Recurrent Pericarditis Epidemiology in the United States

A. Klein, P. Cremer, A. Kontzias, M. Furqan, R. Tubman, M. Roy, M. Magestro. Cleveland Clinic, Cleveland, OH

Purpose: Recurrent pericarditis [RP] occurs when a second episode of pericarditis is experienced ≥4-6 weeks following the initial episode. Published incidence rates are highly variable, and RP prevalence data are limited. To better understand disease burden, this study evaluated RP epidemiology in the US.
Methods: Retrospective claims analysis of the PharMetrics Plus database (Jan_2013 to Mar_2018). Patients (inpatient/ER/outpatient) with ≥1 ICD-9/10 code for pericarditis were included; newly diagnosed cohort [ND]: no claims in 12 months preceding and ≥36 months continuous enrollment post-diagnosis; recurrence: defined as 2 events separated by ≥28 days. Epidemiology was calculated extrapolating age-adjusted incidence to the US Census. Complicated pericarditis [CompP] was defined as ≥2 recurrences or <2 recurrences with a serious complication (e.g. cardiac tamponade or constrictive pericarditis).
Results: Of 2,248 ND patients, 27% experienced recurrence (mean age 47.9 years, 52% female); 15% developed CompP including 14% with ≥2 recurrences and <1% with serious complications.
Recurrence persisted 2 years in 41% of patients and ≥3 years in 22%. US RP population is estimated at 36,500 with 19,500 incident cases annually equating to 6.0/100,000 incidence and 10.9/100,000 prevalence. Of the prevalent population, ~17,000 (47%) have CompP.
Conclusions: Recurrent pericarditis affected one-fifth of patients for ≥3 years. First and second recurrence rates coincided with reports from prior studies (15-30% and 50%, respectively). Patients developed CompP 2-3 times more frequently than previously reported suggesting a higher disease burden. Limitations inherent to database studies apply (e.g., coding accuracy, etc.).
There is a need for approved therapies to reduce recurrence risk.
Funding: This study was funded by Kiniksa Pharmaceuticals Ltd.

Hepatitis B vaccine and risk of acute myocardial infarction among patients with diabetes

K. Bruxvoort, J. Slezak, J.W. Hsu, K. Reynolds, L.S. Sy, S. Jacobsen. Kaiser Permanente Southern California Department of Research and Evaluation, Pasadena, CA

Purpose: HepB-CpG (HEPLISAV-B, Dynavax) is a new licensed adjuvanted hepatitis B vaccine. In a prelicensure trial, the rate of acute myocardial infarction (AMI) was higher (but not statistically significant) in HepB-CpG recipients compared to recipients of another hepatitis B vaccine (ENGERIX-B, GlaxoSmithKline). Hepatitis B vaccination is recommended for patients with diabetes, who are also at higher risk of AMI. To determine if there was an association between AMI rates and ENGERIX-B in individuals with diabetes, we conducted nested case-control study at Kaiser Permanente Southern California.
Methods: The study was nested in a cohort of individuals with diabetes ages ≥ 40 years. AMI cases from 2012 to 2017 identified by primary discharge diagnosis were matched to controls without prior AMI by year, race, sex, birthdate, smoking, cholesterol, systolic blood pressure, and health plan enrollment length. Adjusted odds ratios (aOR) for ENGERIX-B vaccination were compared for cases and controls using conditional logistic regression adjusted for prior healthcare utilization and diabetes duration.
Results: There were 8138 matched pairs, of which 17.4% of AMI cases and 15.0% of controls had received ≥1 ENGERIX-B dose and 9.1% and 7.6%, respectively, had received ≥3 doses. The aOR for receipt of ≥1 dose versus no doses was 1.06 (95% CI: 0.96, 1.18), and the aOR for receipt of ≥3 doses versus <3 doses was 1.08 (95% CI: 0.94, 1.23).
Conclusions: There was no significant difference in receipt of ENGERIX-B between AMI cases and controls. More study will be required to determine whether this is true for HEPLISAV-B.

Environmental Health

Air pollution exposure monitoring among pregnant women with and without asthma

S. Ha, C. Nobles, J. Kanner, S. Sherman, S.H. Cho, N. Perkins, A. Williams, W. Grobman, J. Biggio, A. Subramaniam, M. Ouidir, Z. Chen, P. Mendola. University of California, Merced, CA

Purpose: To characterize exposure to fine particulates ($PM_{2.5}$), nitrogen dioxide (NO_2), and ambient temperature for pregnant women with and without asthma.
Methods: Women (n=40) from the B-WELL-Mom Study (Breathe – Well-being, Environment, Lifestyle, and Lung Function, 2015-2018) were enrolled during pregnancy and assessed for 2-4 days. Daily $PM_{2.5}$, NO_2, and ambient temperature were estimated using personal air monitors and Environmental Protection Agency's stationary monitors based on GPS-tracking of their local mobility and home address. Categorical variables were compared with Fisher's exact tests and time-varying continuous data were analyzed with mixed linear models to account for within-subject variation.
Results: At baseline, 9 women (22.5%) had no asthma, 19 (47.5%) had well-controlled, and 12 (30.0%) had poorly controlled asthma. Mean personal-monitor $PM_{2.5}$ exposure was higher (18.0 $\mu g/m^3$) compared to GPS-based or home-based estimation (9.2 $\mu g/m^3$) (p=0.06). Poorly controlled (9.2 $\mu g/m^3$) and no asthma participants (10.5 $\mu g/m^3$) had higher GPS-based $PM_{2.5}$ exposure compared to well-controlled participants (8.3 $\mu g/m^3$) (p=0.08). Personal-monitor NO_2 exposures were lower (4.9 ppb) compared to the other methods (15.3 and 16.1 ppb) (p<0.01). Average personal-monitor temperature was 24.3°C, but 11°C by the other methods (p<0.01). Most participants (73%) wore their air monitor ≤50% of the times with no significant difference in compliance by asthma status. Low compliance was associated with higher rates of wheezing, exercise activities, smoking, and being around smokers; and lower rates of missed work days.
Conclusions: Exposure to common pollutants differ by assessment method and asthma status. Personal monitors may be more accurate but non-compliance merits attention.

Air pollution, poverty, and cardiometabolic dysfunction among United States adolescents

E. Shenassa, A.D. Williams. Maternal and Child Health Program, Department of Family Science, University of Maryland College Park, 4200 Valley Drive, College Park, MD

Purpose: Double jeopardy of residence in high poverty areas and exposure to pollutants may render pathogens more virulent with worse health outcomes. Double jeopardy is an unexamined determinant of cardiometabolic health among adolescents. We hypothesized the association between air pollution and cardiometabolic dysfunction would be strongest in high poverty areas.
Methods: Data were from 10,651 adolescents aged 12-19 in the National Health and Nutrition Examination Survey (1999-2012), linked with area-level poverty (percent population living in poverty, high poverty ≥ 15.6%), and ambient (ug/m^3) volatile organic compounds (VOCs): benzene, chloroform, acrolein, and butadiene. VOCs were summed and categorized into quartiles (quartile 1 = low VOCs). Cardiometabolic dysfunction was parameterized by summing z-scores of six cardiometabolic biomarkers, grouped into quintiles. Hierarchical ordinal models estimated association between VOCs and cardiometabolic dysfunction, and VOC*poverty interaction terms estimated association between VOCs and cardiometabolic dysfunction in high poverty areas.
Results: Overall, compared to VOC quartile 1, residence in third (OR1.17 95% CI: 1.02, 1.34) and fourth (OR: 1.22 95%CI: 1.04, 1.42) VOC quartiles had elevated odds of cardiometabolic dysfunction. Interaction terms suggest the association between exposure to highest levels of VOCs and cardiometabolic dysfunction is stronger in high poverty areas (VOC quartile 4 OR: 1.33 95%CI: 1.06, 1.68) than in low poverty areas (VOC quartile 4 OR: 1.04 95%CI: 0.83, 1.29).