



INTRODUCTION & OBJECTIVES

- Ticagrelor is a platelet P2Y12 receptor antagonist that inhibits platelet activation and aggregation. It is 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 with major bleeds¹
- 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 who experience an intracerebral hemorrhage (ICH) major bleeding event 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 ICH treatment
- A quantitative, non-interventional study comprising of a retrospective medical chart review and physician-level questionnaire was conducted among neurologists, neurointensivists, neurosurgeons, and trauma/orthopedic surgeons via a web-enabled questionnaire
- All study materials were reviewed and approved by a central institutional review board (IRB) in the United States (Advarra)²
- Eligibility criteria for the physician were:
 - Board-certified or board-eligible neurologists, neurointensivists, neurosurgeons, or trauma/orthopedic surgeons 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 experienced ICH major bleeding event 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 presentation and have experienced ICH major bleeding in the last 12 months
 - Patients for whom physicians know to the best of their ability patients' clinical history regarding their major bleeding event, including bleeding associated with ticagrelor, 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.)
- The study aimed to recruit respondents representing a mix of settings (solo, academic/hospital-based, single specialty practice, tertiary care center), locations (urban, rural, suburban), geographies across US regions to ensure the research consisted of a diverse sample.
- Statistical analysis was conducted using Q Research Software 5.6. (Q Research Software, New York, NY)³

RESULTS

Table 1 | Respondent Demographics

Number of Respondents, N	24
Number of charts, N	79
Number of charts per respondent, median (IQR)	4 (2)
Years in Practice, median (IQR)	12 (10)
Specialty	
Neurologist, n (%)	5 (21%)
Neurointensivist, n (%)	2 (8%)
Neurosurgeon, n (%)	15 (63%)
Trauma Surgeon/Orthopedic Surgeon, n (%)	2 (8%)
Practice Setting	
Urban, n (%)	12 (50%)
Suburban, n (%)	10 (42%)
Rural, n (%)	2 (8%)
Practice Type	
Academic, n (%)	15 (63%)
Tertiary Care Center, n (%)	4 (17%)
Multi Specialty Group Practice, n (%)	3 (13%)
Local or Community Hospital, n (%)	1 (4%)
Single Specialty Group Practice, n (%)	1 (4%)
Solo Private Practice, n (%)	1 (4%)

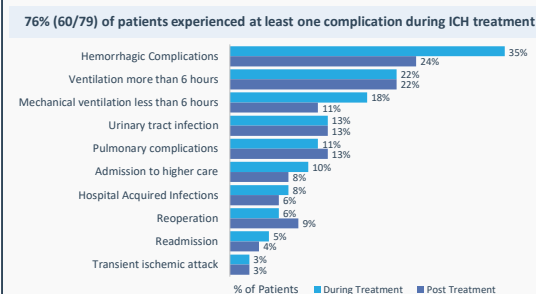
Figure 1 | Patient Demographics

Patient Demographics Based on Chart Data (N=79)

Gender	
Male, n (%)	53 (67%)
Female, n (%)	26 (33%)
Patient Race	
White, n (%)	43 (54%)
Black or Black African, n (%)	15 (19%)
Other / Unknown, n (%)	13 (16%)
American Indian, n (%)	4 (5%)
Asian, n (%)	3 (4%)
Insurance Type	
Medicare, n (%)	49 (62%)
Private, n (%)	18 (23%)
Medicaid, n (%)	8 (10%)
Unknown, n (%)	6 (8%)
Patient Ethnicity	
Not Hispanic/Latino, n (%)	54 (68%)
Hispanic/Latino, n (%)	19 (24%)
Unknown, n (%)	6 (8%)

Figure 2 | Complications and Pharmacy Use

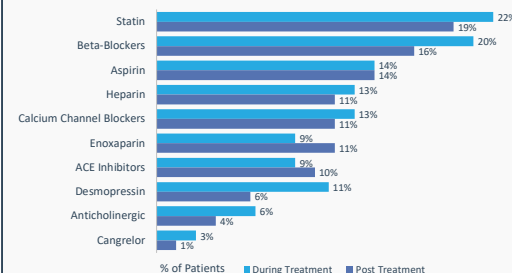
Complications During and Post ICH Treatment (N=79)



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

- As anticipated, hemorrhagic complications were the highest during and post ICH treatment
- Prolonged (24%) and less than 6 hours (18%) ventilation were highly prevalent in patients during and post ICH treatment; admission to higher care was observed in 10% of patients during treatment and 8% post-treatment

Pharmacy Use During and Post ICH Treatment (N=195)

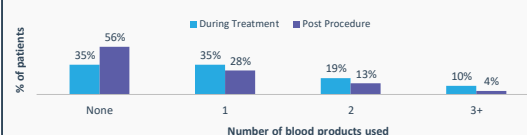


Note: This question allowed respondents to select more than one response

- Use of beta blockers and statins was high both during and post ICH treatment
- Overall, the difference in the pharmacy use during and post treatment was marginal; despite moderate to high utilization due to availability of generics these won't have huge cost impact

Figure 3 | Number of blood products utilized across the two timepoints

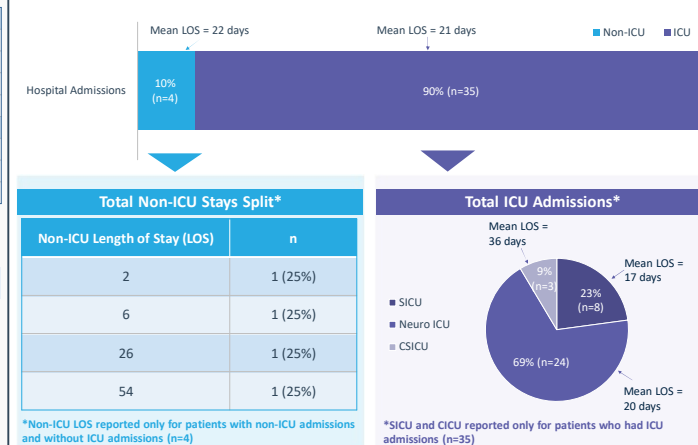
Blood Products* Used During And Post ICH Treatment (N=79)



*Red blood cells, fresh frozen plasma, platelets, fibrinogen, prothrombin complex concentrate, desmopressin acetate, whole blood, cryoprecipitate, and antibiotics; Note that these values have been rounded up to the nearest whole number

Figure 4 | ICU and Non-ICU Admissions

Patients with Pre-operative Inpatient Admissions (N=39)

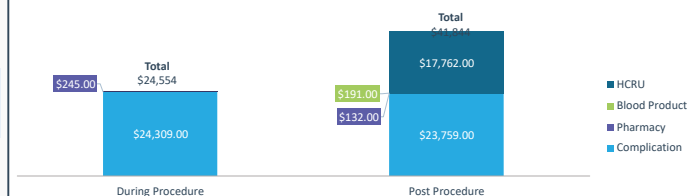


*Non-ICU LOS reported only for patients with non-ICU admissions and without ICU admissions (n=4)

*SICU and CICU reported only for patients who had ICU admissions (n=35)

Figure 5 | Costs Per Patient

Cost Per Patient Associated With ICH Treatment



The unit cost for each complication event¹² (e.g., aspirin, blood product¹³⁻¹⁵ (e.g., red blood cells), and HCRU event¹⁶⁻¹⁸ (e.g., ICU cost per day) was identified across multiple sources. Using chart audit data, which provided the incidence rate for each event, the total cost was calculated by multiplying the unit cost by the incidence rate for each item.

DISCUSSION

- Patients in our study receiving ticagrelor experienced a high complication burden with the current SOC to manage ICH bleeding
- Most patients on ticagrelor and receiving SOC treatment for ICH utilized at least one blood product and/or other pharmaceutical treatments and had hospital stays of 20 days on average
- Calculated cost per patient post ICH treatment was ~\$41,844 (including complication costs (~\$23K), HCRU (~\$17K), blood products (\$191) and pharmacy use (\$131), indicating a large economic burden with the current standard of care
- The total per patient cost associated with ICH treatment was calculated to be \$66,398

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

This study highlights the unmet need for more targeted anti-platelet reversal treatment strategies to reduce the clinical and economic burden associated with ICH management for patients on ticagrelor.