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ORIGINAL RESEARCH

Triglyceride Glucose Body Mass Index as 3 Year Prognostic Indicator for Major Adverse Cardiovascular and Cerebrovascular Events in Patients with Acute Myocardial Infarction After PCI: A Prospective Cohort Study

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Background: Previous studies have suggested that triglyceride glucose-body mass index (TyG-BMI) is associated with cardiovascular mortality in patients undergoing peritoneal dialysis. However, the predictive value of TyG-BMI in the prognosis of acute myocardial infarction (AMI) remains unclear.

Methods: In total, 408 AMI patients who underwent PCI were consecutively included in this study. All included patients were then divided into three groups according to tertiles of TyG-BMI. The association between TyG-BMI and major adverse cardiovascular and cerebrovascular events (MACCEs) were investigated.

Results: Participants were divided into three groups: tertile 1(≤199.4, n=136), tertile 2 (199.4–231.8, n=136), and tertile 3 (≥231.8, n=136). Eighty (19.6%) patients had MACCEs: 18 (13.2%) in tertile 1, 26 (19.1%) in tertile 2, and 36 (25.7%) in tertile 3. The incidence of MACCEs increased as the tertiles of TyG-BMI increased ($p<0.05$). Multivariate Cox regression analysis revealed that diabetes mellitus and TyG-BMI were independent predictors of MACCEs in AMI patients after PCI ($p<0.05$). The receiver operating characteristic (ROC) curve showed that when TyG-BMI was ≥192.4, the sensitivity and specificity were 60.1% and 65.4%, respectively, and the area under the ROC curve (AUC) was 0.632 (95% confidence interval [CI]: 0.562–0.703; $p < 0.001$).

Conclusion: Elevated TyG-BMI level was an independent predictor of the composite MACCEs in patients with AMI after PCI.

Keywords: triglyceride glucose body mass index, major adverse cardiac and cerebrovascular event, acute myocardial infarction, PCI

Introduction

Acute myocardial infarction (AMI) is the leading cause of death in China.[1,2] With the development of guideline-based medical treatments and optimal PCI techniques, the prognosis of AMI has significantly improved.[2] Nonetheless, the long-term prognosis of AMI remains poor, which suggests that further studies are needed to investigate the pathophysiology and therapeutic regimen of AMI to prevent its development and improve prognosis. In addition to traditional cardiovascular disease (CVD), risk factors, such as advanced age, smoking, hypertension, diabetes, hyperuricemia, hyperlipidemia, and triglyceride glucose-body mass index (TyG-BMI) have been suggested as alternative indicators of insulin resistance,[3,4] which has been proven to be a well-established risk factor for CVD.[5,6]

As a parameter for assessing insulin resistance, TyG-BMI includes blood lipid, blood glucose, and nutritional indicators, which could reflect multiple risk factors in the development of CVD. Previous studies have demonstrated that elevated TyG-BMI is related to a higher risk of all-cause mortality in patients with heart failure[7] and uremia undergoing peritoneal dialysis,[8] as well as an increased incidence of MACCEs in elderly and female patients.[9] However,

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to date, no study has investigated the association between TyG-BMI and the long-term prognosis of patients with AMI after PCI. Therefore, we aimed to explore the predictive value of TyG-BMI for the long-term prognosis of AMI after PCI to improve the management of this specific population.

Methods

Study Population

The flowchart of the study is presented in Figure 1. In total, 515 AMI patients who underwent PCI between January 2020 and December 2021 were consecutively enrolled in this study. AMI, including acute ST-segment elevation myocardial infarction (STEMI) and non-ST-segment elevation myocardial infarction (NSTEMI), was diagnosed according to the relevant guidelines.[10,11] The procedure was performed by experienced interventional cardiologists at our center following the latest guidelines.[12] The exclusion criteria are shown in Figure 1. In total, 75 patients met the exclusion criteria, 32 were lost during follow-up, and 408 individuals diagnosed with AMI after PCI were included in this study. This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Informed consent was obtained from all participants prior to their participation in this study.

Clinical, Laboratory Data Assessments and Definition

Trained researchers acquired clinical and laboratory data from the Hospital Information System (HIS) by the trained researchers. The data included demographic characteristics (age, sex, and BMI), comorbidities (current smoking, Diabetes Mellitus, Hypertension, Heart failure, previous stroke, previous AMI, previous PCI, chronic obstructive pulmonary disease and atrial fibrillation), clinical presentation (NSTEMI or STEMI, cardiac function, and left ventricular ejection fraction [LVEF]), and angiographic and procedural characteristics. Laboratory indicators, including FBG, blood lipid, uric acid, creatinine, Troponin I and Creatine kinase-myocardial band (CK-MB) levels, were recorded and compared. Medications were also collected from the HIS database. TyG-BMI was calculated as Ln (fasting TG (mg/dL)×FBG (mg/dL)/2) × BMI.[13]

Follow-up and Endpoints

All patients underwent a 3-year follow-up, and MACCEs were recorded in detail. Follow-up was conducted through readmission, outpatient clinic, online medical service, we-chat, or phone contact. MACCEs was defined as a composite of all-cause death, target vessel revascularization (TVR), acute myocardial infarction (AMI), acute heart failure, and ischemic stroke. The Fourth Universal Definition of MI was used as the diagnostic criterion for AMI.[14] Any lesion that developed in the culprit vessel or its main branches was defined as TVR.[2] All patients were followed up every month after discharge until MACCEs occurred or the 2-year follow-up period was completed.

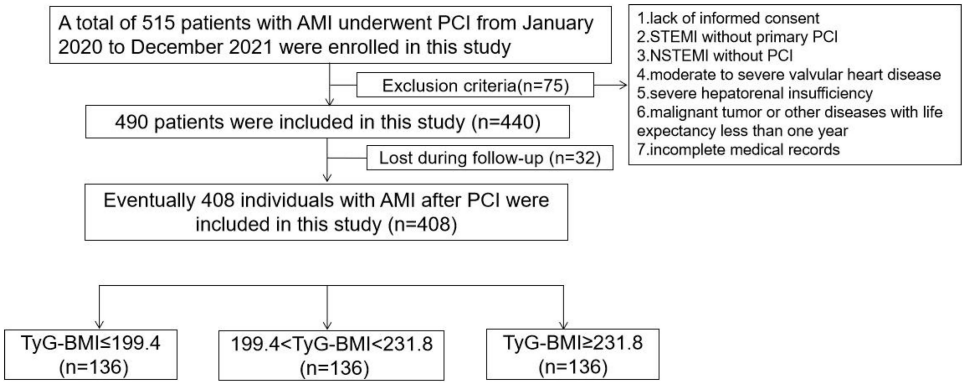

Figure 1 Study flow chart.

Statistical Analysis

SPSS version 20.0 (IBM, USA) was used for data analysis. The Kolmogorov–Smirnov test was used for the normality test for continuous variables. Since TyG-BMI was not normally distributed, the patients were divided into three groups: tertile 1 (≤186.1, n=102), tertile 2 (186.1–241.0, n=205), and tertile 3 (≥241.0, n=101). Clinical, laboratory, and procedural characteristics were compared between the three groups. Categorical variables are shown as rates or percentages and were analyzed using the chi-squared test or Fisher's exact test. Continuous variables are displayed as mean ± standard deviation (SD) or median with the 25th and 75th percentiles, as appropriate, and were compared using the Student's *t*-test or ANOVA test in Gaussian distribution, or the Mann–Whitney *U*-test or Kruskal–Wallis *H*-test in non-Gaussian distribution. Pearson or Spearman correlation analysis, as appropriate, was performed to investigate the correlation between TyG-BMI and the cardiovascular risk factors. Univariate Cox regression analysis was used to investigate risk factors for MACCEs. Multivariate Cox regression analysis was performed to further explore the independent predictors of MACCEs. The Kaplan–Meier survival analysis curve was used to investigate the outcomes of patients in different Tertiles of TyG-BMI. A receiver operating characteristic (ROC) curve was constructed to evaluate the predictive value of TyG-BMI for MACCEs in patients with AMI after PCI. All tests were two-sided, and statistical significance was set at $p < 0.05$.

Results

Baseline and Clinical Characteristics

A total of 408 consecutive patients who were diagnosed with AMI and underwent PCI were recruited. The study flowchart, including the exclusion criteria, is presented in Figure 1. Participants were divided into three groups according to tertiles of TyG-BMI: Tertile 1(≤199.4, n=136), tertile 2 (199.4–231.8, n=136), and tertile 3 (≥231.8, n=136). Compared with individuals in tertile 1, patients with higher TyG-BMI levels tended to have a higher BMI, fasting blood glucose (FBG), TG, and uric acid. Meanwhile, patients with higher TyG-BMI levels had a higher incidence of current smoking and diabetes mellitus ($p<0.05$) (Table 1). No obvious differences were found among the three groups with regard to other indicators ($P>0.05$) (Table 1).

TyG-BMI and Major Adverse Cardiovascular and Cerebrovascular Events

As shown in Table 2, 80 (19.6%) patients had MACCEs, 12 (11.8%) had tertile 1, 18 (13.2%) had tertile 1, 26 (19.1%) had tertile 2, and 36 (25.7%) had tertile 3. There were no differences among the three groups with regard to all-cause

Table 1 Baseline Characteristics of the Three Groups According to TyG-BMI

Variables	Tertile 1 ≤199.4(n=136)	Tertile 2199.4–231.8(n=136)	Tertile 3 ≥231.8(n=136)	P-value
Demographics				
Age, years	66.5(55.0, 76.8)	67.5(62.3, 74.0)	68.5(61.0, 74.0)	0.749
Gender(male), n(%)	106(77.9)	109(80.1)	120(88.2)	0.066
BMI, Kg/m^2	21.2(19.2, 22.3)	24.2(23.1, 25.2)	27.8(26.3, 29.4)	**<0.001**
Medical history				
Current smoker, (%)	66(48.5)	78(57.4)	94(69.1)	**0.003**
Diabetes Mellitus, (%)	14(10.3)	37(27.2)	40(29.4)	**<0.001**
Hypertension, (%)	58(42.6)	69(50.7)	74(54.4)	0.139
Heart failure, (%)	1(0.7)	1(0.7)	3(2.2)	0.472
Previous Stroke, (%)	9(6.6)	4(2.9)	5(3.7)	0.310

(*Continued*)

Table 1 (Continued).

Variables	Tertile 1 ≤199.4(n=136)	Tertile 2199.4–231.8(n=136)	Tertile 3 ≥231.8(n=136)	P-value
Previous MI, (%)	4(2.9)	3(2.2)	1(0.7)	0.364
Previous PCI, (%)	10(7.4)	8(5.9)	7(5.1)	0.742
COPD, (%)	3(2.2)	7(5.1)	5(3.7)	0.426
AF, (%)	10(7.4)	4(2.9)	5(3.7)	0.181
Clinical presentation				
NSTEMI, (%)	72(52.9)	67(49.3)	81(59.6)	0.225
STEMI, (%)	64(47.1)	69(50.7)	55(40.4)	
Killip≥2	22(16.2)	30(22.1)	28(20.6)	0.446
LVEF, (%)	60.3±10.6	60.1±9.6	60.2±10.7	0.990
Target lesions and Lesions characteristics				
LM, (%)	3(2.2)	2(1.5)	2(1.5)	0.909
LAD, (%)	57(41.9)	65(48.1)	63(46.3)	
LCX, (%)	29(21.3)	28(20.7)	24(17.6)	
RCA, (%)	47(34.6)	40(29.6)	47(34.6)	
1-vessel disease, (%)	87(64.0)	80(58.8)	90(66.2)	0.752
2-vessel disease, (%)	23(16.9)	28(20.6)	24(17.6)	
3-vessel disease, (%)	26(19.1)	28(20.6)	22(16.2)	
Laboratory parameters				
FBG, mmol/L	5.1(4.5, 5.8)	5.6(4.9, 7.6)	5.9(5.0, 8.1)	**<0.001**
HbA1c, %	5.6(5.4, 6.2)	5.8(5.4, 6.8)	5.8(5.4, 6.6)	0.498
TC, mmol/L	4.2(3.5, 5.0)	4.3(3.6, 5.1)	4.4(3.7, 5.3)	0.485
TG, mmol/L	1.0(0.8, 1.3)	1.5(1.1, 1.9)	2.0(1.3, 2.7)	**<0.001**
LDL-C, mmol/L	2.8(2.2, 3.5)	2.8(2.3, 3.4)	3.0(2.3, 3.6)	0.546
HDL-C, mmol/L	1.1(0.9, 1.2)	1.0(0.9, 1.2)	1.0(0.9, 1.2)	0.370
Uric acid, umol/L	313.5(257.5, 396.0)	341.0(275.2, 398.8)	393.5(327.3, 461.0)	**<0.001**
CK-MB, ng/mL	29.6(14.9, 129.9)	38.0(19.0, 141.7)	41.1(18.8, 166.3)	0.169
TnI, ng/mL	9.8(2.0, 46.7)	8.4(1.6, 43.2)	11.3(1.9, 57.3)	0.829
Creatinine, umol/L	75.0(66.0, 96.5)	76.0(67.3, 93.0)	83.0(72.05, 92.0)	0.065
TyG-BMI	176.9(162.3, 186.2)	213.5(205.0, 222.6)	253.1(241.0, 275.1)	**<0.001**
Medication				
Aspirin, (%)	135(99.3)	134(98.5)	136(100.0)	0.365
Clopidogrel, (%)	109(80.1)	107(78.7)	105(77.2)	0.839
Ticagrelor, (%)	27(19.9)	29(21.3)	31(22.8)	

(*Continued*)

Table 1 (Continued).

Variables	Tertile 1 ≤199.4(n=136)	Tertile 2199.4–231.8(n=136)	Tertile 3 ≥231.8(n=136)	P-value
ACEI/ARB/ARNI, (%)	79(58.1)	70(51.5)	68(50.0)	0.363
Beta-blocker, (%)	77(56.6)	69(50.7)	78(57.4)	0.485
Calcium canal blocker, (%)	11(8.1)	13(9.6)	17(12.5)	0.468
Statin, (%)	130(95.6)	132(97.1)	130(95.6)	0.771
Ezetimibe, (%)	25(18.4)	39(28.7)	40(29.4)	0.066
Diuretic, (%)	53(39.0)	68(50.0)	62(45.6)	0.184

Abbreviations: BMI, body mass index; MI, myocardial infarction; PCI, percutaneous coronary intervention; COPD, chronic obstructive pulmonary disease; AF, atrial fibrillation; SBP, systolic blood pressure; DBP, diastolic blood pressure; NSTEMI, Non-ST-elevation myocardial infarction; STEMI, ST-Elevation Myocardial Infarction; LVEF, left ventricular ejection fraction; LM, left main; LAD, left anterior descending artery; LCX, left circumflex artery; RCA, right coronary artery; FBG, fasting blood glucose; HbA1c, glycosylated hemoglobin; TC, total cholesterol; TG, Triglyceride; LDL-C, low-density lipoprotein cholesterol; HDL-C, high-density lipoprotein cholesterol; TyG-BMI, triglyceride glucose body mass index; ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin II receptor blocker; ARNI, angiotensin receptor enkephalinase inhibitor.

Table 2 Incidence of Clinical Outcomes in the Overall Population During Follow-Up

Variables	Tertile 1	Tertile 2	Tertile 3	P-value
All cause death, (%)	3(2.2)	4(2.9)	5(3.7)	0.771
TVR, (%)	9(6.6)	13(9.6)	18(13.2)	0.184
AMI, (%)	5(3.7)	7(5.1)	9(6.6)	0.547
Acute heart failure, (%)	0(0.0)	1(0.7)	2(1.5)	0.248
Stroke, (%)	1(0.7)	1(0.7)	2(1.5)	0.788
MACCEs, (%),	18(13.2)	26(19.1)	36(25.7)	0.033

Abbreviations: TVR, target vessel revascularization; AMI, acute myocardial infarction; MACCE, major adverse cardiovascular and cerebrovascular events.

death, TVR, AMI, acute heart failure, and stroke. However, the incidence of MACCEs increased as the tertiles of the TyG-BMI elevated, which had statistical differences ($p<0.05$) (Table 2).

Correlations Between TyG-BMI and Cardiovascular Risk Factors

As the indicators, including age, BMI, uric acid, creatinine, FBG, and blood lipids were not normally distributed, Spearman correlation analysis was performed to investigate the correlation between TyG-BMI and these indicators. The LVEF was normally distributed; therefore, Pearson's correlation analysis was performed. As displayed in Table 3, TyG-BMI was positively associated with age, BMI, uric acid, creatinine, FBG, and TG ($p<0.05$) (Table 3). No correlations were found between TyG-BMI and total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C) and LVEF ($P>0.05$).

Association of the Factors with MACCEs

Univariate Cox regression analysis was performed to explore potential factors associated with MACCEs. As presented in Table 4, hypertension, diabetes mellitus, creatinine, uric acid, LDL-C, and TyG-BMI were identified as risk factors for MACCEs, whereas HDL-C was a protective factor ($p<0.05$) (Table 4). Multivariate Cox regression analysis was used to further explore independent predictors of MACCEs. Diabetes mellitus and TyG-BMI were independent predictors of MACCEs in patients with AMI after PCI ($p<0.05$) (Table 4). The Kaplan–Meier survival analysis curve was used to investigate the

Table 3 Correlations Between the TyG-BMI and Cardiovascular Risk Factors

Variables	Correlation Coefficient (r)	P-value
Age, years	0.135	0.006
BMI, Kg/m^2	0.922	<0.001
Uric acid, umol/L	0.252	<0.001
Creatinine, umol/L	0.118	0.017
FBG, mmol/L	0.256	<0.001
TC, mmol/L	0.051	0.307
TG, mmol/L	0.573	<0.001
LDL-C, mmol/L	0.030	0.548
HDL-C, mmol/L	−0.090	0.070
LVEF, %	0.015	0.763

Abbreviations: BMI, body mass index; FBG, fasting blood glucose; TC, total cholesterol; TG, Triglyceride; LDL-C, low-density lipoprotein cholesterol; HDL-C, high-density lipoprotein cholesterol; LVEF, left ventricular ejection fraction.

Table 4 Univariate and Multivariate Analysis for Predictors of MACCEs

	Univariate Analysis			Multivariate Analysis		
	HR	95% CI	P value	OR	95% CI	P value
Smoking	1.009	0.639–1.549	0.631			
Hypertension	1.524	1.210–3.016	0.032	1.448	0.914–2.654	0.197
Diabetes mellitus	1.324	1.127–3.625	0.021	1.387	1.027–3.419	0.035
Killip≥2	1.256	0.824–4.024	0.520			
Creatinine, umol/L	1.002	1.000–1.004	0.032	1.000	0.995–1.007	0.552
Uric acid, umol/L	1.024	1.001–1.204	0.029	1.001	0.994–1.104	0.420
TC, mmol/L	1.020	0.857–1.215	0.820			
HDL-C, mmol/L	0.927	0.901–0.972	0.007	0.894	0.781–1.011	0.227
LDL-C, mmol/L	1.122	1.058–1.426	0.033	1.241	0.908–1.464	0.209
LVEF, %	0.973	0.955–1.017	0.267			
TyG-BMI	1.012	1.008–1.016	<0.001	1.015	1.009–1.042	<0.001

Abbreviations: TC, total cholesterol; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; LVEF, left ventricular ejection fraction; TyG-BMI, triglyceride glucose body mass index;

outcomes of patients in different Tertiles of TyG-BMI. As shown in Figure 2, the cumulative incidence of MACCEs increased as the TyG-BMI tertiles increased (p=0.001). The ROC curve showed that when TyG-BMI was ≥192.4, the sensitivity and specificity were 60.1% and 65.4%, respectively, and the area under the ROC curve (AUC) was 0.632 (95% confidence interval [CI]: 0.562–0.703; $p < 0.001$) (Figure 3). TyG-BMI had a higher predictive value than TyG or BMI alone (Figure 3).

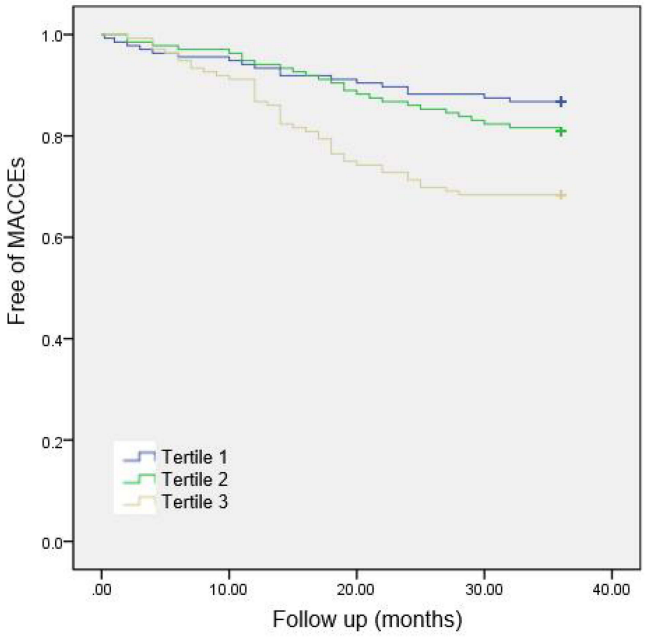

Figure 2 The Kaplan-Meier survival curves analysis.

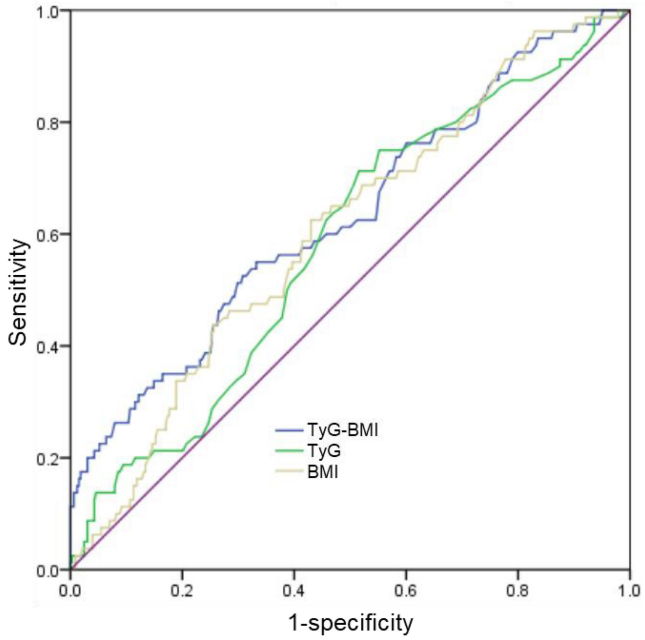

Figure 3 ROC curve showing the distinguishing ability of TyG-BMI for MACCEs.

Discussion

In this study, we first investigated the indicators associated with a higher TyG-BMI in patients with AMI after PCI and found that patients with higher TyG-BMI levels tended to have higher BMI and FBG, TG, and uric acid levels. Patients with higher TyG-BMI levels had a higher incidence of current smoking and diabetes mellitus. Multivariate Cox regression analysis showed that diabetes mellitus and TyG-BMI were independent predictors of MACCEs in patients with AMI after PCI. TyG-BMI had a higher predictive value than TyG or BMI alone. This is the first study to explore the predictive value of TyG-BMI for MACCEs in AMI patients after PCI.

Insulin resistance plays an important role in the pathophysiology and development of type 2 diabetes, dyslipidemia, obesity, and cardiovascular as CVD.[9] Accumulating evidence suggests that insulin resistance is related to the progression of CVD and serves as a predictive indicator of short- and long-term prognoses.[6] In recent years, TyG has been suggested as an alternative indicator for IR assessment of insulin resistance.[2] As a parameter of obesity, BMI is widely used in the clinical practice and plays an important role in the development of insulin resistance.[13,15] TyG-BMI is a novel parameter that is involved in TG, FBG, and the nutritional indicator BMI, providing a new insight for the assessment of insulin resistance as well as the prognostic value for CVD. Prof. Er LK et al discovered that TyG-BMI is closely related to the homeostasis model assessment of insulin resistance, which suggests that TyG-BMI is a reliable and promising indicator for the assessment of insulin resistance in clinical practice.[4] Moreover, a Korean study demonstrated that TyG-BMI has a better predictive value for insulin resistance than TyG and other indicators,[3] which has kicked off a research hot spot in this area. In addition, TyG-BMI has been proven to be associated with traditional CVD risk factors such as hypertension, diabetes, and hyperuricemia.[6,16] Similar to a previous study, we discovered that TyG-BMI was also related to age, uric acid, and creatinine, which suggests that TyG-BMI could serve as a comprehensive and promising indicator for the prediction of CVD prognosis. However, to date, few studies have focused on the relationship between TyG-BMI and long-term prognosis of patients with AMI after PCI.

A more recent study from China, included 2648 STEMI patients who underwent PCI with an average 14.70 (6.00–32.43) months suggested that TyG-BMI was independently linked to MACCEs. However, in this study, only a small percentage (33.2%) of patients underwent timely PCI, which could have affected the prognosis of these patients. Moreover, MACCEs including all-cause death, revascularization, non-fatal MI, and non-fatal stroke were relatively low in the study groups, and only MACCEs and non-fatal stroke were statistical differences.[17] In addition, only patients with STEMI were included; therefore, the results cannot be extrapolated to other populations. TyG has also been associated with MACEs in AMI.[2,18,19] A Korean study demonstrated that TyG-BMI has a better predictive value for insulin resistance compared than TyG and other indicators,[3] and TyG-BMI could further improve the predictive value for the future risk of diabetes.[20] Therefore, we hypothesized that TyG-BMI could be associated with the long-term prognosis of AMI after PCI and aimed to investigate the relationship between TyG-BMI and MACCEs in patients with AMI after PCI. Diabetes mellitus and TyG-BMI were independent predictors of MACCEs in AMI patients after PCI. The cumulative incidence of MACCEs increased as the TyG-BMI tertiles increased. This is the first study to investigate the relationship between TyG-BMI and long-term prognosis of patients with AMI after PCI.

In fact, TyG-BMI has been proven to have a superior predictive power than the TyG index for the prediction of prehypertension and hypertension in all comer patients[21] and in non-diabetic populations.[22] TyG-BMI also had a higher predictive value for the development of diabetes in different future period.[20] Prof. Zhang et al discovered that TyG-BMI is not only significantly related to CAD severity but is also an independent predictor of multivessel disease.[23] Moreover, TyG-BMI has a better predictive value than TyG index.[23] Similar to a previous study, we discovered that TyG-BMI had a higher predictive value than TG or BMI alone. TyG-BMI derived from lipids and glucose, as well as obesity indicators, could provide multiple perspectives and a better predictive value. However, the TyG-BMI has some limitations. In the acute phase of myocardial infarction, stress hyperglycemia can weaken or eliminate its predictive value. The association between TyG-BMI and MACCE was also observed in individuals without diabetes, hypertension, or hyperlipidemia, which demonstrated that, independent of traditional CVD risk factors, TyG-BMI could be an independent risk factor for CVD. However, antihypertensive therapy with glucose- and lipid-lowering treatments could have an impact on the TyG-BMI value, thereby influencing the outcome. Moreover, in patients with type 2 diabetes, traditional cardiovascular risk factors are major predictors of prognosis. However, uncontrolled hyperglycemia further aggravates this situation. Therefore, the different results should be interpreted with caution.

We are the first to report the association between TyG-BMI and long-term prognosis in patients with AMI after PCI. This study had some limitations. First, this was a small single-center study. The incidence of all-cause death, TVR, AMI, acute heart failure, and ischemic stroke was relatively low; therefore, a subgroup analysis could not be performed. Second, we only collected TyG-BMI data on admission and did not dynamically monitor the data. Third, although we attempted to include all indicators, residual covariates may still be present, which may affect the predictive value. Fourth, nutritional indicators and dietary patterns were not included, which may have affected the TyG-BMI calculation. Fifth,

7.3% of the individuals in this study were lost during follow-up, which was relatively high. It is estimated that the incidence of outcomes/events may be even higher in patients lost to follow-up; therefore, this introduces a significant study bias. Finally, large-sample, multicenter, prospective studies are required to validate our conclusions.

Conclusion

We discovered that elevated TyG-BMI was associated with an increased risk of MACCE in AMI patients after PCI.

Abbreviations

AMI, acute myocardial infarction; TyG-BMI, triglyceride-glucose body mass index; MACCE, major adverse cardiovascular events; CVD, cardiovascular disease.

Data Sharing Statement

The datasets generated and analyzed during the current study are not publicly available due to a further study in this area, but are available from the corresponding author upon reasonable request.

Ethics Approval and Informed Consent

This study was conducted in compliance with the ethical principles of the Helsinki Declaration and approved by The Hospital Affiliated to Inner Mongolia University for Nationalities. All subjects provided written informed consent before participation.

Disclosure

The authors declare that they have no conflicts of interest in this work.

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