Development and validation of a model to identity high-risk individuals for esophageal cancer screening

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Title: Development and validation of a model to identity high-risk individuals for esophageal cancer screening
Abstract text: Background:Risk stratification prior to endoscopy is an effective strategy to improve the efficiency of esophageal cancer (EC) screening. However, such prediction tools are limited in the current screening program in China.
Aim:To develop a risk prediction model for EC and precancerous lesions to identify individuals at high risk for endoscopic screening.
Methods:This was a multicenter cross-sectional study. From 2005 to 2015, a total of 86853 Individuals aged 40-69 years who participated in the endoscopic screening in high-risk areas of esophageal cancer was included in the analysis. Eligible participants in were assigned into the derivation cohort (Feicheng) and validation cohorts (Linzhou) according to regional distribution. Predictors for EC and precancerous lesions were selected by univariate and multivariate analyses and logistic regression model was used for model development. Discrimination was estimated using the area under the receiver operating characteristic curve (AUC). Calibration was assessed using Hosmer-Lemeshow test (H-L test). The model was internally validated by 10-fold cross-validation and externally validated in the validation cohort.
Results:A total of 832 patients with high-grade intraepithelial neoplasia(HGIN) and 332 patients with EC were diagnosed through the baseline screening. The final prediction model for HGIN and EC contained 6 variables, including age, sex, smoking, drinking, body mass index and family cancer history. This model generated an AUC of 0.778 (95% confidence interval(CI):0.761-0.794) in the development set, with an AUC of 0.775 after cross-validation. In the validation population, the AUC was 0.714 (95% CI: 0.695-0.734). When endoscopy was used for individuals with medium risk and high risk, 81.4% of total HGIN and EC cases could be detected, while the screening demand reduced by 51.0%.
Conclusion:The developed and validated prediction model showed good performance on identifying individuals at a higher risk for HGIN and EC. This model might be used to guide population-based esophageal cancer screening in high-risk areas.
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