Translational Science and Policy and Health Outcomes

Data Science Biostatistics/Informatics

00003

Volumetric assessment of cervical cancer tumor volume during definitive chemoradiation and the risk of early distant metastasis

Suvidya Lakshmi Pachigolla, Leslie S. Massad, Premal Thaker, David Mutch, Matthew Powel, Farrokh Dehdashti, Barry Siegel, Thomas Mazur, Julie Schwarz, Stephanie Markovina, Perry Grigsby and Alexander Lin

Washington University in St. Louis

ABSTRACT IMPACT: This study assesses patient and volumetric risk factors for distant recurrence within 6 months of completion of curative chemoradiation with brachytherapy in locally advanced cervical cancer. OBJECTIVES/GOALS: Initial tumor volume and tumor shrinkage velocity are prognostic of cure and survival after curative chemoradiation (CRT) for cervical cancer. We explored whether local tumor volumetric changes influence time to distant recurrences outside the radiation field. METHODS/STUDY POPULATION: We performed a retrospective cohort study of patients with FIGO Stage IB-IVA cervical cancer treated with curative CRT and brachytherapy at a tertiary academic center with minimum 3 months follow up and standard post-treatment FDG-PET. Patients received 6 weekly fractions of brachytherapy interdigitated with external beam radiation and cisplatin. Tumor volumes were assessed by MRI at brachytherapy planning. Patients who developed distant metastasis were classified as earliest (3-6 months), early (6-24 months) or late (>24 months) following completion of CRT. Absolute and percent decrease in tumor volume for each fraction were calculated with respect to first brachytherapy volume. Fisher's exact and Mann Whitney-U tests were used for comparison of categorical and continuous variables. RESULTS/ANTICIPATED RESULTS: 143 of 574 (25%) patients developed distant metastasis. Distribution of age, histology, FIGO 2018 stage, primary tumor SUV_{max}, treatment length, and pre/post treatment squamous cell carcinoma antigen levels were not associated in each group. Para-aortic lymph metastases were more common in patients with earliest distant recurrence (33% earliest, 26% early, 12% late, p=0.03). Median initial tumor volume in the earliest (n=24), early (n=29) and late (n=9) groups was 57, 28 and 40 mL, respectively (p=0.08); 57 (earliest) vs 30mL (early+late groups), p=0.04. Average mid treatment (fraction 4) and end of treatment (fraction 6) percent shrinkage was 80 (earliest) vs 73 (early+late), p=0.84 and 94 vs 92, p=0.95, respectively. Neither absolute nor percent tumor shrinkage differed between early vs. late groups. DISCUSSION/SIGNIFICANCE OF FINDINGS: Tumor volumetric changes during definitive chemoradiation were not associated with the timing of developing distant metastasis, which is linked to presence of lymph node metastasis and tumor volume at diagnosis.

00004

Accuracy of the PREP2 algorithm for predicting Three Month Upper Limb Functional Capacity within a United States population of Persons with Stroke

Jessica Barth, Kimberly Waddell, Marghuretta D. Bland and Catherine E. Lang

Washington University in St. Louis

ABSTRACT IMPACT: Evaluate the accuracy of applying a predictive algorithm using clinical measures only in persons with stroke in the US. OBJECTIVES/GOALS: PREP2 is an algorithm, that predicts UL functional capacity at 3 months post stroke from measures taken within the first week.(1, 2) Despite its accuracy and ease of use, challenges arise of applying PREP2 in the US. The objective of this study was to evaluate the accuracy of PREP2 using only clinical measures in persons with stroke in the US. METHODS/STUDY POPULATION: Individuals with first-ever stroke were recruited from a local hospital and followed longitudinally, as part of an ongoing observational cohort. Variables captured within two weeks of stroke and entered into the algorithm were: age, SAFE score(1-3) and NIH Stroke Scale(4) total score. The algorithm classifies individuals into one of four expected categories: excellent, good, limited, or poor. The dependent variable was the predicted category of UL functional capacity as defined by ranges of the 3-month Action Research Arm Test score.(5) Accuracy, specificity, sensitivity, positive predictive value (PPV), and negative predictive value (NPV) of the algorithm, were calculated using a 4x4 contingency table. Other statistics analyzed include demographic characteristics and a weighted kappa for the algorithm. RESULTS/ANTICIPATED RESULTS: Data from 49 individuals were analyzed (57% male, 88% ischemic stroke, age = 65±8.56 years). Expected categorization matched observed categorization in 29/49 subjects, with the overall accuracy of the algorithm of 59% (95% CI = 0.44-0.73). The sensitivity of the algorithm was low except for the excellent category (0.95). Specificity was moderate to high for good (0.81), limited (0.98), and poor (0.95) categories. PPV was low for all categories and NPV was high for all categories except the good category. Additional results including weighted kappa and inaccuracy of predictions to be presented. DISCUSSION/SIGNIFICANCE OF FINDINGS: PREP2 algorithm, with clinical measures only, is better than chance (chance = 25% for each of the 4 categories) alone at predicting a category of UL capacity at 3 months post stroke. PREP2 is a simple tool that facilitates evaluation of eventual UL outcome from measures routinely captured after a stroke within most healthcare settings in the US.

Precision Medicine

00005

Urine tumor DNA detects minimal residual disease in muscle-invasive bladder cancer treated with curative-intent radical cystectomy*

Kevin Chen, Pradeep S. Chauhan, Ramandeep K. Babbra, Wenjia Feng, Eric H. Kim, Zachary L. Smith, Vivek K. Arora and Aadel A. Chaudhuri

Washington University School of Medicine in St. Louis

ABSTRACT IMPACT: Urine tumor DNA non-invasively detects minimal residual disease and infers tumor mutational burden in locally advanced bladder cancer prior to radical cystectomy, which may potentially enable the selection of patients for bladder-sparing treatment or facilitate personalized adjuvant immunotherapy. OBJECTIVES/GOALS: Standard-of-care treatment for muscle-invasive bladder cancer (MIBC) is radical cystectomy. The inability to assess minimal residual disease (MRD) non-invasively limits our ability to offer bladder-sparing treatment. We sought to develop a liquid biopsy solution via urine tumor DNA (utDNA) analysis. METHODS/STUDY POPULATION: We applied uCAPP-Seq, a targeted sequencing method for detecting utDNA, to urine cell-free DNA samples acquired on the day of radical cystectomy from 42 patients with bladder cancer. utDNA variant-calling was performed