



## INTRODUCTION & OBJECTIVES

- Ticagrelor is a potent P2Y12 platelet inhibitor indicated to reduce the rate of cardiovascular death, myocardial infarction, and stroke in patients with acute coronary syndrome (ACS) or a history of myocardial infarction (MI). A common challenge of ticagrelor use includes balancing thrombosis and bleeding risk during periprocedural antiplatelet therapy interruption in patients undergoing urgent surgical or other invasive procedures<sup>1</sup>
- The objective of this study was to understand key aspects of the patient journey, including clinical outcomes such as thrombotic risk, risk of complications, and mortality along with healthcare resource utilization (HCRU), for patients receiving ticagrelor washout who undergo non-deferrable coronary artery bypass graft (CABG) surgery in a real-world clinical setting via medical charts abstracted by treating physicians

## METHODS

- The study utilized real-world medical chart data (patient electronic medical records data) to characterize the patient journey for patients receiving ticagrelor who come to the hospital needing urgent, non-deferrable CABG surgery
- A quantitative, non-interventional study comprising a retrospective medical chart review and physician-level questionnaire was conducted among cardiology healthcare providers (HCPs), including cardiac surgeons, cardiothoracic surgeons, and interventional cardiologists, via a web-enabled questionnaire
- All study materials were reviewed and approved by a central institutional review board (IRB) in the United States (US) (Advarra)<sup>2</sup>
- Eligibility criteria for the physician were:
  - Board-certified or board-eligible cardiac surgeons, cardiothoracic surgeons, or interventional cardiologists in the US who have been practicing for more than three years and less than 30 years post-residency
  - Spend at least 70% of their professional time providing direct patient care
  - Actively managing at least 5 patients on ticagrelor who had an urgent/emergent non-deferrable CABG surgery in the last 12 months
- Eligibility criteria for the medical charts were:
  - Patient is ≥ 18 years of age
  - Patients who have been on ticagrelor immediately before the presentation and have required urgent/emergent non-deferrable CABG procedure in the last 12 months
  - Patients for whom physicians know to the best of their ability patients' clinical history regarding their urgent/emergent non-deferrable procedure, including bleeding associated with ticagrelor, washout of ticagrelor prior to surgery, treatments, blood product use, complications, etc.,
  - Patients for whom physicians know or have direct/ready access to their complications, treatment/management, blood product use, and utilization of healthcare services (e.g., hospitalization, outpatient visits, etc.) during or after the surgical procedure
- The study aimed to recruit respondents across a mix of cardiology settings (solo, academic/hospital-based, single specialty practice, tertiary care center), locations (urban, rural, suburban), and geographies across US regions (*Table 1*)
- Statistical analysis was conducted using Q Research Software 5.6. (Q Research Software, New York, NY)<sup>3</sup>

## RESULTS

**Table 1 | Respondent Demographics**

Number of Respondents, N	66
Number of charts, N	228
Number of charts per respondent, median (IQR)	4 (2)
Years in Practice, median (IQR)	13 (7)
Number of surgeries conducted annually, median (IQR)	120 (100)
<b>Specialty</b>	
Cardiac Surgeon, n (%)	30 (45%)
Cardiothoracic surgeon, n (%)	33 (50%)
Interventional Cardiology, n (%)	3 (5%)
<b>Practice Setting</b>	
Urban, n (%)	39 (59%)
Suburban, n (%)	25 (38%)
Rural, n (%)	2 (3%)
<b>Practice Type</b>	
Academic	29 (44%)
Tertiary Care Center	12 (18%)
Local or Community Hospital	12 (18%)
Multi Specialty Group Practice	6 (9%)
Single Specialty Group Practice	6 (9%)
Solo Private Practice	1 (2%)

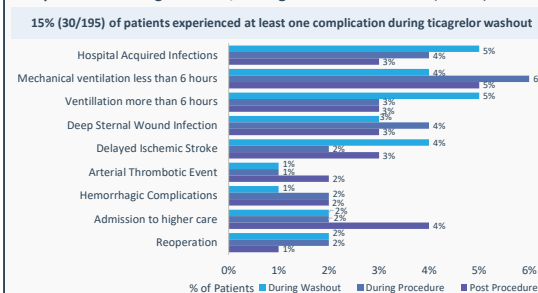
**Figure 1 | Patient Demographics**

**Patient Demographics Based on Chart Data (N=228)**

<b>Gender</b>	
Male, n (%)	165 (72%)
Female, n (%)	63 (28%)
<b>Patient Race</b>	
White, n (%)	135 (59%)
Black or Black African, n (%)	50 (22%)
Other / Unknown, n (%)	19 (8%)
Asian, n (%)	19 (8%)
Native Hawaiian, n (%)	5 (2%)
American Indian, n (%)	1 (0.4%)
<b>Patient Ethnicity</b>	
Not Hispanic / Latino, n (%)	191 (84%)
Hispanic / Latino, n (%)	21 (9%)
Unknown, n (%)	16 (7%)
<b>Insurance Status</b>	
Medicare, n (%)	120 (52%)
Private, n (%)	77 (34%)
Medicaid, n (%)	29 (13%)
Unknown, n (%)	17 (7%)
<b>Washout Status</b>	
Didn't undergo washout, n (%)	33 (14%)
1 day of washout, n (%)	13 (6%)
2 day of washout, n (%)	76 (33%)
3 day of washout, n (%)	54 (24%)
4 day of washout, n (%)	18 (8%)
5 day of washout, n (%)	28 (12%)
6+ days of washout, n (%)	6 (3%)

**Figure 2 | Complications and Pharmacy Use**

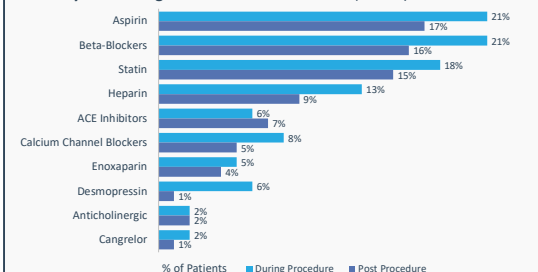
**Complications During Washout, During and Post Procedure (N=195)**



Note: This question allowed respondents to select more than one response

- During ticagrelor washout, 5% and 9% of patients experienced hospital acquired infections (HAIs) and mechanical ventilation, respectively
- Similarly, mechanical ventilation, HAI, and deep sternal wound infection were the most common complications reported during the CABG procedure, affecting 9%, 4%, and 4% of the patients.

**Pharmacy Use During and Post CABG Procedure (N=195)**

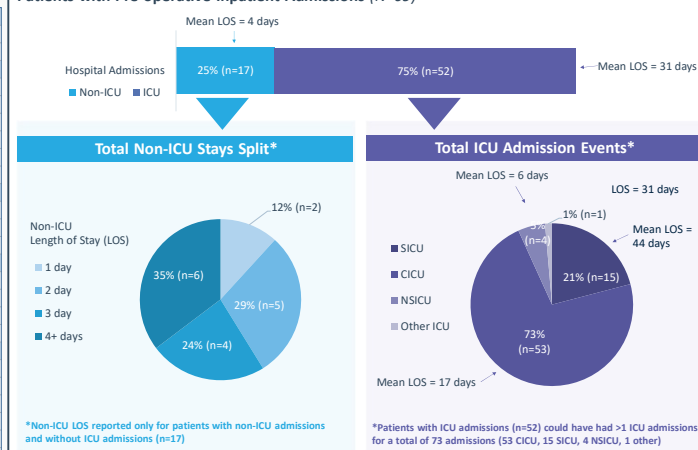


Note: This question allowed respondents to select more than one response

- Beta Blockers and aspirin were being taken most frequently both during and post procedure
- Similarly, statins and heparin were also noted to be used frequently

**Figure 3 | Intensive Care Unit (ICU) and Non-ICU Admissions**

**Patients with Pre-operative Inpatient Admissions (N=69)**

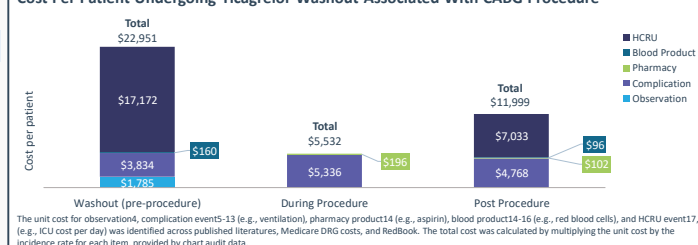


\*Non-ICU LOS reported only for patients with non-ICU admissions and without ICU admissions (n=17)

\*Patients with ICU admissions (n=52) could have had >1 ICU admissions for a total of 73 admissions (53 CICU, 15 SICU, 4 NSICU, 1 other)

**Figure 4 | Costs Per Patient**

**Cost Per Patient Undergoing Ticagrelor Washout Associated With CABG Procedure**



The unit cost for observation, complication events-13 (e.g., ventilation), pharmacy product14 (e.g., aspirin), blood product14-16 (e.g., red blood cells), and HCRU event17,18 (e.g., ICU cost per day) was identified across published literatures, Medicare DRG costs, and RedBook. The total cost was calculated by multiplying the unit cost by the incidence rate for each item, provided by chart audit data.

## DISCUSSION

- Patients undergoing ticagrelor washout prior to CABG experienced high clinical burden peri-procedure with 15% of patients experiencing complications during washout
- There is high washout-related HCRU with 27% of patients having pre-procedure ICU admissions and an average LOS of 31 days
- Cost per patient undergoing ticagrelor washout was calculated to be ~\$22K, including washout observation + HCRU (~\$18K), complications (~\$3.8K), and blood product use (\$160), highlighting an economic burden due to washout-associated costs with the current standard of care
  - The mean washout observation costs (i.e., costs associated with observation of patients during washout outside of room costs) was \$2,404
- The total per patient cost associated with CABG procedure was calculated to be \$40,482

## LIMITATIONS

- Due to the severity of health conditions and comorbidities these patients experience, it may have been challenging to distinguish complications purely associated with ticagrelor washout
- Responses not directly input from medical charts may be subject to recall bias, and respondents may have not been able to accurately remember previous events or experiences, may omit details, or memories may be influenced by subsequent events and experiences
- Physicians may have chosen specific patient charts who had atypical courses or unusual characteristics, leading to sampling bias

## CONCLUSIONS

There remains an unmet clinical and economic need to improve periprocedural management of ticagrelor-treated patients undergoing non-deferrable surgery that a target-specific reversal agent may help to eliminate washout, expedite CABG, and reduce complication risk