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The Spatial Epidemiology of Patients Who Were Screened for and Diagnosed With Primary Aldosteronism in Southern Thailand

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Background: In Thailand where biochemical testing for detection of primary aldosteronism (PA) is only available in a few tertiary centers, which may contribute to a delay in case detection. This study aimed to identify the geographic distribution of PA screening and diagnosis and its contributing epidemiologic and geographic factors in Southern Thailand. **Method:** Data of 688 patients who underwent PA screening between 2011–2017 were reviewed from the electronic database. The patients' residences were extracted from the identification cards or the address recorded in the hospital system. The presence of an endocrinologist and the dominant religion in each province were recorded. The province, district and subdistrict of each patient were transformed to a 6-digit administrative area code corresponding with the global one (GADM[®]). A generalized log-linear model was used to identify predictors for individuals being screened. **Results:** Overall, the prevalence and crude incidence rates of PA in Southern Thailand were 15.6% and 1.66/1,000,000 person-years, respectively. The provinces located adjacent to the Andaman Sea had the highest incidences of PA (3.62–5.17 patients/1,000,000 person-years). Areas with the highest screening rates were located at and near Songkhla where the major tertiary medical center is located. A multivariate log-linear model demonstrated that the distance from the major tertiary center was the only predictive factor for screening while the availability of an endocrinologist and cultural differences were not. The chances of patients who lived in Songkhla, lived less than or more than 200 km from Songkhla to receive PA screening were 100% (reference), 82% (95% CI:0.69–0.97, p-value 0.03), and 66% (95% CI:0.55–0.78, p-value < 0.001), respectively. **Conclusion:** Geographic location was the main factor contributing to a delay in case detection for PA. A public health policy should be developed to mitigate the geographic barrier thus improving the ability of patients to access healthcare services. Further research relating to the underlying risk of the disease such as genetic transmission in populations with a high incidence of PA should be performed.

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Time-Varying Risk of Atrial Fibrillation in Patient With Medically and Surgically Treated Primary Aldosteronism: A Nationwide Cohort Study

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Evidence of increased cardiovascular risk, especially atrial fibrillation, has been accumulating among patients with

primary aldosteronism (PA), but there is still limited information about long-term prognosis related to different treatment strategy. The aim of this study was not only to investigate the incidence of atrial fibrillation, but also to evaluate their time-dependent changes after adrenalectomy (surgery group) or mineralocorticoid receptor antagonists (drug group) for patients with PA compared to those with essential hypertension (EH). From a nationwide cohort in Korea (2003–2017), PA were individually matched for sex, age (± 10 years), and index year in a 1:5 ratio with EH. The primary end point was the time-varying risk of new-onset atrial fibrillation (NOAF) among PA according to treatment mode compared to EH. The secondary end points were the risks of major adverse cardiovascular events (composite of non-fatal myocardial infarction, non-fatal stroke, and death from cardiovascular causes), hospitalization for heart failure, and all-cause mortality. Cox proportional-hazards analysis or time-dependent Cox analysis based on the Schoenfeld residuals testing were performed. We enrolled 1,418 PA patients (755 in PA surgery group and 663 in PA drug group), and matched these with 7,090 EH controls with a median of 5 years. The risk of incident NOAF was statistically higher in patients with PA (both surgery and drug groups) within the three years after diagnosis (adjusted hazard ratio, 3.02; $p < 0.001$), whereas there was no statistically significance after the three years compared to EH (adjusted hazard ratio, 0.50; $p = 0.053$). Patients in the PA drug group had higher risk of non-fatal stroke during the total followed up period (adjusted hazard ratio, 1.53, $p = 0.031$), although the PA surgery group didn't. In contrast, patients with PA had no statistically significant difference in risks for other secondary cardiovascular outcomes. In conclusion, this propensity cohort study of adults with PA demonstrated the changeable risk of NOAF over time possibly due to the residual effect of inappropriate aldosterone levels. These findings can provide clinically relevant guidance in the monitoring the cardiovascular complications, especially NOAF and non-fatal stroke, even after treatment among patients with PA.

Acknowledgements: This study was supported by Collaborative Research Project of Korean Endocrine Society and National Health Insurance Sharing Service (NHIS-2019-4-005). We also thank Minheui Yu and Doori Cho, the members of the SENTINEL (Severance ENdoCrinology daTa scIeNcE pLatform) team for technical assistance in searching and summarizing the relevant literature (4-2018-1215).

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Tolerability and Efficacy of Long-Term Medical Therapy in Primary Aldosteronism

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Introduction: Patients with primary aldosteronism (PA) have increased cardiovascular risk and studies have found

that medical therapy fails to ameliorate this. This may be due to side effects and limited efficacy of medications at tolerable doses. **Methods:** We conducted a retrospective study on 201 patients with PA treated with medical therapy (spironolactone, eplerenone or amiloride) for PA from 2000–2020 at two tertiary centres. Patients were assessed for efficacy to achieve clinical and biochemical control, and for side effects. **Results:** 53.7% of patients achieved blood pressure <140/90mmHg, 44.6% achieved serum potassium \geq 4.3mmol/L, and 63.2% achieved renin levels >1ng/ml/hr. Concordance between biochemical control as assessed by potassium and renin levels was 49%. 45.3% of patients experienced side effects, with 8.5% switching to another medication, 18.9% decreasing dose, and 10.0% stopping medications altogether. Risk factors for side effects were spironolactone use, dose \geq 50mg, duration of treatment \geq 1 year, male gender and unilateral PA. Patients with unilateral PA, compared to bilateral PA, used higher median doses of spironolactone, 75mg vs 50mg, $P<0.001$, but more had persistent hypokalemia, 20.5% versus 6.4%, $P=0.007$. 44 patients with unilateral PA underwent surgery after initial medical therapy, which further improved systolic and diastolic BP, from 142 to 134mmHg, $P<0.001$, and from 85 to 79mmHg, $P<0.001$, respectively. **Conclusion:** Dose-dependent side effects limit the efficacy of medical therapy in PA. Future prospective studies should assess the best monitoring strategy for biochemical control during long-term medical therapy. In patients with unilateral PA, surgery remains a better option compared to life-long medications.

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Total Testosterone Confounds the Association Between Total Bilirubin and Dyslipidemia

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Background: The mechanism for the association between total bilirubin (TBili) and dyslipidemia remains unclear. Total testosterone (TT) has been implicated in reducing bilirubin conjugation and decreasing atherogenic lipids. We hypothesized that 1) TBili was inversely associated with dyslipidemia, and 2) TT confounded this association.

Methods: Our study population consisted of 5,878 (2,730 male and 3,148 non-pregnant female) adults aged \geq 20 years from the 2011–2016 National Health and Nutrition Examination Survey (NHANES). We excluded those taking self-reported cholesterol medications. Participants with transaminitis (AST or ALT >45 IU/L; AST/ALT >5), excessive alcohol consumption (>20 drinks/week for males; >10 for females), iron overload (transferrin >50%), or positive hepatitis B/C serology were also excluded. We categorized TBili into sex-specific quartiles (Male: <0.5, 0.5–0.6,

0.6–0.8, \geq 0.8 mg/dl; Female: <0.4, 0.4–0.5, 0.5–0.6, \geq 0.6). Dyslipidemia was defined as elevated TG (\geq 150 mg/dl) or low HDL (<40 mg/dl for male; <50 for female). We used survey design-adapted multivariable logistic regression, adjusting for TT, demographics, cardiometabolic factors, and liver function. We also stratified by sex-specific median TT levels (386 ng/dl in males; 18.5 ng/dl in females) to determine effect modification. Further, we determined whether the association between TBili and dyslipidemia persisted in males with TT deficiency (<280 ng/dl).

Results: Among the 5,878 adults, 1,013 (38%) males & 958 (30%) females had elevated TG, and 803 (29%) males & 1,146 (33%) females had low HDL. Males in the highest quartile (Q4) of TBili had age-adjusted, mean (SD) 50.1 (3.5) mg/dl lower TG and 4.0 (0.9) mg/dl higher HDL than males in the lowest quartile (Q1; $p<0.0001$). Females in Q4 had 36.4 (4.9) mg/dl lower TG and 5.1 (1.4) mg/dl higher HDL than Q1 ($p<0.0001$). Males and females in Q4 had 60% and 59% lower odds, respectively, of elevated TG compared to Q1 (adjusted OR [95% CI]; Male: 0.40 [0.28, 0.57], Female: 0.41 [0.32, 0.52]). Males and females in Q4 had 44% and 39% lower odds, respectively, of low HDL compared to Q1 (Male: 0.56 [0.38, 0.81], Female: 0.61 [0.42, 0.90]). Adjusting for TT increased the parameter estimate for Q4, relative to the univariate estimate, by 21% in both sexes. There was no significant difference in TT-stratified odds of elevated TG or low HDL. Among the 544 (19%) males with TT deficiency, Q4 had 56% lower odds of elevated TG and 46% lower, but insignificant, odds of low HDL (aOR [95% CI]; TG: 0.44 [0.21, 0.89], HDL: 0.54 [0.26, 1.12]).

Conclusion: TBili was inversely associated with elevated TG and low HDL. TT confounded, but did not modify, this association. Future studies examining TBili's antiatherogenic role should adjust for TT.

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Trends in Serum Lipid Profiles and Lifestyle Factors Among Korean Adolescents, 2007–2018

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Objectives: Trends in serum lipids among teenagers would be crucial predictors of potential cardiovascular disease in adults. We aimed to investigate the trends in lipid profiles and related factors, including obesity, smoking, exercise, alcohol use, and total fat intakes in Korean adolescents from 2007 to 2018. **Methods:** We analyzed 5,967 participants aged 12–19 yrs from the Korea NHANES 2007–2018. Fasting total cholesterol, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), and triglycerides (TG) levels were measured. **Results:** All kinds of lipid profiles, except TG, showed increasing trends from 2007 to 2018 ($P<0.01$). Nevertheless, the prevalence of dyslipidemia showed a trend of decreasing in boys (from 33.3 to 26.6%; $P=0.002$) and maintained in girls (from 28.4 to 30.2%; $P=0.465$), mainly due to a substantial decrease in hypo-HDL-cholesterolemia (9% reduction in boys, 5% reduction in girls). This occurred amid an increasing trend of central obesity in boys ($P<0.001$). In lifestyle factors, there