CHARACTERIZATION OF CANGRELOR UTILIZATION AT A LARGE, ACADEMIC MEDICAL CENTER

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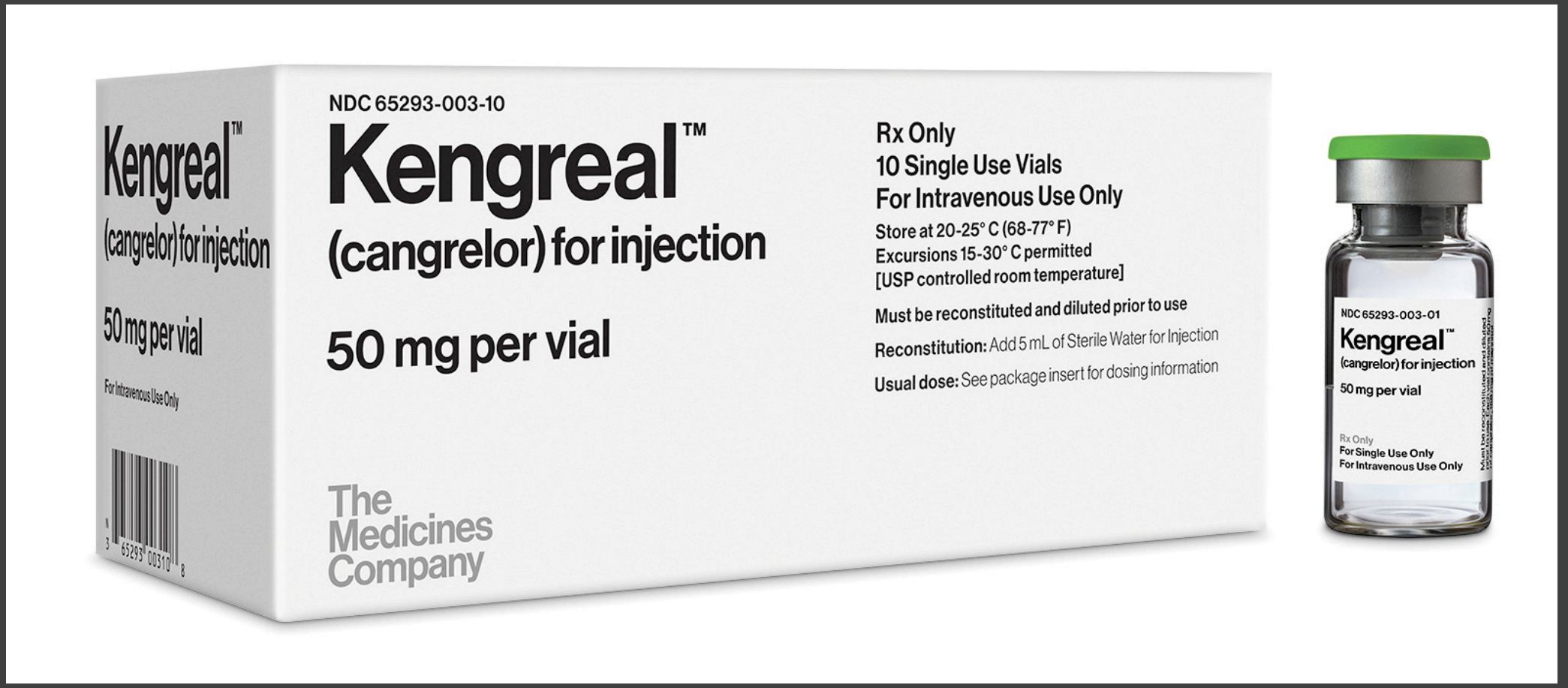


DISCLOSURES

Each author of presentation has nothing to disclose concerning possible financial or personal relationships with commercial entities that may have direct or indirect interest in the subject matter presented

BACKGROUND

Characteristic	Description
Pharmacology	**Mechanism:** IV non-thienopyridine P2Y12 antagonist **Onset:** 2 minutes; **Offset:** 60 minutes
FDA Approval	**Indication:** Adjunct to percutaneous coronary intervention (PCI) **Dose:** 30 mcg bolus followed by 4 mcg/kg/min continuous infusion
“Bridge Therapy”	**Use (Off-Label):** Periprocedural antiplatelet administration to prevent restenosis **Dose:** 0.75 mcg/kg/min
Cost	**Price:** $898.80 per 50 mg vial

Primary Objective	• Characterize cangrelor utilization at a large, academic medical center
Secondary Objective(s)	• Identify potentially inappropriate uses and assess adherence to established dosing • Seek opportunities to optimize the safety and efficacy of antiplatelet management

METHODS

Retrospective, medication use evaluation

Reviewed cangrelor utilization between June 22, 2015 and June 21, 2019.

Management of antiplatelet agents was assessed for justified and appropriate use.

Pertinent secondary surgical interventions

Bleeding episodes and/or ischemic events

Antiplatelet therapy management after cangrelor discontinuation

METHODS (*continued*)

JUSTIFIED USE: History of MI or percutaneous coronary or vascular intervention/stent within 1 year of cangrelor initiation, or other documented, compelling rationale for use relative to cardiac history

APPROPRIATE USE: Use of cangrelor fell within the following parameters for safety and efficacy

- *PO to IV Transition*: Cangrelor initiated ≥ 24 hours after the last dose of clopidogrel or prasugrel and ≥ 12 hours after the last dose of ticagrelor
- *PO Washout Period*: Procedural intervention ≥ 120 hours after the last dose of clopidogrel or prasugrel and ≥ 72 hours after the last dose of ticagrelor
- *Appropriate Dose*: Cangrelor dose of 30 mcg/kg bolus, followed by 4 mcg/kg/min for percutaneous coronary intervention (PCI) or 0.75 mcg/kg/min for bridge therapy
- *Cangrelor End Time*: End of cangrelor infusion ≥ 1 hour and ≤ 6 hours prior to procedure
- *IV to PO Transition*: Oral P2Y12 antagonist started after cangrelor infusion completed if initiating clopidogrel or prasugrel (ticagrelor may be initiated during infusion)

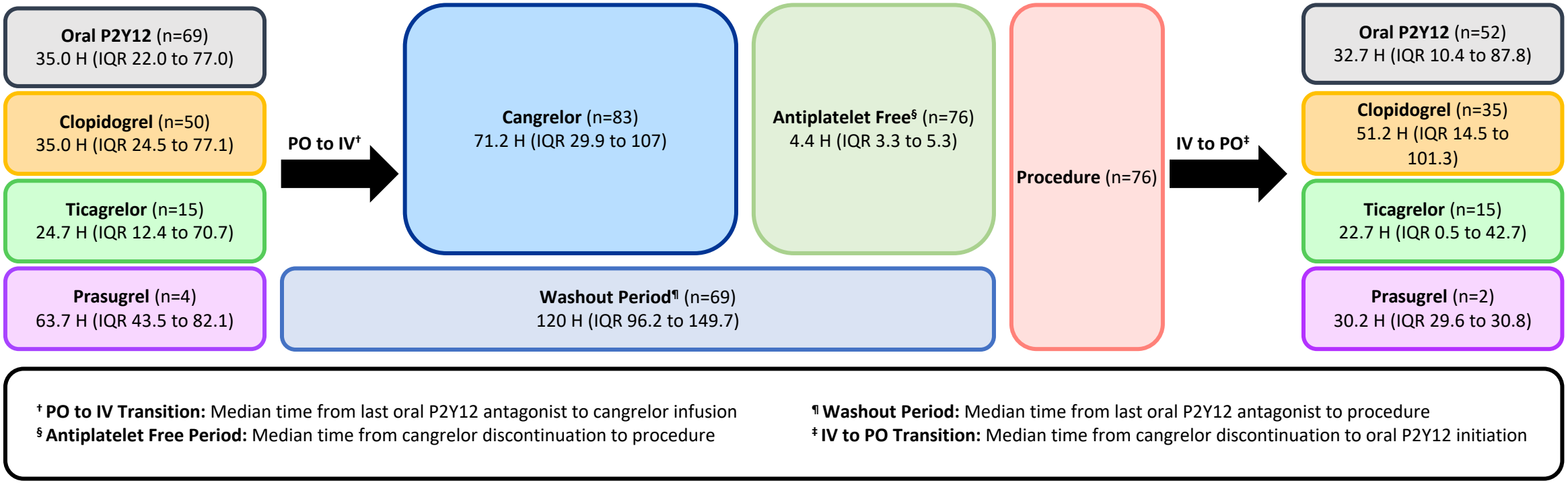
RESULTS

- Evaluation included 96 patients
- Median infusion duration 66.5 hours
- Minimum duration 0.3 hours
- Maximum duration 234.8 hours
- 86.5% of use was ‘bridge therapy’
- 19 patients without cardiac history and/or not on DAPT prior to admission received cangrelor

Patient Characteristics (n=96)				
Age (yr), mean ± SD				66.8 ± 11.9
Male, n (%)				31 (33.3)
Weight (kg), mean ± SD				85.5 ± 21.4
Admitted for Cangrelor, n (%)				36 (37.5)
Length of Stay (days), mean ± SD				13.5 ± 11.2
Length of Stay for Cangrelor Admission (days), mean ± SD				9.8 ± 4.4
Past Medical History, n (%)	**≤ 1 year**		**> 1 year**	**Total**
History of MI	53 (55.2)		15 (15.6)	68 (70.8)
History of CABG	2 (2)		14 (14.6)	16 (16.7)
History of Percutaneous Coronary or Vascular Intervention	75 (78.1)		5 (5.2)	80 (83.3)
History of Coronary or Vascular Stent	66 (70.9)		8 (8.3)	76 (79.2)
No Stent/No MI	-		-	7 (7.3)
Medication History, n (%)	**Clopidogrel**	**Ticagrelor**	**Prasugrel**	**Total**
ASA Only	-	-	-	12 (12.5)
Oral P2Y12	46 (47.9)	15 (15.6)	4 (4.2)	65 (67.8)
Dual Antiplatelet Therapy	50 (42.7)	15 (15.6)	4 (4.2)	60 (62.5)

Indication	N (%)	Median Duration (h)	Max (h)	Min (h)
Overall	96 (100)	66.5	234.8	0.3
Percutaneous Coronary Intervention (PCI)	3 (3.2)	1.7	2.4	0.3
Bridge Therapy				
Bridge to Cardiac Surgery	48 (50)	68.5	234.8	2.1
Bridge to Cardiac Intervention	6 (6.3)	43.3	139.8	8.8
Bridge to Other	29 (30.2)	81.3	221.3	8.9
Post-Op Bridge	8 (8.3)	47.0	73.2	1.2
Strict ‘Nothing by Mouth’ (NPO)	2 (2.1)	47.2	73.0	21.5

ANTIPLATELET BRIDGE THERAPY TRANSITIONS



† **PO to IV Transition:** Median time from last oral P2Y12 antagonist to cangrelor infusion
§ **Antiplatelet Free Period:** Median time from cangrelor discontinuation to procedure
¶ **Washout Period:** Median time from last oral P2Y12 antagonist to procedure
‡ **IV to PO Transition:** Median time from cangrelor discontinuation to oral P2Y12 initiation

RESULTS

- 95.8% met **Justified Use** criteria
- 42.7% met **Appropriate Use** criteria
- 74 errors in cangrelor use occurred
- 19 patients prescribed wrong dose
- 4 patients received wrong dose

Figure 1. Justified and Appropriate Use of Cangrelor

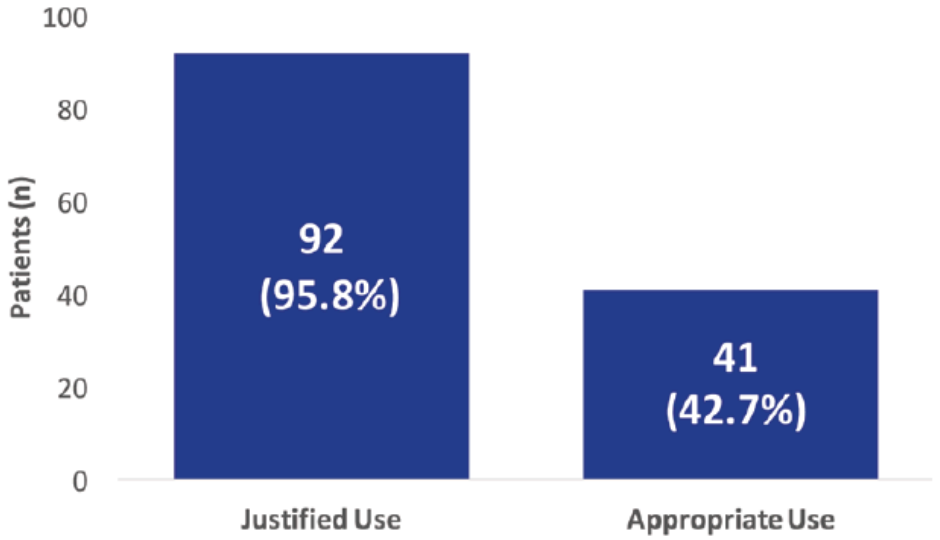
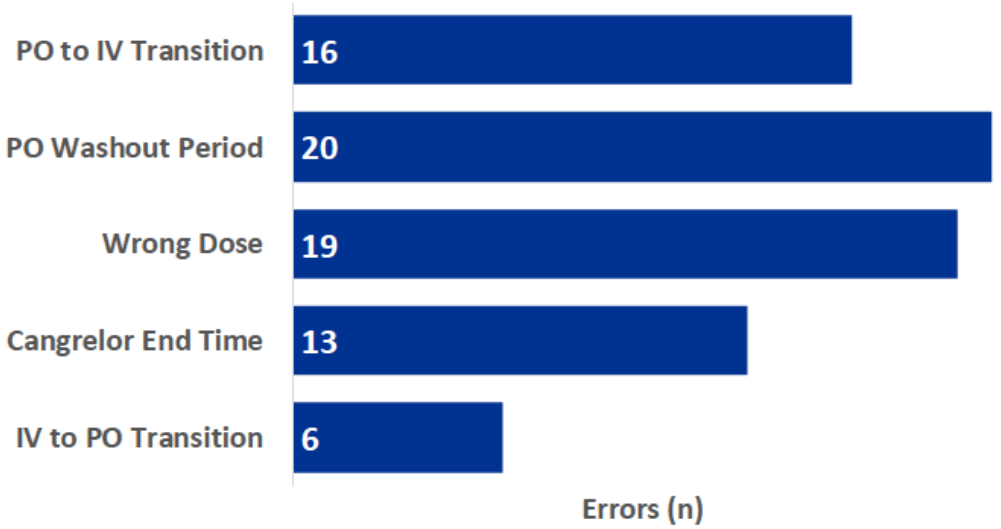


Figure 2. Errors in Cangrelor Use



ADVERSE EVENTS

- 16 adverse events occurred (n=14)
- Bleeding was the most common
- 2 events occurred during infusion
- Major interventions included:
  - Cardiac catheterization
  - Blood transfusions
  - Surgical interventions

	Indication	Event	Description	Antiplatelet	Anticoagulant	Intervention
1	Bridge to Biopsy	Ischemic	Pulmonary embolism	On cangrelor	None	None
2	Bridge to Orthopedic Surgery	Bleeding	Hematoma during line removal	On cangrelor	None	None
3	Bridge to CABG/MVR	Ischemic	Subacute left parietal infarct	Off cangrelor 5 days; on clopidogrel	Heparin, subcutaneous	None
4	Bridge to Liver Biopsy	Ischemic	STEMI	Off cangrelor 5 hours	None	Emergent cardiac catheterization
5	Bridge to CABG	Bleeding	Mid-esophageal bleed	Off cangrelor 18 hours	None	Required transfusion of blood products
6	Bridge to CABG	Bleeding	Bilateral abdominal hematomas	Off cangrelor 10 hours	None	Required transfusion of blood products
7	Bridge to CABG	Ischemic	Acute embolic, multi-infarct CVA	Off cangrelor 31 hours	Heparin, subcutaneous	Cangrelor restarted
8	Bridge to Orthopedic Surgery	Ischemic	NSTEMI	Off cangrelor 34 hours; on clopidogrel	Heparin, subcutaneous	No intervention
9	Bridge to I&D/Leg Debridement	Bleeding	Right thigh hematoma	Cangrelor utilized between surgeries	None	Multiple surgical interventions
10	Bridge to GI Surgery	Ischemic	Large bilateral ischemic infarcts	Off cangrelor 12.5 hours	None	Patient expired
11	Bridge to CABG	Ischemic	NSTEMI	Off cangrelor 3.5 days; on clopidogrel	None	None
12	Bridge to CABG	Bleeding	Post-Operative bleeding	Off cangrelor 10 hours	None	Surgical interventions and cauterizations
13	Bridge to TAVR	Ischemic; Bleeding	NSTEMI; Bleeding from femoral site	Off cangrelor 5 hours	None	Transfusion of blood products
14	Bridge to IABP Placement	Bleeding	Ascending aortic bleed	Off cangrelor 30 minutes	None	Emergent mediastinal exploration; PCC

DISCUSSION

- The primary indication for cangrelor was for ‘bridge therapy’
  - Utilization of cangrelor was justified in the vast majority cases
  - Appropriate use was demonstrated less than half of the time
- Patients prescribed PCI dosing as bridge therapy (n=19)
  - Potential to expose patients to 5x the appropriate dose
- 24 patients received cangrelor without history of oral P2Y12 antagonist
- No policy, procedure, or guideline exists at our institution
  - Practice guidelines have not been fully established in the periprocedural setting
- Limited ability to consistently assess:
  - Medical history
  - Indication/justification for use
  - Bleeding/ischemic events

CONCLUSION

Conclusion 1	• The majority of patients received cangrelor as bridge therapy to a surgical intervention
Conclusion 2	• While use was justified in nearly all patients, errors in ordering cangrelor or antiplatelet transitions occurred in a majority of cases
Conclusion 3	Implementation of an institutional medication guideline, provider and pharmacist education may: • Alleviate potential prescribing issues • Improve safety • Reduce costs

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