outcomes are associated with increased morbidity and cost. Prediction of prolonged hospitalization or short-term readmission would thus be of utility.

PURPOSE: We aim to develop an algorithm for prediction of prolonged hospitalization or unplanned short-term readmission after outpatient CDR. We additionally aim to identify novel features important for model performance.

STUDY DESIGN/SETTING: Retrospective, cohort study.

PATIENT SAMPLE: Adult patients who underwent outpatient CDR between 2012 and 2020 in the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) Registry.

OUTCOME MEASURES: The primary outcome was prolonged admission greater than one night or readmission within three days after outpatient CDR.

METHODS: We built logistic regression and four machine learning models that span different classes of modeling techniques: XGBoost, AdaBoost, gradient boosting, and random forest. Discrimination was assessed using the area under the receiver operating characteristic curve (AUROC). Calibration was assessed using the calibration slope, calibration intercept, and Brier score. Utilizing a partial dependence function, we ranked the contribution of the included variables to the prediction of prolonged admission or unplanned readmission.

RESULTS: A total of 2,033 patients met inclusion criteria. Of these patients who underwent outpatient CDR, 117 patients (5.8%) patients required admission greater than one night and eight (0.4%) were readmitted within three days after surgery. The random forest model was the best-performing model of all tested models with an AUROC of 0.707 $\pm$ 0.061. The model was well-calibrated with a calibration slope of 1.135, calibration intercept of -0.011, and Brier score of 0.056. The features most important for model performance include: female sex, American Society of Anesthesiology Class $\geq$3, body mass index, chronic obstructive pulmonary disease, diabetes mellitus, hypertension, steroid use, number of levels operated on, and operative time.

CONCLUSIONS: We report a random forest algorithm for prediction of prolonged admission or unplanned short-term readmission after outpatient CDR. This algorithm is well-calibrated and displays good discrimination with an AUROC of 0.707. CDR is well-positioned for the ambulatory setting. While numerous studies have shown that ambulatory CDR is associated with excellent outcomes, patient selection is key. Accurate prediction of which patients are at high risk of unplanned readmission or extended admission may aid with appropriate patient selection for outpatient versus inpatient surgery, decreasing cost and morbidity. Modifiable risk factors such as diabetes, obesity, and hypertension may be optimized prior to outpatient CDR to reduce the likelihood of these adverse outcomes.

FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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P210. Preoperative dysphonia and dysphagia improve following cervical deformity surgery

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BACKGROUND CONTEXT: Twenty-five percent of adult cervical deformity patients undergoing deformity correction have impairment due to a voice problem prior to surgery. Prior work has shown that these patients tend to be more frail and more likely to report preoperative dysphagia. We hypothesized that these patients could be at increased risk of post operative dysphonia and dysphagia.

PURPOSE: The purpose of this study was to quantify how patients with preoperative dysphonia differ from their counterparts in terms postoperative dysphagia, dysphonia and HRQOL 6 weeks post surgery.

STUDY DESIGN/SETTING: Retrospective analysis of a prospective multicenter cervical deformity database.

PATIENT SAMPLE: Adult cervical deformity patients with preop dysphonia undergoing deformity correction.

OUTCOME MEASURES: Voice handicap index-10 (VHI-10).

METHODS: Retrospective analysis of a prospective multicenter cervical deformity database. The voice handicap index-10 (VHI-10) was used to assess patient's perception of impairment due to problems with their voice prior to surgery. A score $\geq$11 was considered indicative of dysphonia. Patients were divided into two groups: normalVHI group (VHI-10 score <11) and highVHI group (VHI score $\geq$11). The two groups were compared in terms of baseline demographics, alignment, surgical metrics, and 6-week dysphagia (measured on the EAT-10 questionnaire), and post operative outcomes. T-tests and chi2 tests were performed, as appropriate. The significance level was $p<0.05$.

RESULTS: There were 74 ACD patients included: NormalVHI (n=58, average VHI score 2.77) and HighVHI (n=16, average VHI score 16.37). The groups were similar in terms of baseline demographics and preoperative alignment. There was no statistically significant difference in terms of surgical metrics between the two groups (revision surgery p=0.21, anterior approach p=0.92, use of osteotomies p=0.71, and OR time p=0.15). The two groups had a similar rate of in hospital adverse events (12.2% vs 7.7%, p=0.64), and similar improvements on the NDI, mJOA, and NRS neck and arm pain. HighVHI patients showed significant improvement on the VHI score 6 weeks post-surgery (11.18 vs 16.37, p=0.01). The HighVHI group also showed postoperative improvement on the EAT-10 questionnaire, compared to NormalVHI patients (-3.68 vs 4.03, p=0.003).

CONCLUSIONS: Twenty-five percent of adult cervical deformity patients undergoing deformity correction have impairment due to a voice problem prior to surgery. Contrary to our initial hypothesis, these patients exhibited improvement in dysphonia and dysphagia scores 6 weeks post surgery, with 81% reporting improvement in symptoms of dysphonia, and 69% reporting improvement in symptoms of oropharyngeal dysphagia.

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