Comparison of the efficacy and safety between ticagrelor and clopidogrel in patients with acute coronary syndrome undergoing percutaneous coronary intervention

SE EUN LEE*, SANG EUN LEE, SA MI YANG, JI YOUNG CHOI, HYE WON HAN
Asan Medical Center, Department of Pharmacy, Seoul, South Korea

Background and Importance

The European Society of Cardiology (ESC) and American Heart Association guidelines (AHA) recommend ticagrelor and prasugrel over clopidogrel in dual antiplatelet therapy (DAPT) following percutaneous coronary intervention (PCI) in patients with acute coronary syndrome (ACS).[1-2)]

- Clopidogrel: Slower onset, variable efficacy due to genetic polymorphisms
- Ticagrelor & Prasugrel: Faster, more potent antiplatelet effects

⇒ Superior clinical outcomes in ACS

- Limitations: Higher bleeding risk
- Asian population: Limited studies;

thrombotic and bleeding tendencies differ from non-Asians

Aim and Objectives

Compare the efficacy and safety of ticagrelor and clopidogrel in patients with ACS undergoing PCI, elucidating optimal antiplatelet therapy tailored to individual patient needs.

⇒ Need for domestic studies to optimize antiplatelet therapy in Asian patients

Materials and Methods

1. Research design

- Retrospective observational study
- ACS patients undergoing PCI at a tertiary hospital (Jan 2022 - Jun 2023)
- Exclusion criteria: patients under 18 years of age, cases with insufficient medical records
- Groups: ticagrelor, clopidogrel

* Review of electronic medical records over 1 year post-PCI

* Analysis was divided into ticagrelor group and clopidogrel group based on the first P2Y12 inhibitor prescribed after PCI.

2. Outcomes

Efficacy	**Major adverse cardiovascular events (MACEs)** : Death, MI, stroke, and Revascularization
Safety	**Major bleeding events**

Results

1. Distribution of Prescriptions

: 460 patients included,

- Group: Ticagrelor (n=129, 28.0%), Clopidogrel (n=331, 72.0%)

2. Patient Characteristics

- Clopidogrel group (compared to Ticagrelor group)

: Age ↑, male ↓, HTN/DM ↑,
Length of hospital stay ↑, Myocardial infarction (ACS type) ↓

3. Efficacy (Table1)

- Before PSM: No significant difference (23.8% vs. 18.1%, p=0.756)
- After PSM: No significant difference (24.5% vs. 18.4%, p=0.460)

4. Safety (Table2)

- Before PSM: No significant difference (3.1% vs. 3.9%, p=0.789)
- After PSM: No significant difference (0.0% vs. 4.1%, p=0.495)

Table 1 Efficacy outcomes in patients treated with ticagrelor or clopidogrel

Efficacy outcomes	Before PSM (n=460)		After PSM (n=98)	
	Tica (n=129)	Clo (n=331)	Tica (n=49)	Clo (n=49)
MACEs, no. (%)	25 (23.8)	60 (18.1)	12 (24.5)	9 (18.4)
Death	4 (3.1)	23 (6.9)	3 (6.1)	2 (4.1)
MI	11 (8.5)	22 (6.6)	4 (8.2)	3 (6.1)
Stroke	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Revascularization*	15 (11.6)	32 (9.7)	7 (14.3)	6 (12.2)

*Revascularization: CABG, PCI
All values are P>0.05

Table 2 Safety outcomes in patients treated with ticagrelor or clopidogrel

Safety outcomes	Before PSM (n=460)		After PSM (n=98)	
	Tica (n=129)	Clo (n=331)	Tica (n=49)	Clo (n=49)
Major bleeding, no. (%)	4 (3.1)	13 (3.9)	0 (0.0)	2 (4.1)

All values are P>0.05

- To minimize bias between the two groups, propensity score matching (PSM) was performed.
- Patients who switched P2Y12 inhibitors within 1 year after PCI (n=78) were excluded from the matching process.

Conclusion and Relevance

- **Guideline Recommendation**: Ticagrelor is recommended over clopidogrel for DAPT post-PCI per ESC and ACC/AHA/SCAI guidelines.[1-2)]
- **Clinical Insights**: Clopidogrel was preferred in older, high-risk patients with comorbidities and poor renal function, reflecting real-world decision-making based on patient characteristics.
- **Study Outcomes**: PSM analysis showed no significant differences in MACEs or major bleeding rates between ticagrelor and clopidogrel groups, suggesting similar efficacy and safety in this population.
- **Meta-analysis Findings (Wu et al., 2020)[3)]** : Regional Differences

✓ Efficacy of ticagrelor:
- Europe/US: Significant reduction in MACEs (OR=0.82, p<0.001)
- Asia: More pronounced effect (OR=0.66, P<0.001)

✓ Bleeding Events of ticagrelor:
- Overall population: No significant difference (OR=1.19, p=0.21)
- Asian patients: Higher risk with ticagrelor (OR=1.52, p<0.001)

Further multicenter, prospective studies are needed to provide stronger evidence for the optimal selection of antiplatelet agents.

References

1. Byrne RA, Rossello X, Coughlan JJ, et al. 2023 ESC Guidelines for the management of acute coronary syndromes: Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC), European Heart J. 2023 Oct 7, 44(38):3720–3826.
2. Lawton JS, Tamis-Holland JE, Bangalore S, et al. 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization: Executive Summary: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circ J. 2022;145:e4–17.
3. Wu H, Xiang X, Li D, et al. Efficacy and Safety of Ticagrelor Compared to Clopidogrel in Patients Undergoing Percutaneous Coronary Intervention: A Meta-Analysis. Curr Pharm Des. 2020;26(46):5988-5997.

Connect data: se_0207@naver.com

5PSQ-062