clinic. This study aimed to investigate the diagnostic value of aldosterone levels after the captopril and the saline infusion test for APA.

METHODS 74 PA patients indentified by the confirmatory tests of captopril and saline infusion tests were enrolled into our study. After surgery, 40 patients was confirmed of APA (APA group) while the rests did not (NAPA group). The association between levelsof aldosterone after the captopril and the saline infusion test and APA was analyzed.

RESULTS Thealdosterone before the captopril and saline infusion tests between the two groups were not significantly different. The aldosterone in the APA group after the two confirmatory tests was significantly higher than that in the NAPA group(220.7±19.4 pg/ml vs. 194.3±24.2 pg/ml, P=0.021 in captopril test, 200.5±16.2 pg/ml vs. 182.3±15.1 pg/ml, P=0.035 in saline infusion test). The area under the receiver-operating characteristic curve for detecting APA was 0.78, 95% CI: 0.64~0.95, P=0.026 for captopril test and 0.85, 95% CI: 0.68~0.97, P=0.002 for saline infusion test.

CONCLUSIONS The levels of aldosterone after the captopril and the saline infusion tests could be the important diagnostic indexes for APA.

GW27-e0382
Cluster analysis: a new approach for subgrouping hypertensive patients

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OBJECTIVES Grading of essential hypertension according to blood pressure may not adequately reflect clinical heterogeneity of hypertensive patients. This study was carried out to explore clinical phenotypes in essential hypertensive patients using cluster analysis.

METHODS In this cross-sectional study, BP variations of 362 hypertensive patients (195 males and 167 females) were evaluated with ambulatory blood pressure monitoring (ABPM). All other hypertensive patients were excluded if they (1) were <18 or >90 years old; (2) were under antihypertensive treatment; (3) had a BP over 160/100 mmHg; (4) were night workers; (5) had acute stroke or myocardial infarction within the past 6 months; (6) had sleep apnea syndrome; (7) were diagnosed as secondary hypertension; (8) could not tolerate the ABPM; (9) had other chronic diseases. A cluster analysis was performed on BP variations and other baseline clinical variables to identify patient subgroups. After cluster analysis, chi-squared test and analysis of variance (ANOVA) were performed to check the significance of variables between different clusters.

RESULTS Three clusters were presented here. Cluster 1 (C1, n=143, 40%) has largest number of patients, most of which were male (99%) and mostly likely to be smokers (57%). They had no diabetes and lowest mean level of high density lipoprotein (1.20mmol/L) while the 24h-diastolic BP (DBP, 81.18mmHg), daytime DBP (82.41mmHg) and night-time DBP (76.82mmHg) were the highest than the other two clusters. C2 (n=131, 36%) were all female, the least likely to be smokers (1.5%) and have no diabetes. In this group, the level of triglyceride (0.95mmol/L) was the lowest while the high density lipoprotein (1.34mmol/L) was the highest. Moreover, patients in C2 had the lowest 24h-systolic BP (SBP, 132.03mmHg), 24h-DBP (75.17mmHg), daytime SBP (133.47mmHg), daytime DBP (76.40mmHg), night-time SBP (126.54mmHg), night-time DBP (70.22mmHg) among the three clusters, respectively. Conversely, C3 (n=88, 24%) were all diabetes and had the highest level of triglyceride (1.02mmol/L). Similarly, 24h-SBP (139.13mmHg), daytime SBP (140.53mmHg) and night-time SBP (135.72mmHg) were the highest compared to the other two groups.

CONCLUSIONS Cluster analysis of diverse variables in essential hypertensive patients identified three different clinical phenotypes. These findings highlight the significant heterogeneity that exists within patients with hypertension and may promote the patient-centered clinical management.

GW27-e0406
Cluster identification of hypertensive patients with carotid plaque

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OBJECTIVES Carotid plaque evaluation is useful in cardiac clinics to predict coronary artery disease for patients with various cardiovascular risk factors, such as hypertension. As far as heterogeneity is concerned for hypertension as a common condition, clustering analysis was applied to identify phenotypically distinct hypertensive group with different severity of carotid plaque.

METHODS In this study, a total of 513 patients were continuously recruited and evaluated with carotid ultrasound from April 2012 to June 2013. Clustering analysis was performed on 27 baseline clinical variables including demographic characteristics, medical history, laboratory values and echocardiographic presentation. As is necessary for clustering analysis, the missing values were globally replaced with mean values. Carotid plaque was classified into Grade 0 (normal or no observable plaque), Grade 1 (mild stenosis, 1%-24% narrowing), and Grade 2 (moderate stenosis, ≥25% narrowing). After clustering analysis, differences among cluster centers were using the χ2 test for binary variables and ANOVA for continuous data.

RESULTS Three clusters were eventually identified. Cluster 1 (n=246) was the largest cluster than the others. All of these patients were males, youngest on average (59.0±13.2) and most likely to be smokers (67.9%). They had the lowest mean levels of total cholesterol (4.5mmol/L) and low density lipoprotein (LDL, 2.6mmol/L), while the 24h-systolic BP (SBP, 137mmHg), 24h-diastolic BP (DBP, 82mmHg), daytime SBP (139mmHg), daytime DBP (83mmHg) and night-time DBP (77mmHg) were the highest than other two clusters. Surprisingly, we found the majority of patients having moderate stenosis belong to this cluster, including 32 (80.0%) patients. Cluster 2 (n=97) patients tended to be older (65.4±11.9) with highest levels of total cholesterol (5.0mmol/L), LDL (3.0mmol/L) and fasting glucose (6.8mmol/L). Furthermore, cluster 2 patients had the highest rates of mild stenosis (68.0%) and diabetes mellitus (100%) while had the lowest percentage of smokers (12.4%) and circadian decline rate of SBP (4.4±7.5). Cluster 3 included the lowest percent of male (0%) and diabetes mellitus (0%) with a mean age of 62.9. Compared with other two clusters, this group had the lowest 24h-SBP (131mmHg), daytime SBP (132mmHg), night-time SBP (125mmHg) and fasting glucose (4.7mmol/L). In addition, the rate of no observable plaque was highest among the three clusters.

CONCLUSIONS Clustering analysis of diverse variables identified 3 distinct categories of hypertensive patients with carotid plaque. These results demonstrated that clustering techniques allow visualization of complex multivariate data and may provide new hypothesis for clinical study on carotid plaque.

GW27-e0459
Attainment of acc/aha recommended ldl-c lowering with statin and ezetimibe+statin therapies

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OBJECTIVES The ACC/AHA 2013 cholesterol guidelines do not specify lipid target levels, but rather treatment of patients classified by cardiovascular risk to achieve LDL-C reductions of ≥50% and ≥30 - <50% with high- and moderate-intensity statin therapy, respectively. This analysis evaluated the variability of treatment responses to statin therapy for these parameters in statin-na?ve patients with hypercholesterolemia.

METHODS Data were pooled from 14 randomized, controlled, double-blinded trials in hypercholesterolemic patients and categorized per the 4 risk groups specified by ACC/AHA 2013 guidelines: 1) atherosclerotic cardiovascular disease (ASCVD), 2) baseline LDL-C >190 mg/dL, 3) diabetes, and 4) 10-year ASCVD risk ≥7.5% (no ASCVD or diabetes). Risk groups were further subdivided by recommended statin intensity, age, and 10-year ASCVD risk. Mean percent LDL-C changes from baseline and percentage of patient attainment of LDL-C reductions ≥50% and ≥30% on recommended therapy among risk groups were assessed.

RESULTS Mean percent LDL-C changes from baseline ranged from -49.5 to -52.2% and -37.7 to -40.5% for high- and moderate-intensity therapy with statins, and from -55.1 to 57.5% and -43.3 to -47.7% with ezetimibe+statins, respectively. The percentages of patients who