

Characteristics, Resource Utilization and Outcomes of Out-of-hospital Transfers to MD Anderson Cancer Center ICUs

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BACKGROUND: There is limited knowledge about the characteristics and outcomes of inter-hospital ICU transfers in cancer patients. Inter-hospital transfers to a specialized center could improve outcomes by providing treatments not available at the referral centers. However, there are risk factors associated with patient care delays (e.g., insurance approvals, distance traveled, and transfer process) or advanced stage of the disease that could lead to worsening outcomes or offsetting any potential benefit.

HYPOTHESIS: We hypothesized that due to the high acuity of critically ill cancer patients, ICU inter-hospital transfers would lead to higher a) resource utilization (e.g., ICU days) and b) mortality.

METHODS: This is a single-center retrospective study. We reviewed the charts of all inter-hospital ICU transfer patients admitted to our surgical and medical ICU at MD Anderson Cancer Center from January 2014-July 2015. Demographics, ICU and transfer related data were collected. The Fisher's exact or Chi-square tests were used to evaluate the association between two categorical variables. The Wilcoxon rank-sum test was used to evaluate the difference in a continuous variable between patient groups.

RESULTS: A total of 125 patients were transferred from other hospitals to our ICU in this time period. The majority of patients were known to our hospital (n=76; 60.8%), were male (n=76; 60.8%), admitted to the medical service (n=91; 72.8%) and had admission SOFA scores ≤ 10 (n=104; 83.2%). Leukemia (n=48; 38.4%), lymphoma (n=12; 9.6%) and head and neck surgery (n=11; 8.8%) were the most frequent admitting services. The majority of patients were transferred within Texas (n=107; 85.6%), traveled 154.2 ± 191.4 miles and LOS at the outside facility was 5.4 ± 7.8 days. Most common admitting diagnoses were new leukemia/hyperleukocytosis (n=24; 19.2%), respiratory failure (n=20; 16%) and severe sepsis/septic shock (n=18; 14.4%). Although the majority of patients required higher level of care (n=91; 73.3%), only 20% (n=25) received chemotherapy in the ICU and 44.8% (n=56) required dedicated procedures. ICU LOS was 6.7 ± 8.1 days and factors associated with $LOS \geq 10$ days was a higher SOFA score, medical and weekend admissions, and presence of shock and acute kidney injury (AKI) on admission or ICU stay ($p < 0.005$; Table 1). DNR was established within 24hrs in 7.2% (n=9) and death within 48hrs of admission was 6.4% (n=6). ICU mortality was 19.2% and the associated risk factors were older age, higher SOFA score, use of mechanical ventilation and vasopressors during ICU stay, AKI on admission and ICU LOS ($p < 0.005$; Table 2). Surprisingly, data related to the transfer such as LOS and days on mechanical ventilation at the outside facility, time of transfer, and traveled distance were not associated to increased LOS or mortality in our study ($p > 0.1$; Table 1 and 2).

CONCLUSION: LOS and mortality were similar to our internal ICU population not supporting our hypothesis. The majority of ICU referrals from outside facilities requested transfer for higher level of care of patients newly diagnosed with leukemia. Further analysis of patients transferred for non-

higher level of care might help decrease unnecessary transfers and the potential risks and high costs associated with this process.