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1380P Description of the clinical characteristics and survival in patients with metastatic NSCLC in the Spanish population: An analysis of the thoracic tumours registry (RTT study)

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Background: The lung cancer is the leading cause of death due to cancer in Western countries, the prognosis depends on the tumor stage and the clinical, histological and molecular characteristics.

Methods: The RTT study of the Spanish Lung Cancer Group is a database that includes the data of patients with lung malignant neoplasms. The objective of this retrospective study is to descriptive the clinical and epidemiological aspects of NSCLC in the Spanish population.

Results: The total of patients included in the RTT is 12.897 (Aug 2016 - Jan 2020) and this report is based in the analysis of 5.049 of them. The clinical and demographic data are described in the table. Adenocarcinoma (72,2%), squamous cell carcinoma (SCC) (18,6%), other types. The sites of metastasis: contralateral lung (34.3%), bone (31%), liver (12.8%) and CNS (6.02%). The first-line of treatment was chemotherapy (CT) in 66,54%, oral target therapy 13,45%, immunotherapy (IO) 8,62% and CT+IO 2,46%. The median of PFS of 7.4 months (7.13-7.6 months) in all population with an estimated at 6, 12, 24, and 60 months of 58.3% (95%CI 56.81% - 59.74%), 29.97% (95%CI 28.56% - 31.4%), 13.4% (95%CI 12.2% - 14.6%) and 2.6% (95%CI 1.98%-3.5%) respectively. The median of OS was 15.5 months (14.8-16.4). According to the histological type (SCC vs non-SCC), the median (in months) of PFS was 6.67 (6.1- 7.1) vs 7.53 (7.3-7.9) (HR 0.78, 95% CI 0.72 - 0.85) and OS 13.8 (12.6-15.6) vs 16.9 (15.7 - 18) in non-SSC, p <0.001. The analysis of survival in patients with or without liver metastasis showed a median OS of 15 months (14.3-16m) vs 18.1 months (16.1-19.9m), HR 0.88, 95%CI 0.79-0.98 (p<0.05).

Table: 1380P

	N = 5049
Age, Median	68, 29 y (25-96)
Sex	M:71,16% - F:28,83%
Smoking habit Smoker Former smoker Never smoker	42,42% 41,06% 15,56%
Asbestos exposure	2,14%
Patient history of cancer	13,5%
Family history of cancer	40,82%

Conclusions: The results of our study show a similarity in the clinical characteristics of patients with NSCLC in the Spanish population with the data in the western population previously described. Both, the histological subtype and the presence of liver metastases are predictive factors for survival.

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1381P Spatial-statistics-based modeling for predicting treatment response in non-small cell lung cancer (NSCLC) patients using H&E pathology images

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Background: IMpower150 study in NSCLC (NCT02366143) found no significant overall survival (OS) benefit between the Atezolizumab+Carboplatin+Paclitaxel (ACP, treatment) arm and Carboplatin+Paclitaxel+Bevacizumab (BCP, control) arm, with hazard ratio (HR): 0.85, 95% confidence interval (CI): 0.71-1.03. We applied spatial statistics algorithms to characterize the spatial interaction between tumor cells and lymphocytes in the tumor microenvironment and improved the prediction of response of ACP therapy using the generated spatial features.

Methods: A proprietary image analysis algorithm was applied on H&E pathology images of baseline tissue samples from IMpower150 patients to detect the coordinates of tumor cells and lymphocytes. To systematically extract features that capture the spatial heterogeneity of the tumor microenvironment from these cell coordinates as input, we implemented spatial statistics algorithms based on spatial point, spatial lattice and geostatistical process methods. To investigate the association between the derived spatial features and OS, Cox proportional hazard model with L2 regularization was fitted for the Atezolizumab-treated patients. The high and low response group were further identified using nested Monte Carlo Cross Validation to prevent over-fitting.

Results: 284 ACP patients and 271 BCP patients with H&E pathology images and OS in the IMpower150 study were used in this analysis. 41 spatial features including Ripley's K-function, Morista-Horn index, etc. were derived to capture the cell-cell interaction. In the identified high responder group, the HR between ACP patients and BCP patients is 0·64 (95% CI 0·45—0.91), and the p-value of the log-rank test is 0.012.

Conclusions: We developed the spatial statistics algorithms to identify biologically relevant features in the tumor microenvironment such as immune-cancer cell interactions from the H&E pathology images. Our results indicate the method can better stratify patients who benefit from the Atezolizumab treatment in comparison with standard of care therapy.

Clinical trial identification: NCT02366143.

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1382P Automating access to real-world evidence

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Background: Real-world evidence is important in regulatory and funding decisions. Manual data extraction from electronic health records (EHR) is time-consuming. Automated extraction using natural language processing and artificial intelligence may facilitate this process. We compared manual and automated data collection from EHR of patients with advanced lung cancer.

Methods: Previously, we extracted data using an automated platform from unstructured EHR for ~1200 patients with advanced lung cancer (diagnosed 01/15-05/18 at a major cancer centre). For comparison, 100 of 333 patients that received systemic therapy were randomly selected and clinical data manually extracted by 2 trained abstractors using the same variable definitions, including patient, disease

characteristics and treatment. All cases were re-reviewed by an expert adjudicator. Accuracy and concordance between automated and manual methods are reported.

Results: Automated extraction required significantly less time (<72 hours) than manual extraction (225 person-hours). Collection of demographic data (age, sex, diagnosis) was highly accurate and concordant with both methods, (96-100%). Accuracy and concordance were lower for unstructured data elements in EHR, such as ECOG performance status, date of stage IV diagnosis and smoking status (automated accuracy: 94%, 93%, 88% respectively; manual accuracy: 83%, 78% and 94%). Detection of biomarker testing was highly accurate and concordant (96-98%), although detection of final results was more variable (accuracy 84-100%, concordance 84-99%). Automated extraction identified metastatic sites more accurately than manual (concordance 70-99%), with the exception of lymph node metastasis (automated 66%, manual 92%, concordance 58%), due to use of analogous terms in radiology reports not included in the gold standard definition. Concurrent medications (86-100%) and comorbid conditions (96-100%), were reported with high accuracy and concordance. Treatment details were also accurately captured with both methods (84-100%) and highly concordant (83-99%).

Conclusions: Automated data abstraction from unstructured EHR is highly accurate and faster than manual abstraction. Key challenges include poorly structured EHR and use of analogous terms beyond the gold standard definition.

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1383P Lung cancer in adolescents and young adults (AYA) in Asia: Tumour characteristics and molecular profiles

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Background: More than half of the world's lung cancer (LC) occur in Asia. Studies reported approximately 0.5-2% of LC are diagnosed before the age of 40. LC in the young is less common with different clinico-molecular characteristics and prognoses. We aim to highlight the clinicopathological features and molecular profile of AYAs with LC in an Asian tertiary institution.

Methods: Patients aged between 16-39 who first presented to the National Cancer Centre Singapore from 2015 to 2019 with LC were included. Demographic features and clinico-pathological characteristics were extracted from our electronic health records. 91 AYA patients were recruited however 12 patients were excluded due to incomplete clinicopathological data. We compared our patients to an older study cohort within our institution from a published database.

Results: Median age of diagnosis was 36 years old (n=79). 11.4%(n=9) were diagnosed under the age of 30. There were more female (58.2%, n=46) and Chinese patients (67.1%, n=53). 35 patients (44.3%) were from other Asian countries. Out of 77 patients with known histological subtypes, most had adenocarcinoma (66.2%, n=51). 72.2%(n=57) had Stage IV disease at presentation. The most common mutations found were the Epidermal growth factor receptor (EGFR) and the anaplastic lymphoma kinase (ALK), both with an incidence of 27.8%(n=22) each. RET proto-oncogene (RET), hepatocyte growth factor oncogene (MET) and Kirsten rat sarcoma oncogene (KRAS) mutation rates were 10.1%(n=8), 10.1%(n=8) and 2.5%(n=2) respectively. 11 patients (13.9%) participated in a clinical trial. 17 patients (21.5%) had brain metastases. Median overall survival was 30 months (1.8 months - 152.0 months).

Conclusions: AYAs with LC have distinct characteristics. Compared to an older cohort, AYAO patients with LC tend to be females (58.2% vs 47%), with a higher ALK mutation rate (27.8% vs 4.0%) and a lower EGFR mutation rate (27.8% vs 53.0). Majority had advanced disease at diagnosis with an aggressive course. We intend to elucidate how their mutational profile and tumour mutation burden can affect their outcomes. Further studies to evaluate reasons for low accrual rate for clinical trials among AYAO patients, the types and responses of clinical trials should be done.

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1384P Prognostic factors for survival in patients with metastatic lung adenocarcinoma: Analysis of the SEER database

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Background: Lung cancer is the leading cause of cancer death, accounting for about one-fifth of all cancer deaths. Lung cancer is broadly split into non-small cell lung cancer (NSCLC) (about 80%-85% of cases) and small cell lung cancer (SCLC). Survival is affected by different disease factors, most of which are described in clinical trials. Our objective was to identify poor prognostic factors for survival in patients with stage IV lung adenocarcinoma in real clinical practice.

Methods: We used the SEER database, selecting all patients with stage IV lung adenocarcinoma diagnosed between 2010-15, to describe median overall survival (mOS). Chi-squared bivariate analysis was used for the association of binary qualitative variables, and the ANOVA test was used to compare two or more variables. A multivariate Cox regression analysis was performed to determine the impact of these prognostic factors on OS.

Results: A total of 46,030 patients were included: 51.3% men, 54.8% ≥65 years old (mean 67.03); 68.5% Caucasian; 44.7% lived alone. At diagnosis, metastases were found in bone (39.8%), brain (27.8%), liver (16.4%), and lung (30.3%). In total, 46.51% of patients had only one metastatic site, 29.76% had ≥2, and 21.9% had more metastatic sites. In the overall population, mOS was 6 (95%CI: 5.90—6.09) months (men: 5 mo; women: 7 mo, $p < 0.001$). Among patients with only one site of metastasis, liver metastases had the worst mOS (5 mo; 95%CI: 4.47—5.52), followed by bone metastases (7 mo, 95%CI: 6.73—7.27), brain metastases (7 mo, 95%CI: 6.70—7.30), and lung metastases (9 mo; 95%CI: 8.55—9.44). Patients with two or more sites of metastases showed the worst mOS (≤4 mo) only if liver metastases were present. Among patients with liver metastases, 78.3% had at least one other involved site (bone: 76.4%; Lung: 47.1%; and brain: 37.2%). Multivariate analysis showed that OS was mostly affected by liver metastases (HR=1.447, $p < 0.001$), age ≥65 years (HR=1.366, $p < 0.001$), and bone metastases (HR=1.207, $p < 0.001$).

Conclusions: Liver metastases were identified as the worst prognostic factor in patients with metastatic lung adenocarcinoma. Thus, their presence should be taken into account in future studies evaluating new cancer treatments, such as immunotherapy.

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