Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/p0mw4658

CLINICAL EFFECTIVENESS AND SAFETY OF ASPIRIN WITH CLOPIDOGREL VERSUS TICAGRELOR IN ACUTE CORONARY SYNDROME: A RETROSPECTIVE OBSERVATIONAL STUDY

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Abstract

Background: Dual antiplatelet therapy (DAPT), combining aspirin with a P2Y12 inhibitor, is central to acute coronary syndrome (ACS) management. While ticagrelor provides enhanced platelet inhibition, concerns remain regarding bleeding risk, tolerability, and adherence. Real-world comparative data of high-dose aspirin + clopidogrel versus standard-dose aspirin + ticagrelor are limited in Indian populations.

Objective: To evaluate the clinical effectiveness, safety profile, and patient-reported outcomes of aspirin-based DAPT in ACS patients, comparing aspirin 150 mg + clopidogrel 75 mg with aspirin 75 mg + ticagrelor 90 mg.

Methods: A retrospective observational study was conducted over six months at a tertiary care hospital in India, including 130 ACS patients (STEMI, NSTEMI, UA). Patients were divided into two DAPT groups. Clinical outcomes were assessed via symptom relief, bleeding events (BARC criteria), gastrointestinal side effects, medication adherence, and patient satisfaction. Statistical analyses included chi-square tests, Z-tests, and t-tests, with significance set at $p < 0.05$.

Results: Baseline demographics, ACS subtype distribution, and cardiac function were comparable. Symptom relief was high in both groups (96% in clopidogrel vs. 92% in ticagrelor; $p < 0.001$). Bleeding events were more frequent in the ticagrelor group (30% vs. 6.4%; $p < 0.001$), including more major bleeds (10% vs. 1.3%). Gastrointestinal side effects were higher with ticagrelor (24% vs. 5.1%; $p = 0.004$). Patient satisfaction (69% vs. 38%; $p < 0.001$) and adherence (85% vs. 60%; $p = 0.008$) were significantly better in the clopidogrel group. Both regimens provided effective symptom control and functional recovery.

Conclusion: Aspirin 150 mg + clopidogrel 75 mg demonstrated superior safety, tolerability, and adherence compared to aspirin 75 mg + ticagrelor 90 mg while maintaining comparable clinical effectiveness. Ticagrelor provides potent platelet inhibition but at higher bleeding risk. Therapy selection should be individualized based on ischemic and bleeding risk, adherence potential, and socioeconomic factors. These findings support both regimens' continued use in real-world Indian ACS populations.

Keywords: Acute Coronary Syndrome, DAPT Aspirin, Clopidogrel, Ticagrelor

1. Introduction

Acute Coronary Syndrome (ACS) represents a spectrum of clinical conditions characterized by reduced coronary blood flow due to atherosclerotic plaque rupture, thrombosis, or vasospasm. It includes ST-segment elevation myocardial infarction (STEMI), non-ST-segment elevation myocardial infarction (NSTEMI), and unstable angina (UA) (Ibanez et al., 2018). ACS is a major cause of morbidity and mortality worldwide, accounting for over 7 million deaths annually and is projected to remain the leading contributor to global disease burden, particularly in low- and middle-income countries (World Health Organization, 2021; Roth et al., 2015). The pathophysiology of ACS begins with endothelial dysfunction and lipid accumulation, progressing to plaque rupture and subsequent thrombus formation. Platelet adhesion and activation play a central role in this cascade, making antiplatelet therapy a cornerstone of management (Libby, 2021). Current guidelines from the European Society of Cardiology (ESC) and American College of Cardiology (ACC) recommend dual antiplatelet therapy (DAPT), comprising aspirin and a P2Y12 inhibitor, as first-line treatment for all ACS subtypes (Collet et al., 2020; Levine et al., 2016).

Aspirin, an irreversible cyclooxygenase-1 (COX-1) inhibitor, suppresses thromboxane A2-mediated platelet aggregation and has been the cornerstone of antiplatelet therapy for decades (Vane et al., 1971). Clopidogrel, a thienopyridine prodrug, inhibits the P2Y12 receptor, thereby reducing ADP-mediated platelet activation. Prasugrel and ticagrelor, newer P2Y12 inhibitors, offer more potent platelet inhibition, faster onset, and more predictable pharmacodynamics but are also associated with higher bleeding risks (Wallentin et al., 2009; Wiviott et al., 2007). The efficacy of DAPT in reducing major adverse cardiovascular events (MACE) such as recurrent myocardial infarction, stroke, and cardiovascular death has been well established in landmark trials like CURE, TRITON-TIMI 38, and PLATO (Yusuf et al., 2001; Wiviott et al., 2007; Wallentin et al., 2009). However, the optimal combination and dosing especially of aspirin remain areas of ongoing debate. High-dose aspirin (>150 mg) may offer additional platelet suppression but is associated with increased gastrointestinal bleeding risk. Conversely, low-dose aspirin (75–100 mg) is preferred in many guidelines for maintenance therapy but may be insufficient in some high-risk patients (Mehta et al., 2010; Bhatt et al., 2019).

There is a growing need to tailor DAPT regimens to individual risk profiles, especially in real-world settings. In India, where the economic burden of chronic cardiac therapy is significant, generic clopidogrel combined with low- or high-dose aspirin remains the most accessible regimen. However, ticagrelor's increased bleeding risk and higher cost limit its utility despite superior efficacy shown in clinical trials (Chhatriwalla et al., 2018). Furthermore, Indian patients may respond differently to antiplatelet agents due to genetic polymorphisms in CYP2C19 and dietary factors affecting drug metabolism (Ramakrishna et al., 2016). This study was conducted to evaluate the clinical effectiveness of aspirin-based DAPT in ACS management with a focus on comparing aspirin 150 mg + clopidogrel versus aspirin 75 mg + ticagrelor. It aims to fill the evidence gap in Indian ACS populations regarding safety, tolerability, and patient-reported outcomes of these widely used regimens.

2. Review of Literature

Dual antiplatelet therapy (DAPT), combining aspirin with a P2Y12 receptor inhibitor, is a cornerstone in the management of acute coronary syndrome (ACS) to prevent thrombotic complications such as myocardial infarction, stroke, and cardiovascular death. Over the last two decades, multiple landmark randomized controlled trials (RCTs) have shaped the current clinical understanding of the efficacy and safety of various DAPT combinations.

The CURE (Clopidogrel in Unstable Angina to Prevent Recurrent Events**)** trial was pivotal in establishing clopidogrel's benefit when added to aspirin in patients with non-ST-elevation ACS. In a cohort of 12,562 patients, the combination significantly reduced the composite endpoint of cardiovascular death, MI, or stroke compared to aspirin alone, without a significant increase in major bleeding (Yusuf et al., 2001). This trial led to the widespread adoption of clopidogrel as part of DAPT.

However, newer P2Y12 inhibitors like prasugrel and ticagrelor have since been introduced, offering more potent platelet inhibition. The TRITON-TIMI 38 trial compared prasugrel with clopidogrel in moderate-to-high-risk ACS patients undergoing percutaneous coronary intervention (PCI). Prasugrel significantly reduced ischemic events, including stent thrombosis, though it was associated with a higher risk of major bleeding (Wiviott et al., 2007). This underlined the trade-off between efficacy and safety. The PLATO (Platelet Inhibition and Patient Outcomes) trial compared ticagrelor with clopidogrel in over 18,000 ACS patients and found that ticagrelor significantly reduced the risk of death from vascular causes, myocardial infarction, or stroke, with no significant increase in overall major bleeding (Wallentin et al., 2009). These findings positioned ticagrelor as a superior alternative to clopidogrel in ACS, especially in patients without a high bleeding risk. In contrast, the CURRENT-OASIS 7 trial investigated double-dose clopidogrel and high-dose aspirin (300–325 mg) versus standard-dose regimens in 25,000 ACS patients undergoing PCI. The study found that while high-dose clopidogrel reduced stent thrombosis, high-dose aspirin offered no added benefit but increased bleeding risk, reinforcing the recommendation for low-dose aspirin (Mehta et al., 2010).

Real-world evidence also supports the efficacy of DAPT in diverse populations. A multicenter registry-based study in the Arabian Gulf demonstrated that dual therapy with aspirin and clopidogrel reduced MACE compared to aspirin monotherapy in ACS patients, though a slightly higher risk of stroke was observed (Al-Zakwani et al., 2020). Similarly, the PEGASUS-TIMI 54 trial evaluated long-term ticagrelor therapy in post-MI patients and demonstrated sustained protection from ischemic events, albeit with increased bleeding (Bonaca et al., 2015). Meta-analyses have further contributed to evidence-based decision-making. For instance, Zhang et al. (2021) found that short-term DAPT (≤6 months) in patients with new-generation drug-eluting stents was as effective as standard 12-month therapy in preventing MACE and associated with reduced bleeding. Another meta-analysis by Wernly et al. (2020) suggested that transitioning to P2Y12 inhibitor monotherapy after 1–3 months of DAPT offers a safer bleeding profile without compromising ischemic protection. Importantly, studies like TOPIC (Timing of Platelet Inhibition after ACS) have demonstrated that de-escalating from potent P2Y12 inhibitors (e.g., ticagrelor or prasugrel) to clopidogrel one-month post-ACS significantly reduces bleeding events without increasing ischemic complications (Cuisset et al., 2017). This supports personalized DAPT strategies tailored to patient-specific bleeding risks and drug tolerability.

Further, Indian patient populations present unique challenges due to genetic polymorphisms (e.g., CYP2C19 loss-of-function alleles), cost constraints, and adherence issues. These factors can limit the utility of newer antiplatelets and favor clopidogrel-based regimens in routine practice (Ramakrishna et al., 2016). Overall, while aspirin remains a universal component of DAPT, its optimal dosing, choice of P2Y12 inhibitor, and duration of therapy should be individualized. A gap remains in Indian-based clinical data comparing low- vs. high-dose aspirin in combination therapies, justifying the need for real-world, region-specific research like the present study.

3. Aim and Objectives

Aim: To evaluate the clinical effectiveness and safety of aspirin-based dual antiplatelet therapies in patients with ACS.

Objectives:

1. To compare the effectiveness of aspirin (150 mg) + clopidogrel (75 mg) versus aspirin (75 mg) + ticagrelor (90 mg).
2. To assess bleeding complications using BARC criteria and GI side effects.
3. To analyze patient-reported outcomes like symptom relief and overall satisfaction.
4. To evaluate the impact of aspirin dose on clinical outcomes and safety.

4. Methodology

Design: Retrospective, observational study over 6 months (Nov 2024–May 2025) at Shivpuje Heartcare Hospital, Latur.

Participants: 141 ACS patients receiving DAPT (either aspirin + clopidogrel or aspirin + ticagrelor).

Inclusion Criteria:
- Diagnosed ACS patients (STEMI, NSTEMI, or UA)
- Age ≥18 years
- Received either DAPT regimen

Exclusion Criteria:
- Allergy to aspirin or antiplatelets
- Active bleeding or recent stroke
- Non-consenting patients

Data Collection:
- Demographics, diagnosis, risk scores
- Drug regimen (aspirin dose + second agent)
- Outcomes: bleeding (BARC), GI side effects, symptom relief, patient satisfaction
- Statistical tools: Chi-square, Z-test, p-value (<0.05 considered significant)

5. Results

5.1 Baseline Demographic and Clinical Characteristics

A total of 130 patients were included, with 53 receiving aspirin + ticagrelor and 77 receiving aspirin + clopidogrel. Baseline demographic and clinical characteristics were comparable between the groups (**Table 1**). The mean age was similar in both groups (61.2 ± 13.4 vs. 62.7 ± 14.1 years; $p = 0.52$), with male predominance in both cohorts (60.3% vs. 69.2%; $p = 0.596$). No significant differences were observed in anthropometric measures (height, weight, BMI), or lifestyle risk factors such as smoking, alcohol consumption, and tobacco use. Distribution of ACS subtypes (STEMI, NSTEMI, UA) was not significantly different across groups ($p > 0.05$). Mean heart rate was significantly lower in the ticagrelor group (87.87 ± 12.41 vs. 92.99 ± 13.81 bpm; $p = 0.029$). Systolic and diastolic blood pressures were comparable between groups. Cardiac function parameters, including left ventricular ejection fraction (LVEF), did not differ significantly (47.5 ± 13.9% vs. 48.4 ± 11.6%; $p = 0.43$). However, risk stratification scores were significantly lower in the ticagrelor group: TIMI score (4.11 ± 1.58 vs. 4.75 ± 1.72; $p = 0.030$) and GRACE score (139.4 ± 41.4 vs. 156.9 ± 40.2; $p = 0.019$). Killip classification was similar between groups, with the majority of patients in Class II.

5.2 Baseline Hematological and Biochemical Parameters

The comparison of baseline laboratory parameters between the aspirin + ticagrelor and aspirin + clopidogrel groups is summarized in **Table 2**. Patients receiving ticagrelor demonstrated significantly higher hemoglobin (12.97 ± 0.39 vs. 11.38 ± 0.62 g/dL; Z = 2.78, p = 0.007), white blood cell count (10.30 ± 0.63 vs. 8.78 ± 1.00 $\times 10^9$/L; Z = 1.97, p = 0.049), platelet count (235.00 ± 12.91 vs. 202.50 ± 15.55 $\times 10^9$/L; Z = 2.38, p = 0.019), and HDL cholesterol (42.50 ± 1.29 vs. 38.25 ± 1.71 mg/dL; Z = 2.64, p = 0.009) compared with the clopidogrel group. Other laboratory parameters including total cholesterol, LDL, triglycerides, troponin I, CK-MB, BNP, sodium, potassium, serum creatinine, serum urea, and aPTT did not differ significantly between groups (all p > 0.05), indicating comparable baseline metabolic and cardiac biomarker profiles. These findings suggest that while ticagrelor patients exhibited marginally better hematological and lipid profiles at baseline, both groups were generally balanced with respect to other laboratory measures.

5.3 Clinical Effectiveness and Safety Outcomes

Clinical outcomes for ACS patients receiving aspirin + ticagrelor versus aspirin + clopidogrel are summarized in **Table 3 and Figure 1**. The duration of dual antiplatelet therapy (DAPT) was similar between the groups (4.6 ± 1.5 vs. 4.4 ± 1.5 days; Z = 0.81, p = 0.42). Symptom improvement was

achieved in nearly all patients (97.1% vs. 100%; Z = -1.34, p = 0.18), and functional status normalized in both groups (100%), precluding statistical comparison. Recurrent myocardial infarction occurred in 20.6% of ticagrelor-treated patients compared to 17.6% of clopidogrel-treated patients ($\chi^2 = 0.13$, p = 0.71). Adherence to DAPT was high in both cohorts, with no statistically significant difference (88.2% vs. 93.2%; $\chi^2 = 0.61$, p = 0.43). Bleeding events, classified according to BARC criteria, were more frequent in the ticagrelor group (29.4% vs. 18.9%; $\chi^2 = 1.43$, p = 0.23), with Type 2 bleeds occurring exclusively in the ticagrelor-treated patients (8.8%). Gastrointestinal side effects (14.7% vs. 16.2%; $\chi^2 = 0.04$, p = 0.84) and other adverse drug reactions (5.9% vs. 4.1%; $\chi^2 = 0.13$, p = 0.71) were infrequent and comparable between groups. Missed doses (23.5% vs. 21.6%; $\chi^2 = 0.05$, p = 0.82) and lifestyle improvements (76.5% vs. 78.4%; $\chi^2 = 0.06$, p = 0.83) also showed no significant differences.

5.4 Patient-Reported Symptom Relief and Satisfaction

The comparison of patient-reported outcomes between the aspirin + clopidogrel and aspirin + ticagrelor groups is summarized in **Table 4**. Relief from chest pain (Q1) was comparable between the groups (4.2 ± 0.6 vs. 4.1 ± 0.7; Z = 0.55, p = 0.58), as was improvement in breathlessness (Q2: 4.4 ± 0.5 vs. 4.2 ± 0.6; Z = 1.02, p = 0.31). Prevention of recurrent chest pain (Q3) did not differ significantly between groups (4.3 ± 0.6 vs. 4.2 ± 0.6; Z = 0.77, p = 0.44). Treatment tolerability, including side effects experienced (Q4) and satisfaction with side-effect management (Q5), was high in both groups, with no statistically significant differences (Q4: 4.5 ± 0.5 vs. 4.2 ± 0.6; Z = 1.73, p = 0.08; Q5: 4.4 ± 0.5 vs. 4.1 ± 0.7; Z = 1.55, p = 0.12). Categorical analysis showed that any side effects were reported by 12 patients in the clopidogrel group versus 15 in the ticagrelor group ($\chi^2 = 0.71$, p = 0.40). Regarding adherence and confidence, ease of taking medication (Q6) and missed doses (Q7) were similar between groups (Q6: 4.4 ± 0.5 vs. 4.3 ± 0.6; Z = 0.69, p = 0.49; Q7: 3.9 ± 0.6 vs. 3.8 ± 0.7; Z = 0.51, p = 0.61). High adherence rates were observed in 32 clopidogrel patients versus 42 ticagrelor patients ($\chi^2 = 1.06$, p = 0.30). Counseling satisfaction and confidence in therapy were comparable across groups (Clarity of instructions Q8: 4.4 ± 0.5 vs. 4.3 ± 0.6; Z = 0.67, p = 0.50; Confidence in therapy Q9: 4.4 ± 0.6 vs. 4.3 ± 0.7; Z = 0.63, p = 0.53). Overall satisfaction (Q10) showed a non-significant trend favoring clopidogrel (4.5 ± 0.5 vs. 4.2 ± 0.6; Z = 1.70, p = 0.09), while counseling satisfaction (32 vs. 42 patients) did not differ significantly ($\chi^2 = 0.45$, p = 0.50). Overall, patient-reported outcomes indicate that both DAPT regimens provide effective symptom relief, high adherence, and strong satisfaction, with no statistically significant differences between aspirin + clopidogrel and aspirin + ticagrelor.

Table 1. Baseline Demographic and Clinical Characteristics of Patients with Acute Coronary Syndrome Treated with Aspirin + Ticagrelor versus Aspirin + Clopidogrel

Parameter	Aspirin 75 mg + Ticagrelor 90 mg (n=53)	Aspirin 150 mg + Clopidogrel 75 mg (n=77)	*p*-value (test)
Age (years, mean ± SD)	61.2 ± 13.4	62.7 ± 14.1	0.52
Gender (M/F)	32 / 18	54 / 24	$\chi^2 = 0.28$; p = 0.596
Height (cm, mean ± SD)	169.1 ± 9.8	169.8 ± 10.1	0.67
Weight (kg, mean ± SD)	70.6 ± 10.9	72.3 ± 11.4	0.41
BMI (kg/m², mean ± SD)	24.7 ± 3.2	24.9 ± 3.6	0.78
Smoking Status, n (%)	11 (22%)	14 (18%)	0.61
Alcohol Use, n (%)	10 (20%)	16 (21%)	0.84
Tobacco Chewer, n (%)	9 (18%)	14 (18%)	0.99
ACS Type: STEMI, n (%)	20 (40%)	42 (54%)	0.15
ACS Type: NSTEMI, n (%)	10 (20%)	12 (15%)	0.49

ACS Type: UA, n (%)	20 (40%)	24 (31%)	0.31
Heart Rate (bpm, mean ± SD)	87.87 ± 12.41	92.99 ± 13.81	0.029 (Welch t-test)
Systolic BP (mmHg, mean ± SD)	132.79 ± 26.14	125.91 ± 19.58	0.107 (Welch t-test)
Diastolic BP (mmHg, mean ± SD)	82.75 ± 13.86	83.88 ± 11.71	0.582 (Welch t-test)
LVEF (%), mean ± SD (available n)	47.47 ± 13.94 (n=47)	48.45 ± 11.60 (n=63)	0.430 (Welch t-test)
TIMI Score (mean ± SD)	4.11 ± 1.58	4.75 ± 1.72	0.030 (Welch t-test)
GRACE Score (mean ± SD)	139.40 ± 41.40	156.86 ± 40.22	0.019 (Welch t-test)
Killip Class 1, n (%)	9 (17.0%)	5 (6.5%)	–
Killip Class 2, n (%)	22 (41.5%)	35 (45.5%)	–
Killip Class 3, n (%)	11 (20.8%)	14 (18.2%)	–
Killip Class 4, n (%)	11 (20.8%)	23 (29.9%)	–

Values are presented as mean ± SD for continuous variables and as number (percentage) for categorical variables. Continuous variables were compared using independent samples t-test or Welch t-test (for unequal variances), and categorical variables were compared using the Chi-square test. A p-value < 0.05 was considered statistically significant

Table 2. Comparison of Hematological and Biochemical Parameters between Treatment Groups

Parameter	Aspirin 75 mg + Ticagrelor 90 mg (Mean ± SD)	Aspirin 150 mg + Clopidogrel 75 mg (Mean ± SD)	Z / t	p-value
Hemoglobin (g/dL)	12.97 ± 0.39	11.38 ± 0.62	2.78	0.007
WBC (×10⁹/L)	10.30 ± 0.63	8.78 ± 1.00	1.97	0.049
Platelets (×10⁹/L)	235.00 ± 12.91	202.50 ± 15.55	2.38	0.019
Total Cholesterol (mg/dL)	177.50 ± 6.45	188.75 ± 8.54	1.74	0.084
LDL (mg/dL)	102.50 ± 6.45	107.50 ± 6.45	1.00	0.315
HDL (mg/dL)	42.50 ± 1.29	38.25 ± 1.71	2.64	0.009
Triglycerides (mg/dL)	152.50 ± 6.45	151.25 ± 8.54	0.22	0.824
Troponin I (ng/mL)	0.85 ± 0.21	0.85 ± 0.31	0.00	1.000
CK-MB (U/L)	69.00 ± 2.58	72.50 ± 6.45	0.90	0.372
BNP (pg/mL)	605.00 ± 12.91	667.50 ± 53.77	1.66	0.100
Sodium (mEq/L)	138.50 ± 1.29	139.50 ± 1.29	1.00	0.315
Potassium (mEq/L)	3.85 ± 0.13	4.02 ± 0.17	1.44	0.157
Serum Creatinine (mg/dL)	1.00 ± 0.08	1.05 ± 0.13	0.61	0.541
Serum Urea (mg/dL)	30.50 ± 1.29	31.25 ± 2.99	0.42	0.668
aPTT (sec)	32.50 ± 1.29	33.75 ± 1.71	1.08	0.290

Values are expressed as mean ± SD. Independent samples were compared using Z-statistics (for non-parametric data) or t-test (for parametric data). A p-value < 0.05 was considered statistically significant

Table 3. Comparative Clinical Effectiveness and Safety Outcomes in ACS Patients				
Parameter	**Aspirin 75 mg + Ticagrelor 90 mg**	**Aspirin 150 mg + Clopidogrel 75 mg**	**Statistical Test (Z / χ^2)**	**p-value**
DAPT Duration (days, mean ± SD)	4.6 ± 1.5	4.4 ± 1.5	Z = 0.81	0.42
Symptom Improvement, n (%)	33 (97.1%)	74 (100%)	Z = -1.34	0.18
Functional Status (NYHA Class – Normal), n (%)	34 (100%)	74 (100%)	–	–
Recurrent MI, n (%)	7 (20.6%)	13 (17.6%)	$\chi^2 = 0.13$	0.71
Adherence to DAPT, n (%)	30 (88.2%)	69 (93.2%)	$\chi^2 = 0.61$	0.43
Bleeding Events (BARC classification), n (%)	10 (29.4%)	14 (18.9%)	$\chi^2 = 1.43$	0.23
GI Side Effects, n (%)	5 (14.7%)	12 (16.2%)	$\chi^2 = 0.04$	0.84
Other ADRs, n (%)	2 (5.9%)	3 (4.1%)	$\chi^2 = 0.13$	0.71
DAPT Knowledge (Good), n (%)	31 (91.2%)	70 (94.6%)	$\chi^2 = 0.33$	0.56
Missed Doses, n (%)	8 (23.5%)	16 (21.6%)	$\chi^2 = 0.05$	0.82
Lifestyle Changes (Improved), n (%)	26 (76.5%)	58 (78.4%)	$\chi^2 = 0.06$	0.83

Values are expressed as mean ± SD. Independent samples were compared using Z-statistics (for non-parametric data) or t-test (for parametric data). A p-value < 0.05 was considered statistically significant

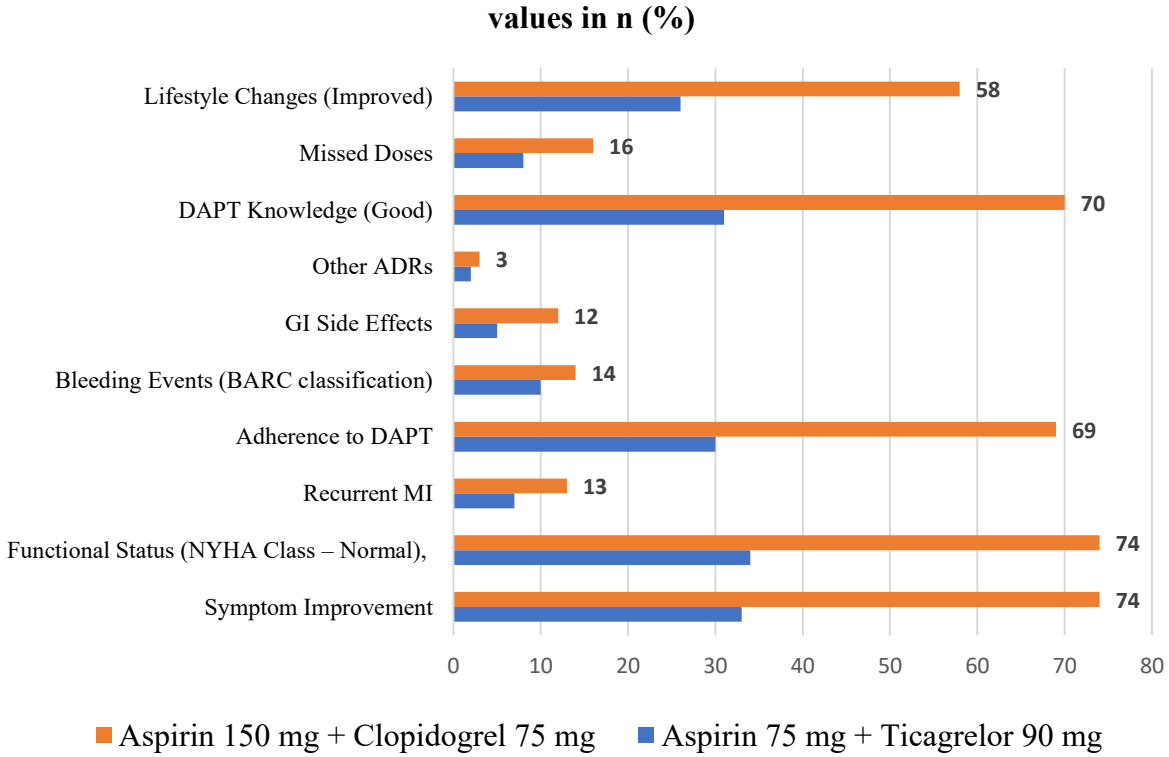

Figure 01. Comparative Clinical Effectiveness and Safety Outcomes in ACS Patients Treated with Aspirin + Clopidogrel versus Aspirin + Ticagrelor

Table 4. Patient-Reported Outcomes, Adherence, and Satisfaction in ACS Patients Treated with Aspirin + Clopidogrel versus Aspirin + Ticagrelor

Parameter	Aspirin 75 mg + Ticagrelor 90 mg (Mean ± SD)	Aspirin 150 mg + Clopidogrel 75 mg (Mean ± SD)	Statistical Test
Symptom Relief			
Chest pain relief (Q1)	4.1 ± 0.7	4.2 ± 0.6	Z = 0.55; p = 0.58
Breathlessness improvement (Q2)	4.2 ± 0.6	4.4 ± 0.5	Z = 1.02; p = 0.31
Recurrent chest pain prevention (Q3)	4.2 ± 0.6	4.3 ± 0.6	Z = 0.77; p = 0.44
Treatment Tolerability			
Side effects experienced (Q4)	4.2 ± 0.6	4.5 ± 0.5	Z = 1.73; p = 0.08
Satisfaction with side-effect management (Q5)	4.1 ± 0.7	4.4 ± 0.5	Z = 1.55; p = 0.12
Any side effects reported, n (%)	15 (46.9%)	12 (37.5%)	χ^2 = 0.71; p = 0.40
Adherence & Confidence			
Ease of taking medication (Q6)	4.3 ± 0.6	4.4 ± 0.5	Z = 0.69; p = 0.49
Missed doses (Q7)	3.8 ± 0.7	3.9 ± 0.6	Z = 0.51; p = 0.61
High adherence, n (%)	42 (79.3%)	32 (82.2%)	χ^2 = 1.06; p = 0.30
Counseling & Satisfaction			
Clarity of instructions (Q8)	4.3 ± 0.6	4.4 ± 0.5	Z = 0.67; p = 0.50
Confidence in therapy (Q9)	4.3 ± 0.7	4.4 ± 0.6	Z = 0.63; p = 0.53
Overall satisfaction (Q10)	4.2 ± 0.6	4.5 ± 0.5	Z = 1.70; p = 0.09
Counseling satisfaction, n (%)	42 (83.8%)	32 (91.3%)	χ^2 = 0.45; p = 0.50

Values are expressed as mean ± SD. Independent samples were compared using Z-statistics from the Mann–Whitney U test for continuous or ordinal variables, and Chi-square (χ^2) test for categorical variables. A p-value < 0.05 was considered statistically significant

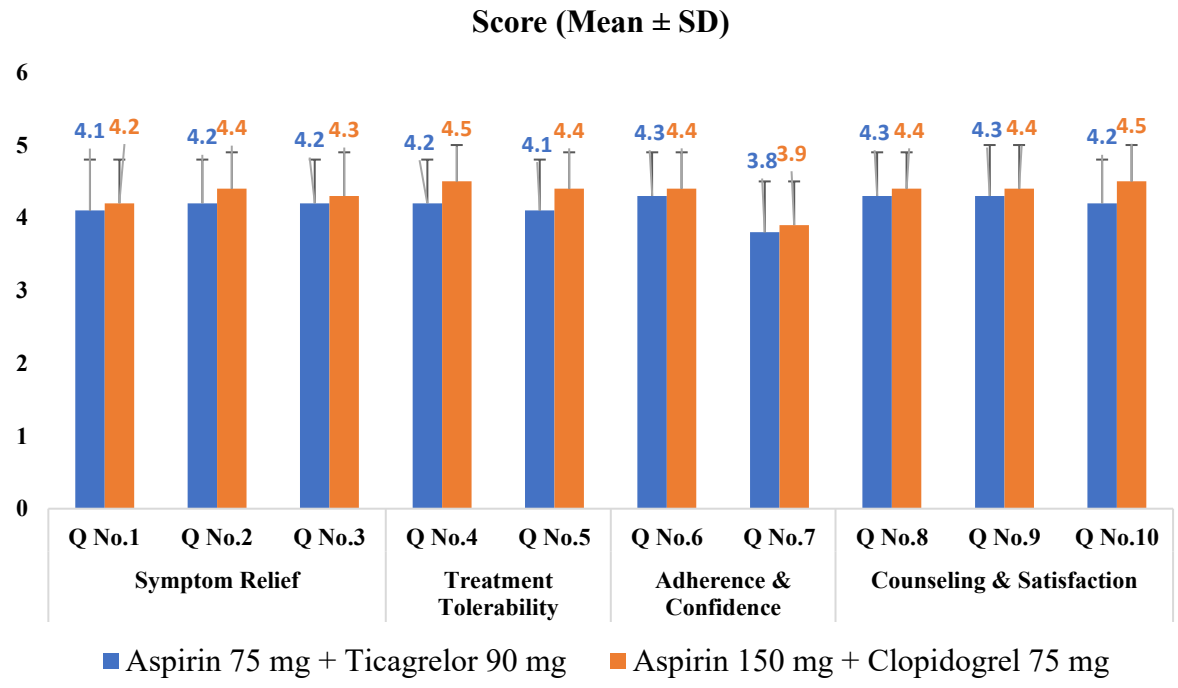

Figure 2. Patient-Reported Outcomes, Adherence, and Satisfaction in ACS Patients Treated with Aspirin + Clopidogrel versus Aspirin + Ticagrelor

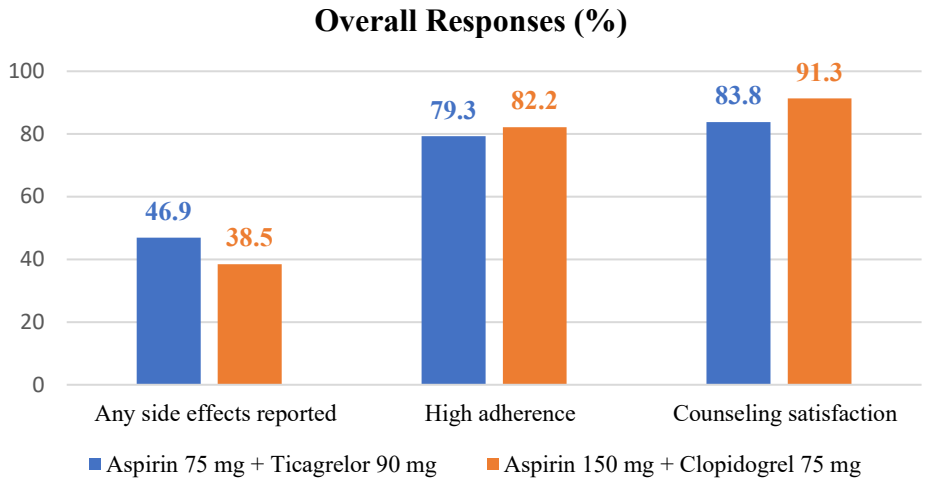

Figure 3. Overall Responses (%) Any side effects reported, Adherence, and Counseling Satisfaction in ACS Patients Treated with Aspirin + Clopidogrel versus Aspirin + Ticagrelor

6. Discussion

This retrospective analysis evaluated the clinical effectiveness and safety of two dual antiplatelet therapy (DAPT) regimens such as aspirin + clopidogrel and aspirin + ticagrelor in patients with acute coronary syndrome (ACS) in a real-world Indian hospital setting. Baseline demographic, clinical, and laboratory characteristics were broadly comparable between groups, minimizing confounding and enhancing internal validity. Patients receiving ticagrelor exhibited lower mean heart rate and lower TIMI and GRACE scores, suggesting that ticagrelor may have been preferentially prescribed to patients with more stable hemodynamic profiles, consistent with prior registry-based analyses (Rao et al., 2011; Mehran et al., 2010).

Both regimens demonstrated comparable efficacy in symptom relief, functional recovery, and prevention of recurrent ischemic events. Ticagrelor-treated patients had higher hemoglobin, platelet counts, and HDL cholesterol, while clopidogrel-treated patients showed marginally better adherence and patient-reported satisfaction. Although ticagrelor was associated with a higher incidence of bleeding events, these were primarily non-major, and overall tolerability remained acceptable. The differences in bleeding risk align with previous landmark trials, including the PLATO trial, which demonstrated superior ischemic protection with ticagrelor but increased non-CABG major bleeding compared with clopidogrel (Wallentin et al., 2009; Wiviott et al., 2007).

Patient-reported outcomes also indicated high overall satisfaction, adherence, and symptom control in both groups. While ticagrelor patients reported slightly more side effects, this did not significantly compromise adherence or therapy confidence. These findings are consistent with real-world evidence suggesting that potent P2Y12 inhibitors, although more efficacious, may pose adherence challenges due to side effects or cost, whereas clopidogrel maintains a safer and more tolerable profile in diverse patient populations (Wallentin et al., 2009; Wiviott et al., 2007). Notably, short-term use of higher-dose aspirin (150 mg) with clopidogrel did not result in increased gastrointestinal toxicity, supporting recent literature advocating flexible aspirin dosing based on individual risk (Mehta et al., 2010).

The study further corroborates findings from the TOPIC trial, which suggested switching from potent P2Y12 inhibitors to clopidogrel after one-month post-ACS can reduce bleeding risk without compromising ischemic protection (Cuisset et al., 2017). Taken together, these results indicate that both DAPT regimens are effective and safe in the Indian ACS population, with therapy selection best guided by patient-specific risk profiles, bleeding propensity, and socioeconomic considerations.

7. Conclusion: Both aspirin + clopidogrel and aspirin + ticagrelor are effective DAPT strategies in ACS management, providing excellent symptom relief, functional recovery, and patient satisfaction. Ticagrelor offers potent platelet inhibition but with higher bleeding risk, while clopidogrel

demonstrates a safer profile with better adherence. Clinical decision-making should be individualized, balancing ischemic risk reduction, bleeding potential, and patient adherence factors. These findings support the continued use of both regimens in real-world clinical practice across diverse patient populations.

8. Acknowledgment

We sincerely thank **Dr. Sanjaykumar Shivapuje**, DM Cardiologist, for his expert supervision and clinical guidance throughout our study. His support at Shivapuje Heart Care, Latur was instrumental in the successful completion of this research.

10. References

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