more drinks in one occasion for men [women]), cigarette smoking (former/current), and depressive symptoms (Patient Health Questionnaire-9 score ≥ 10) and incident CVD through 14 years. Clinical ICD-9 codes identified incident cases of CVD (acute myocardial infarction, heart failure, revascularization, and stroke). We constructed age-adjusted survival curves and CVD rates. Multivariable Cox proportional hazards regressions estimated the hazard ratio (HR) and 95% confidence intervals (CI) of the syndemic score on incident CVD by HIV status, adjusting for baseline demographic, health status, and HIV-related factors. RESULTS/ANTICIPATED RESULTS: Under 10% of all veterans had zero conditions; 25.8% had one; 49.6% had two, and 14.3% had all three. Based on the prevalence of each individual condition in the cohort (unhealthy drinking: 41.5%, cigarette smoking: 75.0%, and depressive symptoms: 21.3%), the observed prevalence of all three conditions was more than double that expected by chance (6.6%). There were 835 cases of incident CVD (50.4% HIV+) during the median follow-up (10.6 years). Overall, age-adjusted incidence rates/1000 person-years increased with greater number of conditions (zero 10.1, one 12.5, two 15.8, three 19.6). Compared to uninfected people with zero conditions, the adjusted hazard ratios of incident CVD were similar by HIV status for each number of conditions. DISCUSSION/SIGNIFICANCE OF IMPACT: The syndemic of unhealthy drinking, cigarette smoking, and depressive symptoms is common and associated with high CVD risk. However, this risk was similar by HIV status. Our results underscore the need to screen for and treat these co-occurring conditions.

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Associations of aspirin, non-aspirin NSAIDs, statins, and metformin with risk of biliary cancer: A Swedish population-based cohort study

Lorena Marcano Bonilla[1], Cathy Schleck[1], William Harmsen[1], Terry Therneau[2], Omid Sadr-Azodi[1], Lewis R Roberts[2] and Nele Brusselaers
[1]Mayo Clinic; Mayo Clinic and [2]Karolinska Institutet

OBJECTIVES/SPECIFIC AIMS: In an effort to elucidate the role of potentially cancer chemopreventive drugs, we leveraged the Mayo Clinic-Karolinska Institute collaboration to create a multidisciplinary team that included an epidemiologist, statisticians, and physicians. We performed a population-based cohort study to examine the association between low dose aspirin, non-aspirin NSAIDs, statins, metformin, other risk factors and the risk of biliary tract cancer (BTC), while assessing confounding by sex. METHODS/STUDY POPULATION: We conducted a nationwide Swedish population-based cohort study using the Swedish Prescribed Drug Registry, which virtually completely enumerates use of prescribed medications nationwide since 2005. BTC diagnosis (intrahepatic cholangiocarcinoma [iCCA], extrahepatic cholangiocarcinoma [eCCA] or gallbladder cancer [GBC]) was ascertained from the Swedish Cancer Registry. Age-scaled Cox models, with exposure as time-varying covariates, were used to calculate hazard ratios (HRs), separately for men and women. RESULTS/ANTICIPATED RESULTS: In the 5.7 million person cohort, the risk of iCCA was significantly lower in men using statins (HR 0.62,95%CI 0.39-1.00, p = 0.05), with a non-significant reduction in women. Statin use was associated with a significantly decreased risk of eCCA in both women (HR 0.60, 0.38-0.94, p = 0.03) and men (HR 0.47,0.28-0.80, p = 0.01). Low dose aspirin (HR 0.76,0.60-0.97, p = 0.03) was associated with a lower risk of GBC only in women, while statins (HR 0.72,0.55-0.93, p = 0.01) showed a significantly decreased risk of GBC in women and a non-significant reduction in men. For all BTC subtypes, combined use of low dose aspirin and statins did not confer additional risk reductions beyond those achieved by statins alone. Male and female users of non-aspirin NSAIDs appeared to be at increased risk of BTC and its subtypes. Metformin did not significantly affect risk of BTC. DISCUSSION/SIGNIFICANCE OF IMPACT: Our collaborative efforts allowed us to develop the largest population-based cohort evaluating risk and protective factors for BTC. Our results provide strong evidence in favor of the chemopreventive roles of low dose aspirin and statins in a subtype- and sex-specific manner. Individual risk factors contribute to development of BTC subtypes in different magnitudes. The next steps to translate these findings into clinical practice require randomized clinical trials that validate our results and provide a more complete picture of the risk-benefit ratio.

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Biomarkers of Stroke Recovery Study

Matthew A. Edwardson[1], Amrita Cheema, Ming Tan and Alexander Dromerick
[1]Georgetown - Howard Universities

OBJECTIVES/SPECIFIC AIMS: There are currently no established blood-based biomarkers of recovery and neural repair following stroke in humans. Such biomarkers would be extremely valuable for aiding in stroke prognosis, timing rehabilitation therapies, and designing drugs to augment natural repair mechanisms. Metabolites, including lipids and amino acids, are engaged in many cellular processes and cross the blood-brain barrier more easily than proteins. Recent advances in liquid chromatography / mass spectrometry (LCMS) allow researchers to obtain a biochemical fingerprint of the metabolites in various biofluids. Thus, metabolite biomarkers of neural repair after brain injury are a promising avenue for future research. Objective: Design and conduct a study to identify metabolite changes in the blood associated with good and poor motor recovery following stroke. METHODS/STUDY POPULATION: We launched the Biomarkers of Stroke Recovery (BIOREC) study, which seeks to enroll 70 participants suffering arm motor impairment following stroke and 35 matched controls. BIOREC is a longitudinal observational study. Fasting blood samples are collected at 5, 15, and 30 days post-stroke, processed, and stored in the Georgetown Lombardi biorepository. Outcome measures, including measures of motor impairment, cognition and language, are assessed at 5, 15, 30, and 90 days post-stroke. The primary outcome measure is the upper extremity Fugl-Meyer score. Control participants are matched for age +/− 1 yr, race, gender, cardiovascular comorbities, and statin use through a computer algorithm that screens the entire MedStar electronic health record (EHR). Control participants provide 2 fasting blood samples one month apart. Once all samples are collected and sent for LCMS analysis, logistic regression analysis will identify potential metabolite biomarkers by comparing participants with good recovery to those with poor recovery as well as stroke participants to controls. RESULTS/ANTICIPATED RESULTS: To date, forty stroke participants have enrolled from 4 acute care hospitals in the Washington, DC metro region and completed all study procedures. Twenty stroke participants either dropped out or were withdrawn due to other medical concerns. Stroke patients ended up at a variety of venues following their acute hospitalization including the acute rehabilitation hospital, skilled nursing facilities, and home. We learned to overcome these logistical challenges by traveling to wherever the patients were sent

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