

Title: Evaluation of hospitalizations in patients undergoing therapy with PD-1/PD-L1 inhibitors

Purpose: PD-1/PD-L1 inhibitors are drugs that have proven efficacy in the treatment of many different types of cancer. In general, these drugs have the potential to improve outcomes in terms of overall survival and progression free survival as compared to other treatment regimens. However, a wide variety of immune-mediated reactions/toxicities may occur. These can vary in severity from mild to life-threatening. Therefore, the overall safety profile of these drugs is somewhat concerning. The purpose of this project was to examine the frequency and cause of hospitalizations in patients undergoing therapy with one of these agents.

Methods: The study was performed as a retrospective chart review. This allowed for a comprehensive review of cancer patients who have received a PD-1/PD-L1 inhibitor in order to determine the rates of hospitalization/adverse events. The PD-1/PD-L1 inhibitors included in the study were atezolizumab, durvalumab, nivolumab, and pembrolizumab. A list of patients receiving one of these agents from September 2018 to September 2020 was created from the health systems electronic health record. A random sequence generator was used to identify 100 patients from this list to be utilized in the analysis. Admitting diagnosis, if the cause of hospitalization was drug-induced, and patient disposition at end of hospitalization were evaluated. Possible predictors of hospitalization were also evaluated including patient related factors (age, height/weight, prior medical history) and cancer/treatment related factors (type of cancer, number of prior therapies, concomitant systemic therapies). The primary endpoint of the study was the rate of hospitalization among patients who received PD-1/PD-L1 inhibitors.

Results: 47.2% of patients enrolled were hospitalized while on a PD-1/PD-L1 inhibitor, however, only 5.4% of patients were hospitalized due to an adverse event directly related PD-1/PD-L1 inhibitor use. Atezolizumab was most commonly used to treat stage IV small cell lung cancer, and it was associated with the highest rate of hospitalization at 62.5%. Durvalumab was most commonly used to treat stage III non-small cell lung cancer, and it had a rate of hospitalization of 23%. Nivolumab was used to treat a variety of cancers, however the most common stage was stage IV/metastatic disease. 58.3% of patients were hospitalized while on nivolumab. Pembrolizumab was most commonly used to treat stage IV non-small cell lung cancer, and it had a rate of hospitalization of 40%. Of all the patients enrolled, 47.3% were on concurrent therapy and 61.8% had received treatment with a previous regimen. Of the patients who were hospitalized, 61.5% were on concurrent therapy, and 46.1% of those patients had received previous treatment for their cancer. Overall, 15.4% of patients died from their hospitalization, and all other patients were either discharged home or to a nursing facility. None of the deaths came directly from adverse events related to PD-1/PD-L1 inhibitor use.

Conclusions: Many patients are hospitalized while on PD-1/PD-L1 inhibitors, however most hospitalizations were not attributed to PD-1/PD-L1 therapy. A majority of the patients in the study had stage III cancer or worse, so general hospitalizations are common amongst this patient population. The scope of this evaluation did not allow us to make conclusions on predictors of hospitalization. A larger study should be considered to further investigate this question.