The characteristics in Chinese NSCLC patients with different BRAF mutation Classes

Qian Wang1, Dingqiang Fu2, Xing Li2, Liwen Zhang2, Xiaowei Dong2, Fei Pang2

1Department of Respiratory Medicine, Affiliated Hospital of Nanjing University of Chinese Medicine, China
2Shanghai OrigiMed Co., Ltd., Shanghai, China

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Background

- Compared with BRAF Class II and Class III mutations in non-small cell lung cancer (NSCLC), BRAF Class I mutations can be effectively targeted by inhibitors.
- However, the characteristics of Chinese NSCLC with different BRAF mutation types have not been fully clarified.
- Thus, the more comprehensive exploration of BRAF mutation profile in Chinese NSCLC was investigated to guide the development of personalized treatment strategies.

Methods

- Data was collected on a total of 2,030 cases of NSCLC throughout China between October 2018 and October 2021.
- Next Generation Sequencing (NGS) is based on the sequencing of tissue samples on a panel with 450 cancer-related genes (YUANSU™).
- Wilcoxon Rank Sum Test were applied to significance statistics.

Results

- Among the samples, BRAF mutations were detected in 82 cases (4.0%, 82/2030), including 19 Class I (0.9%, 19/2030, V600E), 13 Class II (0.6%, 13/2030, K601E, L597R/Q, G464V, G469A/V), and 11 cases Class III (0.5%, 11/2030, G466A/E, N581I, D594G/N). In addition, 39 cases (1.9%, 39/2030) remained unclassified: 22 (1.0%, 22/2030) with potential significance. (Figure 1).
- The BRAF mutations were more commonly observed in primary tumors (p=0.066) and the Class I mutations were more prevalent in female patients (63.2%, 12/19, p=0.005). (Figure 2).
- In addition, the median TMB (7.21 mut/Mb) of Class I mutations was significantly lower than that of Class II mutations (median TMB =12.69 mut/Mb), II mutations (median TMB = 22.32 mut/Mb) and unclassified BRAF mutations (median TMB = 10.33 mut/Mb, p = 0.033), implying that the patients with Class I mutations may not be suitable for immunotherapy compared with patients with Class II and III mutations. (Figure 3).
- Furthermore, TP53, LRP1B, STK11, SPTA1 and MAGI2 were significantly over-mutated in Class II and III (p<0.06) and SETD2 is over-mutated in Class I (p<0.001), might suggesting relatively poor prognosis in NSCLC patients (Figure 4).

Conclusions

The characteristics of Chinese NSCLC were explored, including BRAF mutation types, the incidence of related co-mutations and TMB value, which is helpful to formulate targeted therapy strategies to adapt to different types of BRAF mutation functions according to their genomic and clinical characteristics.