Ticagrelor for the Prevention of Thrombotic Events in Acute Coronary Syndrome and Myocardial Infarction

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**Abstract**

Acute coronary syndrome is associated with high morbidity and mortality. Acute coronary syndrome is concurred with unstable angina and heart attack as a result of reduced blood flow to the heart due to coronary thrombosis. Ticagrelor is an oral, reversible and directly acting inhibitor of the adenosine diphosphate (ADP) receptor-P2Y(12) that has a potential for platelet inhibition. The US Food and Drug Administration (FDA) approved ticagrelor in July 2011 for the prevention of thrombotic events in acute coronary syndrome or myocardial infarction. This review will discuss the potentials of ticagrelor for the management of acute coronary syndrome.

**Keywords:** Ticagrelor; Platelet inhibition; Acute coronary syndrome; Unstable angina; Myocardial infarction

1.0. INTRODUCTION

Acute coronary syndrome refers to a range of acute myocardial ischemic states, and is associated with ST-segment elevation myocardial infarction, non-ST-segment elevation myocardial infarction and unstable angina [1]. The process to the initiation of acute coronary syndrome is linked with disruption of an atheromatous plaque with local generation of thrombin and deposition of fibrin, followed by platelet adhesion and aggregation, finally resulting in the formation of intracoronary thrombus [1]. The US FDA recently approved ticagrelor (Brilinta) for the reduction of thrombotic events in patients with acute coronary syndrome and or myocardial infarction. Ticagrelor inhibits the action of platelets in the circulation, and thus reduces recurrent thrombotic events in the coronary artery [2]. Clinical studies suggest that ticagrelor is effective in preventing heart attack and death. Bleeding and dyspnea are the most common adverse reactions associated with ticagrelor [3].

This review will discuss the potential of ticagrelor in the management of thrombotic events in patients with acute coronary syndrome.

2.0. MECHANISM OF ACTION

Ticagrelor is a platelet aggregation inhibitor. It blocks adenosine diphosphate (ADP) receptors of subtype P2Y(12). It reversibly binds to P2Y(12) receptor and non-competitively blocks ADP-induced platelet activation. ADP receptor blockade could inhibit the action of platelets, resulting in the prevention of recurrent thrombotic events. In contrast to other antiplatelet drugs, ticagrelor is an allosteric antagonist, and the blockade is reversible. AR-C124910XX is an active metabolite of ticagrelor, but the parent compound was shown to be accounted for its majority of the anti-platelet action [4,5].

3.0. THERAPEUTIC POTENTIAL OF TICAGRELOR

Ticagrelor is distinctively indicated to reduce the rate of thrombotic cardiovascular events in patients with acute coronary syndrome. Ticagrelor is supplied as a tablet for oral administration. The recommended initial oral dose is 180 mg. Numerous studies proved the therapeutic potentials of ticagrelor for the prevention of thrombotic events in patients with acute coronary syndrome and myocardial infarction [3,6,7].
A double-blind, randomized trial investigated a comparative effect of ticagrelor (180 mg loading dose, 90 mg twice daily maintenance dose) and clopidogrel (300 to 600 mg loading dose, 75 mg daily maintenance dose) on the prevention of cardiovascular events in patients with an acute coronary syndrome and with or without ST-segment elevation myocardial infarction [7]. This large multicenter trial concluded that treatment with ticagrelor significantly reduced the rate of death from vascular events and myocardial infarction without increasing the rate of overall major bleeding as compared to clopidogrel in these patients [7]. Likewise, the Platelet Inhibition and Patient Outcomes (PLATO) trial reported that ticagrelor significantly reduced ischemic end points and mortality without a significant increase in bleeding but with numerically more non-procedure-related bleeding as compared to clopidogrel in acute coronary syndrome patients with chronic kidney disease [8]. Moreover, this randomized double-blind study strongly suggested that ticagrelor is a better choice than clopidogrel for patients with acute coronary syndrome for whom an early invasive strategy is planned [9]. In addition, as compared to clopidogrel, ticagrelor treatment was observed to be associated with a substantial reduction in total and cardiovascular mortality rate without an excessive risk of coronary artery bypass graft surgery [CABG]-associated bleeding in the subgroup of patients undergoing CABG [10]. Furthermore, the benefits of ticagrelor over clopidogrel were noted to be consistent in patients of acute coronary syndrome initially intended for non-invasive management with those from the overall PLATO results [11,12].

4.0. CONCLUSION

Ticagrelor is a first oral antagonist of the P2Y(12) receptor indicated for the prevention of thrombotic events in patients of acute coronary syndrome linked with unstable angina and ST-segment elevation or non-ST-segment elevation myocardial infarction. It is a selective and reversible inhibitor of ADP-induced platelet aggregation with a quick onset of action. As suggested in large clinical studies, ticagrelor seems to be more effective than clopidogrel in preventing ischemic events in patients with acute coronary syndrome with overall cardiovascular benefit. Taken together, ticagrelor could be of potential therapeutic value in patients with high risk of ischemic events or irresponsible to clopidogrel.

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REFERENCES


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