

PS1-05:

Predicting the Risk of Hyperkalemia in Patients with Kidney Disease Starting Angiotensin-Converting Enzyme Inhibitors

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Background and Aims: Angiotensin converting enzyme (ACE) inhibitors are widely used in patients with chronic kidney disease (CKD) because the drugs slow disease progression. But some physicians are reluctant to prescribe ACE inhibitors "or use higher doses" because of concerns about the risk of hyperkalemia (high potassium), a potentially fatal adverse effect. Physicians need a tool to help them predict the risk of hyperkalemia; for example, high risk patients could be targeted for intensive laboratory monitoring. We synthesized known predictors of hyperkalemia into a prognostic risk score to predict the risk of hyperkalemia. **Methods:** We assembled a retrospective cohort of adult patients with possible CKD (at least one recently estimated glomerular filtration rate (eGFR) value less than 60 mL/min/1.73m²) who started an ACE inhibitor between 1998 and 2006 at Kaiser Permanente Northwest, a health maintenance organization (HMO). We followed patients for the earliest evidence of hyperkalemia: (1) potassium value > 5.5 mmol/L; (2) diagnosis code for hyperkalemia (ICD-9-CM 276.7). Cox regression synthesized known predictors of hyperkalemia that were recorded in the electronic medical record or KPNW databases into a risk score to predict the absolute risk of hyperkalemia 90 days after starting therapy. **Results:** We followed 5,097 patients who experienced 145 hyperkalemic events, a 90-day risk of 2.1% (95% CI 1.9% to 2.4%). The following baseline characteristics predicted hyperkalemia and contributed to the risk score: age, eGFR, diabetes, heart failure, current use of potassium supplements, current use of potassium sparing diuretics (e.g., spironolactone), and a high starting dose for the ACEinhibitor. The risk score discriminated high-risk patients (top quintile, observed risk of 7%) from low risk patients (bottom quintile, observed risk of 0.7%). Predicted and observed risks agreed closely (within 1%) for each quintile. **Conclusions:** The risk score separated high-risk patients (who may need more intensive laboratory monitoring) from low risk patients (whose physicians could use ACE-inhibitors more confidently). If validated in other clinical settings, the risk score could improve the efficiency of laboratory monitoring for hyperkalemia by focusing attention on higher risk patients.

PS1-06:

Increased Incident Renal Disease with ACE-I + Thiazide Therapy for Hypertension: The Geisinger Clinic Population

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Background and Aims: Thiazide diuretics are recommended alone or in combination for uncomplicated hypertension (HTN). Most patients require treatment with 2 or more drugs. Based on studies of mono-therapy, ACE-I are recommended for patients at risk of renal disease, including diabetics. Data are sparse regarding thiazide plus ACE-I combination therapy. We hypothesized that thiazide plus ACE-I is associated with a lower incidence of renal disease compared with other common thiazide combinations, but that confounding by indication for diabetes might attenuate this effect. **Methods:** We conducted a retrospective cohort study of thiazide combinations in a 41-site clinical practice that is the dominant provider in a large rural area. Data were extracted from an electronic medical record for all patients >60 years treated for HTN between 2001 and 2006. Patients with prevalent renal disease, or <6 months of treatment or follow-up, were excluded. Diabetes was defined as ICD9 250.* Renal

disease was defined as ICD-9 codes 403.*-404.*, 593.9, 585.*-586.* or an estimated glomerular filtration rate (eGFR) <60 mL/min/1.73m². Incident renal disease by eGFR required >2 measurements persisting >3 months. **Results:** Among 4700 patients (98% Caucasian, 69% female, mean age 70 yrs, mean follow-up 32.5 months), the incidence of renal disease was 22.7%. Five drug categories accounted for 97% of thiazide combinations: ACE-I, Angiotensin Receptor Blocker (ARB), Beta-blocker (BB), Calcium Channel Blocker (CCB) and Potassium-sparing diuretic (P-S). In Cox models with ACEI + thiazide as the reference group, adjusted for age, sex, and pretreatment blood pressure, patients who used BB + thiazide (HR 0.72, 95% CI, 0.600-0.86) and CCB + thiazide (HR 0.72, 0.55-0.96) had significantly lower hazard ratios for incident renal disease than those who used ACE-I + thiazide. In analyses stratified on diabetes status, results were generally similar for patients with and without diabetes except for the suggestion of a greater rate of incident renal disease in patients without diabetes who used P-S + thiazide (HR 1.23, 1.01-1.49) compared with ACE-I + thiazide. **Conclusions:** Contrary to expectation, ACE-I with thiazide was associated with an increased incidence of renal disease compared with all other groups except potassium-sparing diuretics. This risk was significantly greater than that observed with BB. The association was not meaningfully changed by accounting for diabetes.

PS1-09:

Clinical Features, Treatment Practices, and Outcomes of Older Patients Hospitalized with Decompensated Heart Failure

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Background: Heart failure (HF) disproportionately affects older adults and previous studies have suggested that the demographic as well as clinical profile of older patients with HF is different from that of younger patients. However, generalizable, population-based data on the clinical, treatment, and prognostic profile of older as compared to middle aged and younger patients with HF are lacking. **Methods and Results:** Residents of the Worcester (MA) metropolitan area hospitalized for de-compensated HF at 11 greater Worcester medical centers during 1995 and 2000 (n=4,534) were compared according to 4 age groups (<65, 65-74, 75-84, and >85 years). The mean age of patients with acute HF was 76 years and 24% were >85 years. Older patients (>75) were more likely to be female and to have higher ejection fraction findings, multiple comorbidities, and a lower body mass index. Older patients were significantly more likely to receive symptom modifying medications and less likely to receive disease modifying medications than younger patients. Advanced age was directly associated with increased in-hospital, 30-day, and 1-year death rates in both crude and adjusted analyses. **Conclusions:** The results of this communitywide study suggest that clinical, treatment, and prognostic factors differ by age in patients hospitalized for de-compensated HF. These high-risk patients warrant special attention in future studies in order to improve their management and long-term survival.