Abstract:

Background: End-of-life (EOL) care for pediatric oncology patients often involves complex decision-making, particularly regarding surgical interventions. There is limited data on the frequency of interventions and characteristics of pediatric patients with a cancer diagnosis who undergo surgery near EOL. Therefore, this study aimed to examine these aspects of EOL care using data from the Pediatric Health Information System (PHIS) database.

Methods: We conducted a retrospective review of the PHIS database, spanning January 2015 to December 2023, focusing on pediatric patients (ages 0-21 years) with both a malignancy flag and a discharge mortality flag. EOL was defined as within 72 hours of date of death. Timing of surgery and invasive procedures to death was identified using post-operative length of stay data. Age groups were categorized using American Academy of Pediatrics (AAP) definitions: infant/toddler, child, and adolescent. We utilized the complex chronic condition flags to identify patient co-morbidities. We conducted descriptive analysis of demographic variables and employed Chi-square and Fisher's exact tests to examine associations between categorical variables.

Results: Over the study period, 5,232 pediatric patients with cancer died in PHIS hospitals. The median age was 11 years [IQR 4-16], with 54.4% male, 67.7% non-Hispanic, 55.1% white, and the median hospital length of stay was 15 days [IQR 4-41]. (See Table 1 for complete demographics). Of the cohort, 1,648 patients (31.5%) underwent surgery or invasive procedure(s) within 72 hours of death. There were no significant differences between those who did and did not undergo surgery or invasive procedure(s) at EOL by sex, admission category, or race. However, non-Hispanic

patients were more likely to undergo surgery or invasive procedure(s) at EOL than Hispanic patients (32.4% vs. 27.5%, p<0.0001). Patients with higher-intensity medical interventions, such as intensive care unit (ICU) admission (37.6% vs. 15.2%, p<0.0001), mechanical ventilation (44.5% vs. 19.9%, p<0.0001), and extracorporeal membrane oxygenation (ECMO) (64.2% vs. 27.9%, p<0.0001), were more likely to undergo surgery or invasive procedure(s) within 72 hours of death. Patients with certain complex chronic condition flags, including cardiovascular, hematologic/immunologic, metabolic, renal/urologic, neurologic/neuromuscular, were more likely to have surgery or invasive procedure(s) near EOL compared to those without these flags. Patients with a respiratory flag, however, were less likely to undergo surgery or invasive procedure(s) at EOL than those without (25.6% vs. 32.5%, p<0.0001).

Conclusion: Over 30% of pediatric cancer patients who die in the hospital undergo surgery or an invasive procedure within 72 hours of death. Patients receiving high-intensity interventions, such as ICU care, mechanical ventilation, and ECMO, are more likely to have surgery or invasive procedures near EOL. This study highlights the significant role of surgery and invasive procedures in the EOL management of pediatric patients with cancer, indicating a need for further research to assess the benefits and burdens of these interventions in this population.