Sedative, narcotic and delirium drug dosing by nursing shift in a medical ICU

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**Rationale:** There is growing literature describing the effects of certain psychotropic medications on the development of delirium in the ICU. Few studies, however, report the prescribing patterns of these medications, especially in the intensive care literature. We will graphically and numerically describe the patterns and total doses of lorazepam, fentanyl, and haloperidol, by nursing shift, in a cohort of older medical intensive care patients. Our hypothesis is that patients in the ICU receive greater doses of psychoactive medications in the evening and night shift than they do during the day shift.

**Methods:** Participants were 309 consecutive patients age 60 and older admitted to the medical ICU at Yale-New Haven Hospital. Detailed records of medication administration were collected for all patients in the study. Data concerning time, dosage and route of administration of opioids, benzodiazepines and haloperidol was collected. Characteristics of the study sample were summarized with means and standard deviations or medians and interquartile ranges for continuous variables, and with counts and percentages for dichotomous variables. We used graphical methods to plot drug doses by shift for the first fifteen shifts of the ICU stay. Longitudinal plots of medication dosage by shift were created by calculating the mean dosage levels for each of the first fifteen shifts during which patients were in the ICU and by then interpolating values with regression splines. Subsequent longitudinal plots were created that stratified the data by gender and intubation status during the first 48 hours of ICU stay. Stratified trajectories were numerically compared by calculating indicators of change over time for each trajectory in a given stratified plot. Quantitative data analysis was performed with SAS statistical software, version 9.

**Results:** Mean age of our study populations was 75 years. Fifty-five percent received lorazepam, 58% received fentanyl and 32% received haloperidol during their ICU stay. Both lorazepam and haloperidol demonstrated shift differentials with greater doses administered on the evening and night shifts. There was no shift differential seen with fentanyl dosing. Men had higher doses of both haloperidol and lorazepam and increased shift variability compared to women. Patients who were intubated within 48 hours of their ICU admission were given higher doses of lorazepam while those who were not intubated early in their course received higher doses of haldol.

**Conclusions:** We have demonstrated that older medical ICU patients receive increased doses of lorazepam and haloperidol on the evening and night shifts. There are many factors which may contribute to this finding including delirium and staffing concerns. Further investigation regarding these drug patterns is needed.