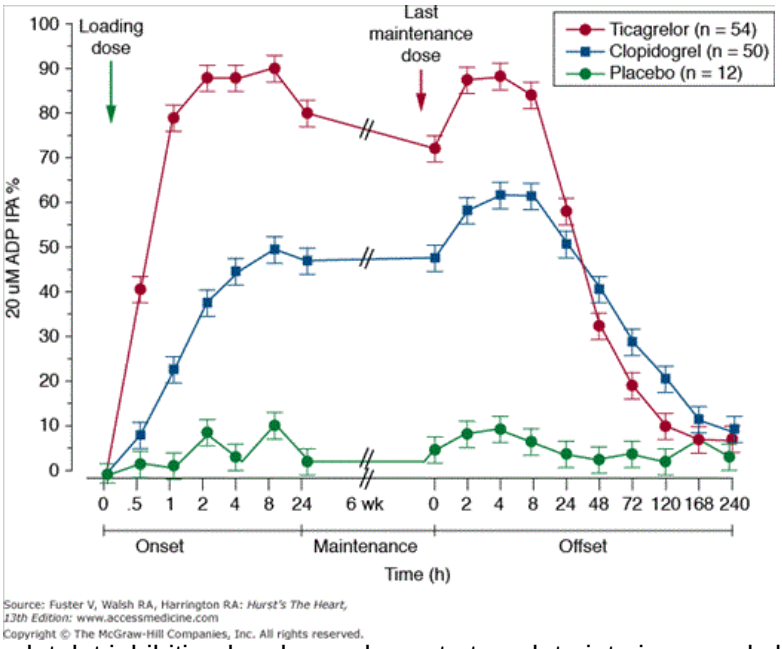
Ticagrelor for Primary PCI in the Emergency Department

Beginning March 2016, **ticagrelor (Brilinta®)** will replace clopidogrel (Plavix®) as the preferred P2Y12 inhibitor antiplatelet agent for patients in patients presenting with STEMI. It should also be considered as upfront therapy for patients presenting with NSTEMI/UA who have no history of ICH. Ticagrelor will be available in the Pyxis machines within the Emergency Department and should be administered in addition to aspirin when ACS is identified.

Rationale: Ticagrelor is a potent oral P2Y12 inhibitor that has a faster onset of action and greater antiplatelet effect than clopidogrel (see figure below)[1].



This improvement in platelet inhibition has been shown to translate into improved clinical outcomes. The PLATO trial, a large, randomized study comparing ticagrelor to clopidogrel in patients presenting with ACS, found that ticagrelor resulted in lower incidence of major adverse cardiac events, mortality, and stent thrombosis, with no increase in the incidence of major bleeding[2].

Dose: 180 mg is the appropriate loading dose of ticagrelor for all patients, **regardless of previous P2Y12 inhibitor exposure.** Studies have demonstrated that ticagrelor administration following clopidogrel load is both safe and effective. Therefore, if a patient is loaded by an outside hospital or EMS with clopidogrel, a ticagrelor loading dose should still be administered[3,4].

Administration: Administered orally without regards to food. May be crushed and mixed with water for administration via an NG or OG tube.

Contraindications: Ticagrelor is contraindicated in patients with a history of intracranial hemorrhage.

Need for Cardiac Surgery: The possibility for the need for cardiac surgery should not preclude the use of ticagrelor in the emergency department. A recent study suggests that discontinuation of ticagrelor 3 days prior to CABG did not increase the incidence of major bleeding complications compared to holding for 5 days[5]. Clopidogrel should still be held for 5 days prior to surgery.

Cost: A 180 mg loading dose of ticagrelor ($10) costs less than a 600 mg loading dose of clopidogrel ($42). Individual insurance coverage for long-term ticagrelor use can be assessed following PCI, and concern for this should not prevent the use of upfront ticagrelor.

References:

1. Gurbel PA, Bliden KP, Butler K, et al. Randomized double-blind assessment of the ONSET and OFFSET of the antiplatelet effects of ticagrelor versus clopidogrel in patients with stable coronary artery disease: The ONSET/OFFSET study. *Circulation*. 2009;120(25):2577-2585.

2. Wallentin L, Becker RC, Budaj A, et al. Ticagrelor versus clopidogrel in patients with acute coronary syndromes. *N Engl J Med*. 2009;361(11):1045-1057.

3. Hibbert B, Maze R, Pourdjabbar A, et al. A comparative pharmacodynamic study of ticagrelor versus clopidogrel and ticagrelor in patients undergoing primary percutaneous coronary intervention: The CAPITAL RELOAD study. *PLoS One*. 2014;9(3):e92078.

4. Caiazzo G, De Rosa S, Torella D, et al. Administration of a loading dose has no additive effect on platelet aggregation during the switch from ongoing clopidogrel treatment to ticagrelor in patients with acute coronary syndrome. *Circ Cardiovasc Interv*. 2014;7(1):104-112.

5. Hansson EC, Jidéus L, Åberg B, et al. Coronary artery bypass grafting-related bleeding complications in patients treated with ticagrelor or clopidogrel: A nationwide study. *Eur Heart J*. 2015. doi: 10.1093/eurheartj/ehv381.