MA16.01 Project PRIORITY: A Patient-Founded and Patient-Driven Research Partnership on Real-World Data on EGFR-Positive Lung Cancer

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Background: Despite increases in PFS in EGFR-positive lung cancer patients due to EGFR TKIs, patients eventually develop resistance to these drugs. Project PRIORITY (Patient Reported Initiative On Resistance, Incidence, Treatment study) is a patient-founded and patient-driven longitudinal study aimed at understanding unmet needs of the global EGFR-positive lung cancer community. Method: A comprehensive 103-question, IRB-approved patient-facing survey about the diagnostic and treatment journey of patients (including risk factor exposure, treatments, symptom and side-effect management, access to biomarker testing and clinical trials) was developed with input from US FDA statisticians and expert clinicians, and then pilot-tested among English-speaking patients both locally and internationally. Differences between US and international participants were analyzed by Chi-square (for categorical variables) and ANOVA. Result: Of the 253 respondents, 27.7% were international participants. In line with previous studies with EGFR patients, participants reported low rates of active tobacco exposure (16.4%) and high rates of second-hand tobacco exposure (34.7%). Also, first-line use of afatinib (OR = 2.5, p < 0.05) and erlotinib (OR = 3.3, p < 0.05) were associated with development of a T790M mutation reflecting similarity in clinical characteristics. US participants were more likely to find childhood exposure to secondhand smoke, family history of cancer (other than lung cancer), use of more than one line of therapy, and combination first-line therapy (P < 0.05 for all variables). International participants were more likely to report first-line treatment with 1st/2nd generation TKI, less use of tissue and plasma NGS, lower clinical trial participation, and more use of whole-brain radiation for brain metastasis (P < 0.05 for all variables).

Conclusion: This first-of-its-kind international study provides a comprehensive picture of the treatment of EGFR-positive lung cancer patients in the real-world setting and highlights the existence of diagnostic (low NGS rates) and treatment gaps (low clinical trial participation and different treatment sequencing) both within the US and internationally. Keywords: EGFR, Real-world data, targeted therapies

MA16.02 T790M Allelic Fraction Level Did Not Correlate Survival in T790M Positive NSCLC — Observations from an Early Access Program


Background: Osimertinib is an irreversible third-generation EGFR-TKI indicated for patients with metastatic EGFR T790M mutation positive NSCLC after progression of initial TKI therapy. An early access program (EAP) was started in 2015 providing ethical access of Osimertinib to patients with metastatic NSCLC running out of treatment options in Hong Kong. As some prior data suggested that T790M allele fraction (AF) correlated survival outcomes in patients receiving Osimertinib, we try to validate it with data from this EAP. Survival outcomes and safety data of Osimertinib in the real world practice under this EAP were also analysed. (NCT03219970) Method: This retrospective analysis included EAP patients who had advanced or metastatic NSCLC harbouring EGFR T790M mutation that progressed on prior TKI ± chemotherapy. EAP subjects received Osimertinib at 80mg daily until disease progression, intolerable toxicities or death. The T790M mutation can be assessed by any approved molecular tests in any specimen types. The AF levels in patients with T790M mutation confirmed by quantitative plasma genotyping (QPG) using ddPCR technique of the same vendor were retrieved. The primary objective was to assess the relationship of post-Osimertinib overall survival (OS) and T790M AF level. Secondary objectives included investigator-assessed response, time to discontinuation (TTD) of Osimertinib, safety (Osimertinib-related adverse events of special interest, AEs) and OS of all EAP participants. Result: From Sep 2015 to Feb 2017, 156 patients enrolled in the EAP and received treatment. At time of data cut-off (11 Oct 2018), 74 (47%) were alive. Median follow-up was 23.4 (range: 1-30) months, median age 62 years, 62% female, 26% ECOG PS ≥ 2, 96.8% with metastatic disease. Besides T790M, 56% of patients had exon 19 deletions and 41% had exon 21 L858R mutations. Ninety-one patients had QPG using ddPCR method with AF data. OS, best response rate and TTD were not significantly related to T790M AF level as a continuous variable (p=0.20; hazard ratio 1.022, 95% CI 0.989 to 1.057), confirmed through sensitivity analysis with different AF threshold values. The investigator assessed best response rate was 41.7% (65/156) and disease control rate was 62.2% (97/156). Median TTD was 15.77 (12.43, 18.98) months. Median OS was 21.88 (95% CI 19.14-26.21) months. AEs were reported in 7.7% of patients overall: 5.8% QTc prolongation and 1.9% pneumonitis. Conclusion: T790M AF level did not correlate with TTD and OS in this EAP cohort but the limitations should not be overlooked. The survival outcomes concurs other reported series. Keywords: Osimertinib, Allelic fraction, Early access program

MA16.03 Big Data Analysis for Personalized Medicine in Lung Cancer Patients

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Background: Despite recent advances in the treatment of lung cancer, there is still a critical need for more effective and personalized therapy. Big data analysis offers a unique opportunity to harness the massive amounts of data generated by clinical practice to improve patient outcomes and advance research. Method: We present an analysis of a large database of lung cancer patients treated at a major comprehensive cancer center. The database includes demographic, clinical, and outcome information for over 10,000 patients. We used machine learning algorithms to identify predictive factors for survival and response to treatment. Results: Our analyses identified several key factors that impact survival and response to therapy, including age, gender, stage of disease, and genetic mutations. We also identified new biomarkers that may be predictive of response to targeted therapies. Conclusion: Big data analysis provides valuable insights into the treatment of lung cancer and can help to improve patient outcomes. Keywords: Lung cancer, Personalized medicine, Big data analysis.
MA16.05
Wearable Technology for Preconditioning Before Thoracic Surgery: A Feasibility Study

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Background: Preconditioning before surgery can lower complication rates but there are significant barriers to its adoption in the lung cancer population, which is characteristically older, suffers multiple comorbidities, and is averse to exercise. In an effort to overcome these barriers, we designed Move For Surgery (MFS), a home-based, preoperative preconditioning program which involves aerobic exercise using wearable technology and deep breathing exercises. We aimed to test the feasibility of MFS in preparation for a randomized controlled clinical trial. 

Method: In this prospective feasibility study, patients undergoing resection for NSCLC were preoperatively enrolled and provided with a wearable activity tracker (Fitbit) and a booklet describing various aerobic exercises, deep breathing exercises, and nutritional and smoking cessation tips. The daily step count, sleep cycle, and calories burned were synced and tracked remotely. Daily step goals were set by increasing the participants’ baseline step count by 600 steps each week until the day of surgery. Participants were encouraged and motivated to reach their daily step goal by daily automatic reminders through the Fitbit. Participants completed the EQ-5D-5L health-related quality of life instrument at baseline and on the day of surgery. Data is presented as mean +/- SD and median (range).

Result: Of the 40 patients screened, 62.5% (25/40) were eligible and enrolled. Of the 15 not eligible, 80% (12/15) did not have a smartphone. Participants (n=25) were enrolled from 11/2017 to 07/2018. Median age was 62 (33-82) and 72% (18/25) were women. The mean predicted FEV1 and DLCO were 88.9% +/- 23.4% and 74.9% +/- 19.8% respectively. Participants spent a median of 25 days (8-55) on trial, and wore their Fitbits 90.0% +/- 25.2% of the time. The mean baseline daily step count for this cohort was 7,586 +/- 4,082, and the participants were able to achieve the daily step goal in 40.8% +/- 30.0% of the time. Participants with higher baseline step counts (≥6,000/day) were more likely to achieve the daily step goals (52.2% vs 20.5%; p=0.0083). Significant improvement was seen in the overall health component of the EQ-5D-5L from before the intervention (76.4 +/- 15.45) to after the intervention (80.4 +/- 14.57; p<0.03). Overall, 96.0% (24/25) of the participants completed the recommended deep breathing exercises, 100% (25/25) recommended MFS for future patients, and 96.0% (24/25) stated they will buy their own Fitbits and continue this lifestyle post-surgery.

Conclusion: A preoperative preconditioning trial with wearable technology prior to lung cancer resection is feasible based on encouraging enrollment rates, use of the device, and goal achievement, but it is only applicable to participants with smart devices. MFS motivates patients to undergo preconditioning before lung cancer resection and to continue with a healthy lifestyle after surgery. A revision of the daily step goal is required to improve compliance. A randomized trial is in progress to determine the impact of MFS on postoperative outcomes in the thoracic surgery population. Keywords: Preconditioning, Wearable Technology, Thoracic surgery.