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ORIGINAL ARTICLE

High-dose bolus tirofiban versus low-dose bolus in patients with acute coronary syndrome undergoing percutaneous coronary intervention

Perkütan koroner girişimine alınan akut koroner sendromlu hastalarda düşük yükleme dozuna karşılık yüksek yükleme dozunda tirofiban

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ABSTRACT

Objective: Aim of the present study was to determine effects of high-dose versus low-dose intravenous (IV) bolus tirofiban on angiographic measures, ST resolution, enzymatic infarct size, and clinical outcomes in patients with acute coronary syndrome (ACS) who were undergoing percutaneous coronary intervention (PCI) and received current pharmacoinvasive therapy.

Methods: Acute coronary syndrome patients (n=271, 85.6% male; mean age: 57.9±12.6 years) from between 2009 and 2015 who received IV tirofiban therapy following PCI were retrospectively analyzed. All patients had received maintenance tirofiban infusion (0.15 µg/kg/min) after bolus dose and 600 mg clopidogrel. Percentage of patients undergoing drug eluting stent implantation procedure was 33.5%. Tirofiban was administered to all patients in bailout situation or for thrombotic complication after PCI.

Results: High-dose IV bolus group (25 µg/kg; n=140) was associated with greater ST segment resolution (66% *vs.* 50%, p=0.013) and reduced peak troponin release [12.4 ng/dL (range: 6.5–21.5 ng/dL) *vs.* 16.4 ng/dL (range: 10.1–27.4 ng/dL), p=0.001] compared with low-dose bolus group (10 µg/kg, n=131). Cardiovascular event rates were similar between groups at in-hospital, 1-month, and 6-month follow-up (p=1.000, 1.000, and 0.287, respectively). Percentage of patients with post-procedural Thrombolysis in Myocardial Infarction (TIMI) grade III flow, major, and minor bleeding were similar (p=0.085, 1.000, and 0.965, respectively).

Conclusion: Use of high-dose IV bolus tirofiban in addition to aspirin and high-dose clopidogrel improves ST segment resolution, reduces infarct size, and does not increase bleeding events in patients with ACS undergoing PCI compared with low-dose bolus. Angiographic measures and clinical endpoints were similar between groups.

ÖZET

Amaç: Güncel farmakoinvaziv tedavi uygulanan ve perkütan koroner girişime (PKG) alınan akut koroner sendromlu (AKS) hastalarda intravenöz (İV) düşük yükleme dozuna karşılık yüksek yükleme dozunda tirofibanın anjiyografik ölçümler, ST segment rezolüsyonu, enzimatik enfarkt büyüklüğü ve klinik sonlanımlar üzerine etkilerini belirlemeyi amaçladık.

Yöntemler: 2009 ile 2015 yılları arasında PKG sonrası İV tirofiban tedavisi alan AKS'li 271 hasta (%85.6 erkek, ortalama yaş: 57.9±12.6) geriye dönük olarak incelendi. Tüm hastalar yükleme dozunun ardından sürdürme dozunda tirofiban infüzyonu (0.15 µg/kg/dk) ve 600 mg klopidogrel aldı. İlaç kaplı stent takılan hastaların oranı %33.5 idi. Tirofiban tüm hastalarda kurtarıcı amaçlı ya da trombotik komplikasyon varlığında PKG'den sonra verildi.

Bulgular: İntravenöz yüksek yükleme dozunda tirofiban uygulanan grupta (25 µg/kg, n=140), düşük yükleme dozu alanlara göre (10 µg/kg, n=131) ST-segment rezolüsyonu daha fazla (%66 ve %50, p=0.013) ve pik troponin salınımı daha azdı (12.4 ng/dL [dağılım: 6.5–21.5 ng/dL] ve 16.4 ng/dL [dağılım: 10.1–27.4 ng/dL], p=0.001). Hastane içi, bir ay ve altı aylık takiplerde kardiyovasküler olay oranları gruplar arasında benzerdi (sırasıyla, p=1.000, 1.000 ve 0.287). İşlem sonrası Thrombolysis in Myocardial Infarction (TIMI)-3 akımı olan hasta oranı, majör ve minör kanama oranları gruplar arasında benzerdi (sırasıyla, p=0.085, 1.000 ve 0.965).

Sonuç: Aspirin ve yüksek doz klopidogrele ilaveten yüksek yükleme dozunda İV tirofiban uygulamasının PKG'ye alınan AKS'li hastalarda düşük yükleme dozuna kıyasla ST-segment rezolüsyonunu iyileştirme ve enzimatik enfarkt büyüklüğünü azaltmada kanama olaylarını artırmaksızın daha etkin olduğu gösterildi. Anjiyografik ölçümler ve klinik sonlanımlar gruplar arasında benzerdi.

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Intravenous (IV) glycoprotein (GP) IIb/IIIa receptor blockers prevent platelet aggregation by inhibiting fibrinogen from binding to conformationally activated form of GPIIb/IIIa receptor on 2 adjacent platelets.[1] They reduce frequency of major adverse cardiac events (MACE) in short- and long-term follow-up in patients with acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI).[2–4] Tirofiban is a small-molecule, non-peptide GPIIb/IIIa inhibitor.[4]

European guidelines have declared that use of tirofiban during PCI should be considered for bailout therapy if there is angiographic evidence of massive thrombus, slow or no-reflow, or thrombotic complication.[2,3] American guidelines recommend high-dose bolus tirofiban at the time of PCI in patients with ST elevation myocardial infarction (STEMI) for large thrombus burden or inadequate P2Y12 receptor antagonist loading, and in patients with non-ST elevation acute coronary syndrome (NSTE-ACS) and high-risk features (e.g., elevated troponin).[5,6]

Previous small studies have demonstrated high-dose bolus tirofiban provided better platelet aggregation inhibition compared with low-dose bolus, and clinical endpoints and safety profile were similar.[7,8] However, patients did not receive dual antiplatelet therapy in sufficient doses (300–450 mg loading of clopidogrel), there were no data related to use of drug eluting stent (DES), and follow-up time was short in these studies. Aim of the present study was to evaluate effects of high-dose versus low-dose IV bolus tirofiban on angiographic measures, ST segment resolution, enzymatic infarct size, and clinical outcomes in patients with ACS who underwent PCI and received current therapies.

METHODS

ACS patients from between 2009 and 2015 who received IV tirofiban therapy following PCI were retrospectively analyzed. Patients with stage 4 or 5 chronic kidney disease, severe liver failure, therapy-resistant cardiogenic shock, severe uncontrolled hypertension (>180/110 mmHg), increased risk of bleeding (bleeding diathesis, thrombolytic treatment, history of stroke within 2 years, recent major surgery, intracranial or intraspinal trauma or surgery within 2 months, intracranial neoplasm, thrombocytopenia, active internal bleeding), inadequate file recordings [electrocardiography (ECG) data, angiographic information, follow-up data] or patients with life expectancy of <1 year were excluded. Total of 271 patients were included in the study (low-dose bolus group: 131 patients, high-dose bolus group: 140 patients). Ethics committee of Eskişehir Osmangazi University approved the study.

Abbreviations:

ACS	*Acute coronary syndrome*
BMS	*Bare metal stent*
CK-MB	*Creatine kinase-myocardial band*
DES	*Drug eluting stent*
ECG	*Electrocardiography*
GP	*Glycoprotein*
IV	*Intravenous*
LVEF	*Left ventricle ejection fraction*
MACE	*Major adverse cardiac event*
PCI	*Percutaneous coronary intervention*
NSTE ACS	*Non-ST elevation acute coronary syndrome*
STEMI	*ST elevation myocardial infarction*
TIMI	*Thrombolysis in Myocardial Infarction coronary flow grade*

Data regarding the following were obtained from file records: age, gender, body mass index, hypertension, diabetes mellitus, family history of coronary artery disease, smoking, history of previous coronary artery disease, time from onset of chest pain to balloon (minutes), door-to-balloon time (minutes), physical examination findings (systolic blood pressure, diastolic blood pressure, heart rate, Killip class), medications, ECG, left ventricle ejection fraction (LVEF) (% on first day of hospitalization), fasting glucose, lipid profile, and creatinine level. Enzymatic estimation of infarct size was performed by serial blood measurement of myocardial band fraction of creatine kinase (CK-MB) and troponin I.[9] Peak CK-MB and peak troponin I were defined as highest serum concentrations within first 48 hours. Percent resolution in ST segment elevation was determined by comparison of lead with maximum ST elevation on ECG recorded 90 minutes post PCI with baseline ST elevation in patients with STEMI.[10]

Angiographic definitions

All patients underwent coronary angiography and PCI procedures via femoral or radial percutaneous approach. Patients were transferred directly to catheter laboratory (primary PCI for patients with STEMI, or urgent catheterization for patients with NSTE-ACS). All patients were pretreated with aspirin (300 mg orally) and clopidogrel (600 mg orally). Coronary flow before and after coronary intervention was evaluated by 2 blinded interventional cardiologists according to the Thrombolysis in Myocardial Infarction (TIMI)

coronary flow classification.[11] Stent thrombosis was defined as presence of ACS with angiographic or autopsy evidence of thrombus or occlusion. Target lesion revascularization was defined as any repeated percutaneous revascularization of stented segment, including 5-mm proximal and distal margins.[12]

Intravenous tirofiban was administered as high-dose bolus (25 μg/kg) or low-dose bolus (10 μg/kg) followed by infusion therapy (0.15 μg/kg/min) for mean duration of 18 to 24 hours. Treatment in all cases was initiated in angiography laboratory after PCI in bailout situation or thrombotic complication (downstream therapy).

Patients underwent coronary stent implantation, balloon angioplasty alone, or conservative therapy. Balloon angioplasty alone was preferred for patients who developed stent thrombosis (in-stent balloon angioplasty) or who had small vessel diameter. Conservative therapy was preferred for coronary artery bypass surgery transfer patient and patients with aneurysmatic vessels. Other patients underwent stent implantation [bare metal stent (BMS) or DES]. Some patients had more than 1 stent implanted.

Clinical points

MACE was defined as cardiovascular death, stent thrombosis, recurrent myocardial infarction, or target vessel revascularization during hospitalization, at 1-month, or 6-month follow-up. Safety endpoints were major bleeding, minor bleeding, and thrombocytopenia. Major bleeding was defined as intracranial hemorrhage, ≥5 g/dL decrease in hemoglobin concentration, or ≥15% absolute decrease in hematocrit. Minor bleeding was observed blood loss of 3 to 5 g/dL in hemoglobin concentration or 10% to 15% decrease in hematocrit, or no observed blood loss with ≥4 g/dL decrease in hemoglobin concentration and ≥12% decrease in hematocrit.[11] Platelet count <100 000/mm^3 was defined as thrombocytopenia.[8]

Statistical analysis

All statistical analyses were performed with SPSS software, version 17.0 (IBM Corp., Armonk, NY, USA). Distribution of continuous variables was tested for normality with one-sample Kolmogorov-Smirnov test, and data were presented as mean and standard deviation or median and interquartile range, as appropriate. Categorical variables were presented as frequency and group percentage, and differences between groups were compared using chi-square test. For categorical variables, we used Fisher's exact test when theoretical values were lower than expected value of 5, continuity correction was applied when they were between expected value of 5 and 25, and Pearson chi-square test when they were higher than expected value of 25. Differences between patients of normally and non-normally distributed variables were evaluated using independent samples t-test and Mann-Whitney U test, respectively, as appropriate. In addition, univariate and multivariate Cox's proportional hazards model was applied to identify independent risk factors for MACE during 6-month follow-up (MACE rate at sixth month). P value of <0.05 was considered statistically significant result.

RESULTS

No statistically significant differences between the 2 groups were found in baseline demographic and clinical characteristics or medications (Table 1). Frequency of patients with STEMI was similar between groups (p=0.503). Pain-to-balloon and door-to-balloon times were not significantly different (p=0.098, 0.285, respectively) (Table 1). Frequency of patients with Killip class >1 was similar in both groups (p=0.449). Peak CK-MB values were lower in high-dose bolus group than low-dose bolus group, but not statistically significant (p=0.129). Peak troponin I value was significantly lower in high-dose bolus group than low-dose bolus group [12.4 ng/dL (range: 6.5–21.5 ng/dL) vs 16.4 ng/dL (range: 10.1–27.4 ng/dL); p<0.001]. Percentage of 90-minute ST segment resolution was significantly higher in high-dose bolus group than low-dose bolus group [66.0% (range: 50.0–80.0%) vs 50.0% (range: 36.5–75.0%); p=0.013]. Other laboratory values were similar between groups (Table 1).

Angiographic characteristics of the groups are presented in Table 2. No significant differences were found between groups in distribution of culprit lesion, frequency of patients with triple-vessel disease, or pre- and postprocedure TIMI flow (grade III). Groups were similar in terms of percentage of patients who underwent stent implantation, type of stent (BMS or DES), balloon angioplasty alone, or conservative follow-up (Table 2). One patient (in low-dose bolus group) was transferred for coronary artery bypass surgery.

Table 1. Baseline characteristics of the study population

	Low-dose bolus (n=131)	High-dose bolus (n=140)	*p*
Age, Mean±SD	57.56±13.40	58.29±11.98	0.634
Sex (male), n (%)	110 (84.0)	122 (87.1)	0.568
Persistent ST segment elevation, n (%)	128 (97.7)	134 (95.7)	0.503
Body mass index (kg/m^2)	27.4 (25.0–29.1)	26.9 (25.1–29.0)	0.877
Hypertension, n (%)	46 (35.1)	49 (35.0)	0.984
Diabetes mellitus, n (%)	34 (26.0)	39 (27.9)	0.724
Smoker, n (%)	70 (53.4)	69 (49.3)	0.495
Family history of coronary artery disease, n (%)	32 (24.4)	26 (18.6)	0.240
Previous coronary artery disease, n (%)	27 (20.6)	30 (21.4)	0.869
Killip class >, n (%)	19 (14.5)	15 (10.7)	0.449
Aspirin, n (%)	130 (99.2)	139 (99.3)	1.000
Clopidogrel, n (%)	129 (98.5)	139 (99.3)	0.611
Beta blocker, n (%)	124 (94.7)	128 (91.4)	0.423
Angiotensin converting enzyme inhibitor, n (%)	107 (81.7)	104 (74.3)	0.143
Angiotensin receptor blocker, n (%)	15 (10.7)	13 (9.3)	0.856
Statin, n (%)	116 (88.5)	121 (86.4)	0.731
Warfarin, n (%)	5 (3.8)	9 (6.4)	0.486
Pain to balloon time (min)	165.0 (138.0–208.0)	155.0 (123.0–195.0)	0.098
Door to balloon time (min)	35.0 (31.0–40.0)	33.0 (30.2–38.0)	0.285
ST segment resolution (%)	50.0 (36.5–75.0)	66.0 (50.0–80.0)	0.013
Left ventricle ejection fraction (%)	45.0 (38.0–52.0)	43.0 (35.0–50.0)	0.137
Fasting glucose (mg/dL)	102.0 (91.0–118.0)	105.5 (92.0–124.0)	0.176
Creatinine (mg/dL)	0.93 (0.80–1.10)	0.97 (0.87–1.10)	0.201
High-density lipoprotein cholesterol (mg/dL)	38.0 (33.0–44.0)	38.5 (33.0–42.0)	0.544
Low-density lipoprotein cholesterol (mg/dL)	112.0 (92.0–130.0)	108.0 (91.0–137.5)	0.630
Peak Creatine kinase-myocardial band (U/L)	132.0 (100.0–185.0)	119.1 (94.1–167.0)	0.129
Peak troponin (ng/dL)	16.4 (10.1–27.4)	12.4 (6.5–21.5)	0.001

Incidence of MACE was not significantly different between high-dose bolus group and low-dose bolus group during hospitalization (6.4% vs 6.1%, respectively; p=1.000), at 1-month follow-up (10.7% vs 11.5%, respectively; p=1.000) or 6-month follow-up (13.7% vs 19.1%, respectively; p=0.287). There were no significant differences between groups with respect to major or minor bleeding incidences (p=1.000, 0.965, respectively). In low-dose bolus group, 2 patients developed major bleeding (1 intracranial and 1 upper gastrointestinal system bleeding) and 11 patients developed minor bleeding (5 access site bleeding, 4 upper gastrointestinal system bleeding, and 2 hematuria). In high-dose bolus group, 3 patients developed major bleeding (1 intracranial, 1 lower gastrointestinal system, and 1 intrapericardial bleeding) and 13 patients developed minor bleeding (7 access site bleeding, 4 upper gastrointestinal system bleeding, and 2 hematuria). Clinical endpoints and bleeding events are summarized in Table 3.

Survival and regression analyses

ST segment resolution, LVEF, high-dose bolus tirofiban, DES implantation, and peak troponin I values were assessed using univariate and multivariable Cox regression analyses to identify independent risk factors related to MACE rate at sixth month. In univariate model, ST segment resolution and LVEF were found to be strongly associated with incidence of MACE at sixth month (p<0.001, 0.013, respectively) (Table 4).

Table 2. Angiographic characteristics

	Low-dose bolus (n=131)		High-dose bolus (n=140)		*p*
	n	%	n	%	
Triple-vessel disease	24	18.3	23	16.4	0.802
Baseline TIMI III flow	4	3.1	3	2.1	0.715
TIMI III flow after procedure	111	84.7	129	92.1	0.085
Infarct-related vessel					
Left anterior descending artery	73	55.7	70	50.0	0.345
Circumflex artery	12	9.2	15	10.7	0.823
Right coronary artery	39	29.8	50	35.7	0.298
Saphenous grafts	7	5.3	5	3.6	0.679
Coronary stenting	118	90.1	126	90.0	1.000
Bare-metal stent	83	63.4	77	55.0	0.162
Drug-eluting stent	37	28.2	54	38.6	0.072
Balloon	10	7.6	13	9.3	0.787
Conservative	3	2.3	1	0.7	0.356

TIMI: Thrombolysis in Myocardial Infarction.

Table 3. Clinical endpoints

	Low-dose bolus (n=131)		High-dose bolus (n=140)		*p*
	n	%	n	%	
In-hospital MACE	8	6.1	9	6.4	1.000
In-hospital death	4	3.1	4	2.9	1.000
In-hospital reinfarction	4	3.1	5	3.6	1.000
In-hospital stent thrombosis	4	3.1	3	2.1	0.715
In-hospital TVR	4	3.1	5	3.6	1.000
1-month MACE	15	11.5	15	10.7	1.000
1-month death	5	3.8	5	3.6	1.000
1-month reinfarction	8	6.1	10	7.1	0.922
1-month stent thrombosis	7	5.3	7	5.0	1.000
1-month TVR	11	8.4	10	7.1	0.874
6-month MACE	25	19.1	19	13.7	0.287
6-month death	8	6.1	6	4.3	0.687
6-month reinfarction	13	9.9	12	8.6	0.862
6-month stent thrombosis	12	9.2	8	5.7	0.394
6-month TVR	19	14.5	13	9.4	0.254
TIMI major bleeding	2	1.5	3	2.1	1.000
TIMI minor bleeding	11	8.4	13	9.3	0.965
Thrombocytopenia	1	0.8	2	1.4	1.000

MACE: Major adverse cardiac event; TIMI: Thrombolysis in Myocardial Infarction; TVR: Target vessel revascularization.

Each 1% increase in ST segment resolution was associated with 2% reduction in MACE rate, and for every 1% decrease in LVEF, 3.3% increase in MACE rate was seen at sixth month. High-dose bolus tirofiban,

Table 4. Univariate and multivariate analyses of variables associated with MACE rate at sixth month

	Univariate analysis			Multivariate analysis		
	HR	CI	*p*	HR	CI	*p*
ST segment resolution (%)	0.978	0.967–0.988	<0.001	0.980	0.969–0.991	<0.001
Left ventricle ejection fraction (%)	0.968	0.944–0.993	0.013	0.969	0.944–0.995	0.022
Peak troponin (ng/dL)	1.000	0.976–1.024	0.982	0.998	0.974–1.023	0.883
TIMI 3 flow after procedure (n, %)	0.633	0.282–1.420	0.267	0.845	0.365–1.952	0.693
Drug-eluting stent (n, %)	1.407	0.771–2.566	0.266	1.330	0.722–2.450	0.360
High-dose bolus tirofiban	0.704	0.387–1.278	0.248	0.764	0.405–1.439	0.404

CI: Confidence interval; HR: Hazard ratio; MACE: Major adverse cardiac event (during 6-month follow-up); TIMI: Thrombolysis in Myocardial Infarction; TVR: Target vessel revascularization.

DES implantation, and peak troponin I values were not found to predict 6-month MACE rate in univariate model. Again, multivariable model showed that ST segment resolution [hazard ratio (HR): 0.980; 95% confidence interval (CI): 0.969–0.991; p<0.001] and LVEF [HR: 0.969; 95% CI: 0.944–0.995; p=0.022] were significantly associated with incidence of MACE at sixth month, while the other factors were not (Table 4).

DISCUSSION

This study demonstrates that high-dose IV bolus of tirofiban administered for bailout situations or thrombotic complications in addition to 300 mg aspirin and 600 mg clopidogrel is associated with greater ST segment resolution and reduced peak troponin release compared with low-dose bolus in patients with ACS who underwent PCI. However, the 2 regimens are similar in terms of angiographic measures, clinical endpoints, and major or minor bleeding events. In addition, we found LVEF and ST segment resolution were independent predictors for MACE rate at sixth month.

GPIIb/IIIa inhibitors are recommended during PCI for bailout situations or thrombotic complications.[2,3] On the other hand, use of GPIIb/IIIa inhibitors is associated with increase in major bleeding complications, without significant increase in intracranial hemorrhage.[2] Routine use of GPIIb/IIIa inhibitor as adjunct to primary PCI performed with unfractionated heparin is debatable.[2,3]

Tirofiban is a small-molecule, non-peptide tyrosine derivative in class of GPIIb/IIIa inhibitors.[13,14] Though it is similar to abciximab in high affinity for GPIIb/IIIa receptor, tirofiban dissociates from GPIIb/IIIa receptor more rapidly than abciximab.[13,14] Different dosing regimens of tirofiban have been developed over time, which has resulted in mixed results in clinical trials.[4] Recent study demonstrated upstream tirofiban therapy significantly improves myocardial perfusion, ST segment resolution, in-hospital mortality rate, and in-hospital sudden cardiac death in patients with STEMI and with no increased risk of major bleeding.[15]

Small studies have compared high-dose versus low-dose IV bolus tirofiban followed by maintenance infusion. High-dose IV bolus tirofiban was found to be associated with better platelet aggregation inhibition after PCI in STEMI patients and in patients with ACS who underwent PCI when compared with low-dose bolus.[7,16] However, angiographic outcomes were similar between groups.[7] Ren et al. found that early use of high-dose bolus tirofiban in addition to 600 mg clopidogrel was more efficient at inhibiting platelet activity than standard-dose bolus in patients with acute STEMI undergoing primary PCI.[17] Bilsel et al. reported single high-dose bolus tirofiban without infusion in addition to 300 mg clopidogrel was associated with better platelet aggregation inhibition immediately after bolus dose compared with low-dose bolus following maintenance infusion.[8] High-dose bolus tirofiban has also been found to demonstrate results similar to those of abciximab in terms of angiographic, electrocardiographic, and clinical outcomes.[18,19]

In the studies mentioned above, loading dose of clopidogrel was insufficient (300 or 450 mg) or number of patients was small.[7,8,16,17] In addition, there

were no data on DES implantation or long-term clinical follow-up in these studies. Our patients received current therapies compatible with current guidelines.[2,3,5,6] Loading dose of clopidogrel was 600 mg and one-third of the patients (33.5%) had DES inserted in the present study. In-hospital, 1-month, and 6-month follow-up data are presented.

Almost all of our patients had persistent ST segment elevation and percentage of patients with NSTE-ACS was low (2.3% in low-bolus dose group and 4.3% in high-bolus dose group). In our study, overall in-hospital mortality rate in patients with ACS was about 3%, which is lower than real life. This finding may be due to fact that our patients were at relatively less risk; we included patients with NSTE-ACS (in-hospital mortality rate is lower than for STEMI) but patients with cardiogenic shock were excluded.

Our findings demonstrate that high-dose IV bolus tirofiban is associated with better ST segment resolution and smaller infarct size compared with low-dose bolus in patients with ACS undergoing PCI and receiving current pharmacoinvasive therapy. Although these advantages were not associated with additional advantage in terms of clinical outcomes, high-dose bolus regime did not increase bleeding events. Due to these advantages, high-dose bolus tirofiban for bailout therapy or thrombotic complications can also be used safely in patients with ACS undergoing PCI.

European guidelines recommend both bolus dosages of tirofiban (25 μg/kg or 10 μg/kg IV) with maintenance infusion of 0.15 μg/kg/min in cases of normal renal function or chronic kidney disease stages 1 through 3.[2,3] American guidelines for management of STEMI recommend 25 μg/kg bolus dose tirofiban.[5] However, reference studies cited in this guideline did not directly compare the 2 bolus doses. One was related to pre-hospital initiation of high-dose bolus tirofiban[20] and the other compared tirofiban and abciximab.[21] American guidelines for management of patients with NSTE-ACS do not include any recommendation related to bolus dose of tirofiban.[6]

We found that LVEF and ST segment resolution were independent predictors for MACE rate at sixth month in multivariate Cox regression analysis. High-dose bolus tirofiban, DES implantation, and peak troponin I values were not found to be independent predictors for MACE rate at sixth month.

Study limitations

Our study was retrospective in design and there was risk of selection bias. However, in-hospital, 1-month, and 6-month follow-up data were collected by different investigators to prevent bias. Only patients who had clopidogrel administered were included; patients receiving prasugrel or ticagrelor were excluded. Also, intracoronary tirofiban administration was not investigated in this study. Furthermore, corrected TIMI frame count was not considered. Fınally, study had small number of patients; however, results determined are valuable.

Conclusion

Although it does not improve angiographic TIMI flow or clinical endpoints, high-dose IV bolus tirofiban for bailout situation or thrombotic complications significantly improves ST segment resolution, reduces infarct size, and does not increase bleeding events in patients with ACS undergoing PCI and receiving current therapy. For this reason, it may be used safely in such patients given effective antiplatelet therapy.

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Anahtar sözcükler: Akut koroner sendromlar; antiplatelet ilaçlar; kanama; tirofiban.