

Association between the first line chemotherapy and second line immunotherapy in lung cancer patient

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Background/Aims: The immune checkpoint inhibitors that target the programmed cell death receptor-1 and its ligand have achieved remarkable success in treatment for advanced lung cancer. However, it is little known about clinical biomarkers that could help to select patients who will respond well to immunotherapy. We conducted a retrospective study to figure out whether the first-line platinum-based doublet chemotherapy agent would affect the subsequent outcome of immunotherapy in non-small cell lung cancer (NSCLC) patients.

Methods: Retrospective data of 108 NSCLC patients who were treated with immunotherapy including pembrolizumab, nivolumab, or atezolizumab between January 2018 and June 2020 were reviewed. We excluded patients who did not receive platinum-based doublet chemotherapy agents as first-line and patients who received immunotherapy as other than the second line. The clinical information, pathological variables, and radiological findings were reviewed. The patient data were followed up until the date of the last visit, death, or the end of data recording (31 June 2020). The Kaplan-Meier method was used for estimation of survival time and the log-rank test was used for assessment of the difference in survival between the types of first-line chemotherapy.

Results: A total of 84 NSCLC patients were treated with second-line immune checkpoint inhibitors after first-line platinum-based doublet chemotherapy. Forty-three (51%), 36 (43%), 3 (4%) and 2 (2%) patients received pemetrexed, gemcitabine, docetaxel and paclitaxel for the first-line treatment, respectively. The pemetrexed group showed significantly shorter mean progression-free survival (4.0 months vs. 9.1 months, $P=0.036$) compared to other regimen groups. The gemcitabine group showed longer survival than other groups (8.4 months vs. 4.6 months and 37.3 months vs. 32.0 months for PFS and OS, respectively); however, this difference was not statistically significant ($P=0.158$ and $P=0.112$ for PFS and OS, respectively).

Conclusions: The type of platinum-based doublet chemotherapy received as first-line treatment may predict the survival of patients treated with second-line immune checkpoint inhibitors.

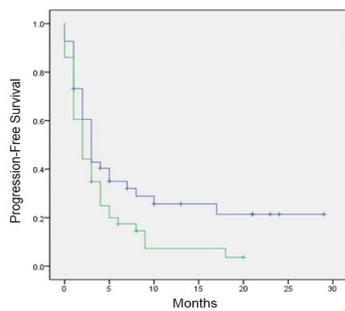


Figure 1. Kaplan-Meier PFS curves for pemetrexed group

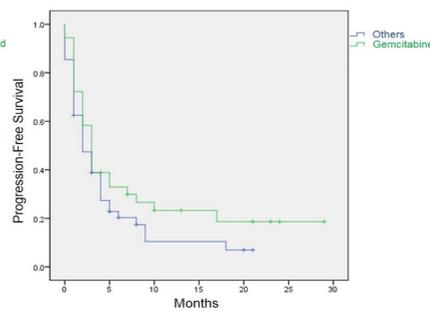


Figure 2. Kaplan-Meier PFS curves for gemcitabine group

Table 1. Baseline characteristics of 84 study patients.

Variables	Pemetrexed group (n=43)	Gemcitabine group (n=36)	Docetaxel group (n=3)	Paclitaxel group (n=2)
Age, years	67 (62-73)	71 (64-76)	68 (59-72)	60 (57-63)
Male gender	32 (74)	34 (94)	3 (100)	2 (100)
Histology				
Adenocarcinoma	41 (95)	4 (11)	1 (33)	2 (0)
Squamous cell carcinoma	0 (0)	4 (81)	0 (0)	0 (0)
NSCLC, NOS	2 (5)	3 (8)	2 (67)	0 (0)
PD-L1				
SP263	41 (95)	33 (92)	3 (100)	1 (50)
S22CS	24 (56)	23 (64)	0 (0)	1 (50)
SP142	17 (40)	18 (50)	3 (100)	0 (0)
T stage				
≤ 2	25 (58)	14 (39)	1 (33)	0 (0)
> 2	18 (42)	22 (61)	2 (67)	2 (100)
N stage				
≤ 1	15 (35)	8 (22)	1 (33)	1 (50)
> 1	28 (65)	28 (78)	2 (67)	1 (50)
M stage				
0	2 (0)	6 (17)	1 (33)	1 (50)
1a	7 (16)	6 (17)	1 (33)	0 (0)
1b	7 (16)	14 (39)	1 (33)	1 (50)
1c	27 (63)	10 (28)	0 (0)	0 (0)
Immunotherapy				
Pembrolizumab	12 (28)	12 (33)	2 (67)	1 (50)
Nivolumab	13 (30)	14 (39)	0 (0)	0 (0)
Atezolizumab	18 (42)	10 (28)	1 (33)	1 (50)