate of 7-TAABs among the NSCLC, benign and healthy groups					
	Total				
index	χ^2	<i>P</i>	<i>P1</i>	<i>P2</i>	<i>P3</i>
P53	1.153	0.562	-	-	-
PGP9.5	11.126	0.004*	0.015*	0.046*	-
SOX2	6.323	0.042*	0.223	0.025*	0.275
GAGE7	13.835	0.001*	0.001*	0.020*	0.689
GUB4-5	2.435	0.296	-	-	-
MAGE A1	9.584	0.008*	0.004*	0.214	0.163
CAGE	2.006	0.367	-	-	-
Combined	24.321	<0.001*	<0.001	0.002*	0.354
<i>P</i> is the comparison among the NSCLC, benign and healthy groups. <i>P1</i> is the comparison between the NSCLC and benign groups. <i>P2</i> is the comparison between the NSCLC and healthy groups. <i>P3</i> is the comparison between the benign and healthy groups. * <i>P</i> <0.05 was statistically different among the three groups.					

Figures

Figure 1

Comparative analysis of 7-TAABs expression between NSCLC, benign and healthy groups a. Expression of p53 in NSCLC, benign and healthy groups; b. PGP9.5 expression in NSCLC, benign and healthy groups; c. SOX2 expression in NSCLC, benign and healthy groups; d. GAGE7 expression in NSCLC, benign and healthy groups; e. GUB4-5 expression in NSCLC, benign and healthy groups; f. MAGE A1 expression in NSCLC, benign and healthy groups; g. CAGE expression in NSCLC, benign and healthy groups.

Figure 2

The ROC curve of 7-TAABs in NSCLC diagnosis

Figure 3

The positive rates of 7-TAABs in the three groups (%)

Figure 4

The positive rate of 7-TAABs in the NSCLC group