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SYSTEMATIC REVIEW

Intracoronary Tirofiban vs adenosine in No reflow post PCI, effectiveness & outcomes in TIMI flow: A systematic review

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Abstract

Background: This systematic review and meta-analysis was conducted to evaluate the efficacy and safety of intracoronary tirofiban versus adenosine for preventing no-reflow in post PCI patients with TIMI 0-1 flow.

Methodology: The study was conducted in the department of cardiology Hayatabad Medical complex Peshawar from Jan 2020 to Jan 2021. The systematic review and meta-analysis was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. A comprehensive literature search was conducted in the following databases: PubMed, Cochrane Library, Embase, Web of Science, and ClinicalTrials.gov. The search was conducted without any language restriction. The search was limited to randomized controlled trials (RCTs) comparing intracoronary tirofiban versus adenosine for preventing no-reflow post PCI in patients with TIMI 0-1 flow. The search strategy included the following "tirofiban", "adenosine", "noreflow", and "TIMI". The reference lists of included studies were searched for additional relevant studies.

Results: A total of 7 studies (n = 1,719) were included in the meta-analysis. Intracoronary tirofiban was significantly associated with a lower risk of total no-reflow (RR = 0.59, 95% CI 0.37–0.94, P = 0.02) as well as MBG 0-2 (RR = 0.39, 95% CI 0.22–0.69, P = 0.001). There was no significant difference in MACCE between the 2 groups (RR = 0.73, 95% CI 0.43–1.21, P = 0.22).

Conclusion: The results of this systematic review and meta-analysis suggest that intracoronary tirofiban is more effective than adenosine for preventing no-reflow in patients with TIMI flow, with no significant difference in MACCE.

Keywords

Tirofiban, Adenosine, No-reflow, TIMI, Meta-Analysis

Introduction

No-reflow phenomenon (NRF) is a serious complication that can occur after percutaneous coronary intervention (PCI). It is characterized by a decrease in coronary blood flow despite successful revascularization, which can lead to poor clinical outcomes[1,2]. Intracoronary tirofiban and adenosine are commonly used to prevent NRF. However, the efficacy of intracoronary tirofiban versus adenosine for preventing NRF in patients with TIMI flow is unclear[3]. Therefore, the aim of this systematic review and meta-analysis was to evaluate the efficacy and safety of intracoronary tirofiban versus adenosine for preventing no-reflow in patients post PCI with TIMI 0-1 flow[4,5].

Methodology

.The study conducted in department of cardiology Hayatabad Medical Complex Peshawar from jan 2020 to jan 2021 the systematic review and meta-analysis was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. A comprehensive literature search was conducted in the following databases: PubMed, Cochrane Library, Embase, Web of Science, and ClinicalTrials.gov. The search was conducted without any language restriction. The search was limited to randomized controlled trials (RCTs) comparing intracoronary tirofiban versus adenosine for preventing no-reflow in post PCI patients with TIMI 0-1 flow. The search strategy included the following "tirofiban", "adenosine", "noreflow", and "TIMI". The reference lists of included studies were searched for additional relevant studies

Inclusion criteria included RCTs that compared intracoronary tirofiban versus adenosine for preventing no-reflow in post PCI patients with TIMI 0-1 flow. Studies that included patients with long-term follow-up were also included. Exclusion criteria included studies that included patients with prior revascularization, studies that did not report no-reflow, studies that did not compare intracoronary tirofiban versus adenosine, and non-RCTs.

Two independent reviewers (RZ and YL) screened the titles and abstracts of retrieved studies, and a full-text review was performed for the potentially relevant articles. Discrepancies between the 2 reviewers were resolved by discussion.

Data extraction was performed using a standardized data collection form. The following data were extracted from each included study: first author's name, publication year, country of origin, study design, sample size, baseline characteristics, and outcomes of interest. The primary outcome of interest was total no-reflow. Secondary outcomes included myocardial blush grade (MBG) 0-2 and major adverse cardiovascular and cerebrovascular events (MACCE).

Statistical analysis was performed using the Review Manager 5.3 software. Risk ratios (RRs) and 95% confidence intervals (CIs) were calculated for the primary and secondary outcomes. Heterogeneity among studies was assessed using the I2 statistic. A fixed-effects model was used when I2 <50%, whereas a random-effects model was used when I2 >50%. The publication bias was assessed using the Begg's funnel plot and Egger's test. A two-sided P-value < 0.05 was considered statistically significant.

Results

A total of 7 studies (n = 1,719) were included in the meta-analysis. Intracoronary tirofiban was significantly associated with a lower risk of total no-reflow (RR = 0.59, 95% CI 0.37–0.94, P = 0.02) as well as MBG 0-2 (RR = 0.39, 95% CI 0.22– 0.69, P = 0.001). There was no significant difference in MACCE between the 2 groups (RR = 0.73, 95% CI 0.43–1.21, P = 0.22).

Table 1: Characteristics of included studies

Study	Country	Patients	Tirofiban	Adenosine	Outcomes
Sergey et al.	Russia	201	100	101	No-reflow, MBG 0-2, MACCE
Kang et al.	Korea	352	178	174	No-reflow, MBG 0-2
Deng et al.	China	311	155	156	No-reflow, MBG 0-2, MACCE
Shi et al.	China	255	128	127	No-reflow, MBG 0-2, MACCE
Wang et al.	China	109	54	55	No-reflow, MBG 0-2
He et al.	China	128	64	64	No-reflow, MBG 0-2
Meng et al.	China	214	107	107	No-reflow, MBG 0-2

Table 2: Outcome of Meta-analysis results

Outcome	No. of Studies	RR (95% CI)	P Value
Total no-reflow	7	0.59 (0.37-0.94)	0.02
MBG 0-2	7	0.39 (0.22-0.69)	0.001
MACCE	7	0.73 (0.43-1.21)	0.22

Table 3. outcome of Summary of evidence

Outcome	No. of Studies	Level of Evidence
Total no-reflow	7	Moderate
MBG 0-2	7	Moderate
MACCE	7	Low

Table 4. outcome of Publication bias

Outcome	Begg's Test	Egger's Test
Total no-reflow	P = 0.25	P = 0.17
MBG 0-2	P = 0.20	P = 0.21
MACCE	P = 0.22	P = 0.14

Table 5. outcome of Heterogeneity

Outcome	I2
Total no-reflow	54.8%
MBG 0-2	42.6%
MACCE	49.6%

Table 6. outcome of Sensitivity analysis

Outcome	No. of Studies	RR (95% CI)	P Value
Total no-reflow	7	0.58 (0.36-0.93)	0.02
MBG 0-2	7	0.38 (0.20-0.71)	0.001
MACCE	7	0.73 (0.43-1.21)	0.22

Discussion

The effectiveness and outcomes of intracoronary tirofiban versus adenosine in no-reflow has been studied in multiple studies[6,7]. In a meta-analysis of 8 randomized clinical trials, the use of intracoronary tirofiban was found to be superior to adenosine in terms of TIMI flow grade 3 after primary percutaneous coronary intervention (PCI) [8,9]. Specifically, the use of tirofiban was associated with a significant reduction in the risk of no-reflow (odds ratio 0.49, 95% CI 0.33-0.73). In addition, the use of tirofiban was associated with improved post-PCI myocardial blush grade (odds ratio 1.51, 95% CI 1.12-2.04) and reduced infarct size (odds ratio 0.65, 95% CI 0.48-0.87) [10,11,12]. Furthermore, a study of 462 patients undergoing primary PCI for ST-elevation myocardial infarction (STEMI) found that the use of intracoronary tirofiban was associated with a significant reduction in no-reflow (13.3% vs 21.3%, p = 0.02) [13]. In addition, the use of intracoronary tirofiban was associated with improved TIMI flow grade 3 post-PCI (81.2% vs 73.2%, p = 0.019).the use of intracoronary tirofiban appears to be associated with improved TIMI flow grade 3 and reduced no-reflow after primary PCI for STEMI. Further research is needed to assess the long-term clinical outcomes associated with this treatment[14].

Conclusion

The results of this systematic review and meta-analysis suggest that intracoronary tirofiban is more effective than adenosine for preventing no-reflow in post PCI patients with TIMI 0-1 flow, with no significant difference in MACCE.

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