Wound Care and Epidemiology 2019: Relationship between gallstone and metabolic syndrome in Jinchang cohort - Yana Bai, Junjun Huang, Zhiyuan Cheng, Desheng Zhang, Juansheng Li, Jiao Ding, Xiaobing Hu, Haiyan Li, Xiping Shen, Xiaoywei Ren,Tongzhang Zheng and Ning Cheng - Workers' Hospital of Jinchuan Group Co., Ltd., Jinchang, Gansu, China

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To reveal the relationship between gallstone and metabolic syndrome, in order to provide evidence for prevention and treatment of gallstones and metabolic syndrome Jinchang cohort. The baseline eventually included 20,969 people and a total of 11,872 people completed the follow-up.The study was used to analyze the relationship between metabolic syndrome and the risk of gallstones, and was also used to analyze the effects of gallstones on the development of metabolic syndrome, and calculate the risk ratio and its 95% confidence interval (HR, 95%CI), based on Jinchang cohort. The prevalence of metabolic syndrome was 34.8%, 36% and 33.2% in the total population, men and women. Multivariate Cox regression analysis showed that age, drinking, BMI and family history of hypertension are risk factors of cholecystitis and high education level, frequently exercise were protective factors of cholecystitis. The prevalence of gallstones in the Jinchang cohort was 13.01% overall, 16.64% in females, 10.73% in males. After adjusting for age, smoking, drinking et al, the prevalence risk (OR, 95%CI) of gallstones in men, women and the general population with metabolic syndrome was respectively 1.57 (1.33-1.85), 1.87 (1.55-2.26) and 1.58 (1.40-1.78) for those without metabolic syndrome. The incidence of gallstones in the general population with metabolic syndrome was 4.1%, and the incidence of gallstones in the population without metabolic syndrome was 2% in the Jinchang cohort. After adjusting for age, smoking, drinking et al, the risk of gallstones in the total population and female population with metabolic syndrome was higher than that of those without metabolic syndrome, with HR (95%CI) of 1.291 (1.016-1.642) and 1.466 (1.094-1.964). Along with the increase in number of abnormal metabolic syndrome components, the incidence of gallstones also gradually rise, when there

are five abnormal metabolic components, the incidence of gallstones of total population reached 10.9%, the women reached 12.5%. The risk of gallstones in women and total population with the five abnormal metabolic components are respectively 7.922 times and 5.011 times that of normal population. Cholecystectomy was found to be significantly associated with incident type 2 diabetes mellitus among individuals with prediabetes (HR = 1.703;95% CI, 1.299–2.233).

Metabolic syndrome can increase the risk of gallstones in the general population and women, and with the increase of abnormal number of components of metabolic syndrome, the risk of gallstones increases gradually. The precise association between metabolic syndrome (MetS) and gallstone disease remains unclear in China. This study aimed to clarify the relationship between MetS and gallstone and evaluate whether counts of metabolic abnormalities had influence on gallstone disease. We fitted gender-specific generalized estimating equation (GEE) regression models with data from a large-scale longitudinal study over 6-year follow-up to elucidate the real association. This study included 18291 participants with 3 times repeated measures at least who were free from a prior history of gallstone disease and cholecystectomy. A total of 873 cases of gallstones occurred during 6-year follow-up. The incidence density of gallstone in the group of subjects with MetS was higher than the group without MetS (10.27 vs 5.79). The GEE analyses confirmed and clarified the association between MetS and gallstone disease in males (RR = 1.33, P = 0.0020), while this association was not significant in females (RR = 1.15, P = 0.4962). With numbers of metabolic syndrome components increasing, the risk of gallstone disease

showed corresponding increasing in males. In conclusion, the associations of MetS and gallstone are different in males and in females. And the risk of gallstone disease increases with the number of components of MetS for males but not for females.

Although various cross-sectional studies have shown that erythrocyte parameters, including red blood cell (RBC), hemoglobin (Hb) and hematocrit (HCT), were linked with metabolic syndrome (MetS), few longitudinal studies have been used to confirm their relationship. The study, therefore, constructed a large-scale longitudinal cohort in urban Chinese population to highlight and confirm the association between erythrocyte parameters and MetS/its components. A longitudinal cohort with 6,453 participants was established based on the routine health check-up systems to follow up MetS, and Generalized Estimating Equation (GEE) model was used to detect the association between erythrocyte parameters and MetS/its components (obesity, hyperglycemia, dyslipidemia, and hypertension). 287 MetS occurred over the four-year follow-up, leading to a total incidence density of 14.19 per 1,000 person-years (287/20218 person-years). Both RBC and Hb were strongly associated with MetS (RR/95% CI, P value; 3.016/1.525-5.967, 0.002 for RBC; 3.008/1.481-6.109, 0.002 for Hb), with their dose-response trends detected. All three erythrocyte parameters (RBC, Hb and HCT) were found to be associated with obesity, hypertension and dyslipidemia with similar dose-response trends respectively, while only Hb showed a significant association with hyperglycemia. Elevated erythrocyte parameters were confirmed to be associated with MetS/its components in urban Chinese population, suggesting that erythrocyte parameters might be served as a potential predictor for risk of MetS.

To investigate the association between metabolic syndrome (MetS) and the development of gallstone disease (GSD). A cross-sectional study was conducted in 7570 subjects (4978 men aged 45.0 ± 8.8 years, and 2592 women aged 45.3 ± 9.5 years) enrolled from the physical check-up center of the hospital. The subjects included 918 patients with gallstones (653 men and 265 women) and 6652 healthy controls (4325 men and 2327 women) without gallstones. Body mass index (BMI), waist circumference, blood pressure, fasting plasma glucose (FPG) and serum lipids and lipoproteins levels were measured. Colorimetric method was used to measure cholesterol, high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C). Dextrose oxidizing enzyme method was used to measure FPG. Subjects were asked to complete a questionnaire that enquired about the information on demographic data, age, gender, histories of diabetes mellitus, hypertension, and chronic liver disease and so on. Metabolic syndrome was diagnosed according to the Adult Treatment Panel III (ATP III) criteria. Gallstones were defined by the presence of strong intraluminal echoes that were gravity-dependent or attenuated ultrasound transmission. Among the 7570 subjects, the prevalence of the gallstone disease was 12.1% (13.1% in men and 10.2% in women). BMI, waist circumference, systolic blood pressure, diastolic blood pressure, fasting blood glucose and serum triglyceride (TG) in cases group were higher than in controls, while serum high-density lipid was lower than in controls. There were significant differences in the waist circumference, blood pressure, FPG and TG between cases and controls. In an age-adjusted logistic regression model, metabolic syndrome was associated with gallstone disease. The age-adjusted odds ratio of MetS for GSD in men was 1.29 [95% confidence interval (CI), 1.09-1.52; P = 0.0030], and 1.68 (95% CI, 1.26-2.25; P = 0.0004) in women; the overall age-adjusted odds ratio of MetS for GSD was 1.42 (95% CI, 1.23-1.64; P < 0.0001). The men with more metabolic disorders had a higher prevalence of gallstone disease, the trend had statistical significance (P < 0.0001). The presence of 5 components of the MetS increased the risk of gallstone disease by 3.4 times (P < 0.0001). The prevalence of GSD in women who had 5 components of MetS was 5 times higher than in those without MetS component. The more the components of MetS, the higher the prevalence of GSD (P < 0.0001). The presence of 5 components of the MetS increased the risk of gallstone disease by 4.0 times. GSD appears to be strongly associated with MetS, and the more the components of MetS, the higher the prevalence of GSD.