from 2,441 participants enrolled in the ASPirin in Reducing Events in the Elderly (ASPREE) randomized controlled trial of daily low-dose aspirin vs placebo in the United States, we developed multivariable risk prediction models for the composite outcome of dementia, disability, or death. We used two machine learning techniques, decision trees and random forests, to develop novel non-parametric outcomes classifiers and generate risk-based subgroups. The comparator method was an extant semi-parametric proportional hazards predictive risk model. We then assessed HTE by examining the 5-year absolute risk reduction (ARR) of aspirin vs placebo in each risk subgroup. RESULTS/ANTICIPATED RESULTS: In the random forest classifier, the ARR at 5 years in the highest risk quintile was 13.7% (95% CI 3.1% to 24.4%). For the semi-parametric proportional hazards model, the ARR in the highest risk quintile was 15.1% (95% CI 4.0% to 26.3%). These results were comparable and provide evidence of the viability of internally developed parsimonious non-parametric machine learning models for HTE analysis. The decision tree model results (5-year ARR = 17.0%, 95% CI= -5.4% to 39.4% in the highest risk subgroup) exhibited more uncertainty in the results. DISCUSSION/SIGNIFICANCE: None of the models detected significant HTE on the relative scale; there was substantial HTE on the absolute scale in three of the models. Treatment benefit on the absolute scale may be regarded as bearing greater clinical importance and may be present even in the absence of benefit on the relative scale.

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Development and Validation of an Artificial Intelligence Model to Accurately Predict Spinopelvic Parameters

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OBJECTIVES/GOALS: The correction of spinopelvic parameters is associated with better outcomes in patients with adult spinal deformity (ASD). This study presents a novel artificial intelligence (AI) tool that automatically predicts spinopelvic parameters from spine x-rays with high accuracy and without need for any manual entry. METHODS/STUDY POPULATION: The AI model was trained/validated on 761 sagittal whole-spine x-rays to predict the following parameters: Sagittal Vertical Axis (SVA), Pelvic Tilt (PT), Pelvic Incidence (PI), Sacral Slope (SS), Lumbar Lordosis (LL), T1-Pelvic Angle (T1PA), and L1-Pelvic Angle (L1PA). A separate test set of 40 x-rays was labeled by 4 reviewers including fellowship-trained spine surgeons and a neuroradiologist. Median errors relative to the most senior reviewer were calculated to determine model accuracy on test and cropped-test (i.e. lumbosacral) images. Intraclass correlation coefficients (ICC) were used to assess inter-rater reliability RESULTS/ANTICIPATED RESULTS: The AI model exhibited the following median (IQR) parameter errors: SVA[2.1mm (8.5mm), p=0.97], PT [1.5° (1.4°), p=0.52], PI[2.3° (2.4°), p=0.27], SS[1.7° (2.2°), p=0.64], LL [2.6° (4.0°), p=0.89], T1PA [1.3° (1.1°), p=0.41], and L1PA [1.3° (1.2°), p=0.51]. The parameter errors on cropped lumbosacral images were: LL[2.9° (2.6°), p=0.80] and SS[1.9° (2.2°), p=0.78]. The AI model exhibited excellent reliability at all parameters in both whole-spine (ICC: 0.92-1.0) and lumbosacral x-rays: (ICC: 0.92-0.93). DISCUSSION/SIGNIFICANCE: Our AI model accurately predicts spinopelvic parameters with excellent reliability comparable to fellowship-trained spine surgeons and neuroradiologists. Utilization of predictive AI tools in spine-imaging can substantially aid in patient selection and surgical planning.

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Emergency Department Use of Neuroimaging and Hospitalization for Transient Ischemic Attacks in the United States: A Cross-Sectional Study

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OBJECTIVES/GOALS: A TIA is a transient episode of symptoms attributed to a cerebrovascular cause, and associated with an increased risk of stroke. Care of these patients often requires substantial resources in the Emergency Department (ED). We therefore described neuroimaging and hospitalization use for TIA within a nationally representative sample of US ED visits. METHODS/STUDY POPULATION: Retrospective cross-sectional analysis using TIA encounters in the 2018 National Emergency Department Sample (NEDS), an AHRQ dataset consisting of a weighted sample of 20% of all US ED encounters. Non-contrast Head CT, CTA Head, Carotid Ultrasound, MRI and CT Perfusion imaging utilization was determined based on Common Procedural Terminology (CPT) codes in the non-admitted encounters. The study population includes all adult patients with a discharge diagnosis of TIA as determined by ICD-10 codes (H34.0, G45.0-3, G45.8 G45.9) in any diagnosis position. The percentage of patients receiving each neuroimaging test was reported with the corresponding 95% confidence interval (CI). We utilized survey sample weights to generate reliable national estimates. RESULTS/ANTICIPATED RESULTS: The study population consisted of 80,803 ED encounters with a discharge diagnosis of TIA, representing 326,802 weighted ED visits nationally. Among this group, 46.8% of patients were discharged and 41.8% were admitted to the same hospital, 7% of patients were transferred to another facility, and the remaining 5% left AMA, were dispositioned to home health, died in the ED, or had an unknown disposition. Because discharged encounters retain their more precise CPT coding of procedural information, imaging analysis was conducted in discharged TIA encounters only. Of these encounters, 73% (95% CI, 70.7-76.5) received a noncontrast head CT, 20.9% (95% CI, 19.1-22.7) a CTA Head, 22.5% (95% CI, 20.6-24.4) a carotid ultrasound, and 31.5% (95% CI, 29.3-33.7) an MRI brain without contrast. DISCUSSION/SIGNIFICANCE: The discharge rate of just under 50% of patients is consistent with other published data, and represents a gradual trend over the past decade of decreased admissions for TIA. The fact that for many of these patients, the entire episode of care occurs in the ED setting suggests that the ED may be a rich target for future innovations in care for TIA.

https://doi.org/10.1017/cts.2024.289