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## DISTANCE TRAVELED TO TERTIARY CARE AS PROGNOSTIC INDICATOR IN INTRACEREBRAL HEMORRHAGE OUTCOMES

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**INTRODUCTION:** Intracranial hemorrhage (ICH) has high morbidity and mortality, disproportionately affecting rural patients despite adjusting for comorbidities. Inter-hospital transfers for rural patients cause delays in access to specialized care and are associated with adverse outcomes. Published prognostic tools lack distance as factor hence we explored training of three machine learning models to predict 30-day mortality, modified Rankin scale on discharge and discharge disposition in ICH patients using distance from home to tertiary care.

**METHODS:** Preprocessing functions and ML models were imported from the Python 3.8 library scikit-learn. All categorical variables were one-hot-encoded; ordinal variables were integer encoded. Three machine learning models were trained to predict three labels: 30 Day Mortality (Alive, Dead/Hospice), modified Rankin Score upon discharge (7 classes), and Discharge Disposition (Home/Inpatient Rehabilitation Facility, Hospice/Acute Care Facility Skilled Nursing Facility/Other Health Care Facility/Expired /Long Term Care Hospital). Data was split 60/40 for training and testing sets respectively. Mean and standard deviation of F1 score, recall, and precision were calculated over 10 trials. Feature importance was determined using permutation feature importance.

**RESULTS:** The dataset contained 138 patients admitted in calendar year 2019 with 13 useable features: 8 categorical features, 4 numeric features, and 1 ordinal feature. For all of these models, the five most important features were GCS on Admission, ICH Score, age, smoking status, and maximum distance travelled to tertiary care facility. The Multinomial Naive Bayes model showed F1 score of 0.8129 for 30-day mortality. Random forest performed lower but better than chance for mRS at discharge, F1 score 0.68 and discharge disposition 0.34. Varying classification of discharge disposition did not improve.

**CONCLUSIONS:** Distance travelled by an ICH patient from home to tertiary medical center was shown to be indeterminate in patient's outcome in our predictive model. Ongoing study including rural urban status, time traveled to specialized care from point of origin as well as payer status are being evaluated in a larger sample to create a prognostic model accounting for social determinants affecting ICH outcomes.

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## ANTIBIOTIC PROPHYLAXIS IN POSTOPERATIVE NEUROSURGICAL PATIENTS WITH A DRAIN: BRIEF VERSUS EXTENDED

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**INTRODUCTION/HYPOTHESIS:** Current guidelines recommend pre-operative and intra-operative antibiotics to reduce the risk of surgical site infections (SSIs) in neurosurgical patients, but post-operative antibiotic prophylaxis duration with drain placement remains controversial. The purpose of the study was to compare the incidence of SSIs in patients receiving extended versus brief antibiotic prophylaxis following neurosurgical drain placement (NDP).

**METHODS:** This was a retrospective chart review conducted in adults that required NDP and received at least one dose of post-operative antibiotics within a community health-system between May 2020 and September 2020. The primary outcome of this study was the incidence of SSIs following NDP.

**RESULTS:** A total of 177 patients were included for analysis (74 patients encompassing the brief group (BG) and 103 patients in the extended group (EG). The baseline patient demographics were similar between the two groups. For the primary outcome, the EG group had more SSIs compared to the BG; however, this did not reach statistical significance (1.35% vs 4.85%;  $p = 0.204$ ). The EG group had significantly longer duration of prophylactic antibiotic (0.7 days vs. 2.1 days;  $p < 0.001$ ), hospital length of stay (LOS) (3 days vs. 4 days;  $p = 0.029$ ), and postsurgical hospital LOS (3 days vs. 4 days;  $p = 0.011$ ). Ninety-day readmissions specifically due to SSIs was not statistically significant (1.4% vs 3.9%;  $p = 0.316$ ). However, the EG had greater all cause 90-day readmission rates (5.4% vs. 16.5%;  $p = 0.024$ ).

**CONCLUSIONS:** This study demonstrated no statistical difference in SSIs following NDP between patients that received extended versus brief antibiotic prophylaxis. Therefore, this confirms the recommendations reported in current literature to limit postoperative antibiotic duration to 24 hours after neurosurgery, regardless of NDP.