

Severity of Gastrointestinal Bleeding after Coronary Stenting is Associated with a Subsequent Increased Risk of a Major Adverse Cardiovascular Event

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BACKGROUND

❖ DAPT increases the risk gastrointestinal bleeding (GIB) after coronary stenting. It remains unclear if a GIB after coronary stenting is associated with a major adverse cardiovascular event (MACE).

OBJECTIVE & HYPOTHESIS

- ❖ We aimed to determine features of the index GIB following coronary stenting that may predict MACE.
- ❖ We hypothesized that measures of severity, such as ICU admission, transfusion requirements and length of stay would be associated with MACE.

METHODS

- ❖ Retrospective study across Mayo Clinic Florida between January 2015 and December 2021.
- ❖ Inclusion criteria: 1) successful coronary stenting, 2) initiation of DAPT, 3) index GIB after coronary stenting 4) 18 years or older. Excluded if any of above not met
- ❖ The primary endpoint was MACE. Significance was defined as $p < 0.10$ given the small sample size.
- ❖ A severe GIB was defined as: 1) ≥ 5 pRBCs transfused, 2) hospital stay ≥ 7 days, 3) transfer to ICU, 4) cardiac arrest, or 5) death.
- ❖ Univariable Cox Proportional Hazard Regression Analysis and Kaplan-Meier Estimates were performed.
- ❖ Censors included: 1) MACE, 2) death, or 3) lost to follow up. Time to censor from index GIB was recorded.

CONCLUSIONS

- ❖ In this single-center retrospective cohort study, we found patients who were transferred to the ICU at the time of GIB, or had a severe bleed were subsequently at a higher risk of MACE.
- ❖ Discontinuation of DAPT after GIB, transfusion requirement, length of stay, hemoglobin or change in hemoglobin at GIB were not associated with MACE.
- ❖ Further studies are needed to determine if a rebleed is a risk factor for MACE.

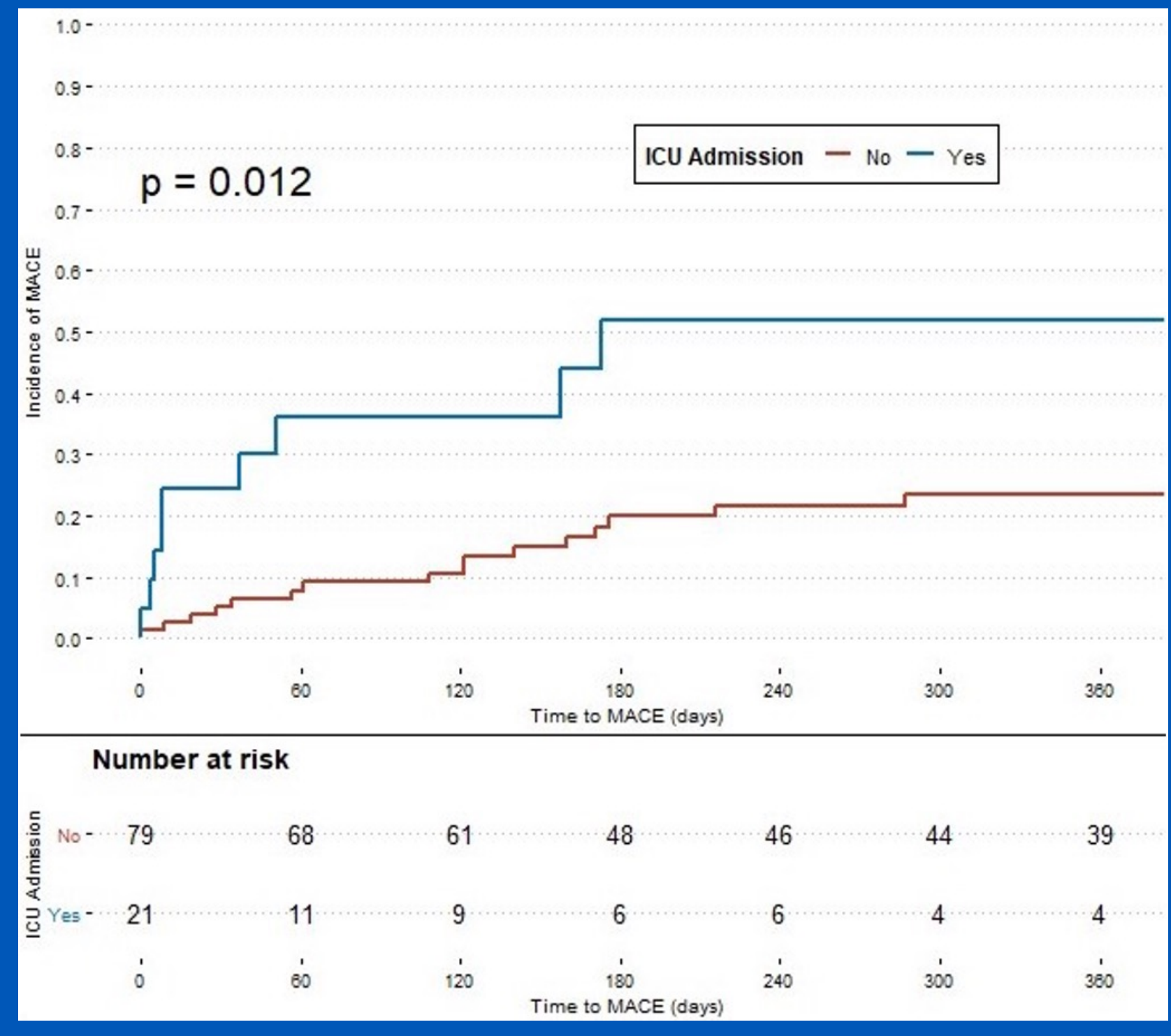
ICU admission during an index GIB following coronary stenting is associated with a 162% increased risk of MACE.

Table 1: Baseline Characteristics of All Patients and Unadjusted Cox Proportional Hazards Regression Analysis for MACE Following Coronary Stenting and Index GIB

Baseline Characteristics Median (IQR) or Fraction (%)	Unadjusted Cox Regression For MACE after Index GIB		
	All Patients N=100	HR (95% CI)	p-value
Age at Coronary Stent Placement, per 10 years	70.5 (61.7-77.8)	1.30 (0.93-1.84)	0.13
Male gender	74 (74.0%)	0.91 (0.42-1.99)	0.91
White Race	100 (100%)	NA	NA
Hispanic Ethnicity	1 (1.0%)	NA	NA
Never Smoker	32 (32.0%)	1.10 (0.53-2.30)	0.80
Body Mass Index, per 1 kg/m ²	30.0 (26.4-30.4)	1.02 (0.97-1.07)	0.45
Obesity	50 (50.0%)	1.64 (0.80-3.39)	0.18
Comorbidities – defined as per HAS-BLED			
Hypertension	91 (91.0%)	3.95 (0.53-29.09)	0.18
Chronic Kidney Disease	15 (15.0%)	1.49 (0.57-3.90)	0.42
Liver Disease	15 (15.0%)	1.78 (0.67-4.73)	0.25
History of stroke	12 (12.0%)	1.58 (0.60-4.14)	0.35
Prior Major Bleeding (before LHC)	28 (28.0%)	0.52 (0.20-1.36)	0.18
Labile INR	29 (29.0%)	2.00 (0.98-4.10)	0.0570
Age > 65	66 (66.0%)	2.43 (1.00-5.92)	0.0512
Medication predisposing to bleeding	100 (100.0%)	NA	NA
Alcohol use	26 (26.0%)	0.40 (0.14-1.14)	0.0868
HAS-BLED score	4 (3-5)	1.20 (0.92-1.55)	0.17
Coronary Catheterization Data			
Pre-catheterization Endoscopy Performed	12 (12.0%)	0.85 (0.26-2.80)	0.79
Indication for coronary catheterization			
• Acute Coronary Syndrome	65 (65.0%)	1.64 (0.75-3.57)	0.21
o NSTEMI	41 (41.0%)	1.30 (0.64-2.63)	0.47
o STEMI	24 (24.0%)	1.33 (0.57-3.11)	0.51
• Stable CAD	35 (35.0%)	0.61 (0.28-1.33)	0.21
Number of Stents Placed, per 1 stent	2 (1-2)	1.19 (0.80-1.77)	0.39
Hemoglobin prior to catheterization, per 1 g/dL	12.70 (10.5-14.2)	0.88 (0.76-1.03)	0.11
Medications After Catheterization			
Proton pump inhibitor	31 (31.0%)	1.30 (0.62-2.73)	0.48
SSRI	12 (12.0%)	1.61 (0.61-4.21)	0.33
NSAIDs	2 (2.0%)	NA	NA
Anticoagulation	42 (42.0%)	1.96 (0.96-4.00)	0.0652
• Warfarin	27 (27.0%)	1.50 (0.53-4.24)	0.45
• DOAC	14 (14.0%)	0.71 (0.25-2.02)	0.52
Indication for Anticoagulation			
• Atrial Fibrillation	33 (33.0%)	1.24 (0.36-4.27)	0.74
• DVT/PE	6 (6.0%)	0.73 (0.17-3.19)	0.68

Baseline Characteristics Median (IQR) or Fraction (%)	Unadjusted Cox Regression For MACE after Index GIB		
	All Patients N=100	HR (95% CI)	p-value
Gastrointestinal Bleed (GIB)			
Median time to Index GIB from stenting, days	166 (22.8-374.8)	NA	NA
P2Y12 inhibitor taken prior to admission	89 (89.0%)	3.87 (0.53-28.4)	0.18
Presenting sign			
• None	10 (10.0%)	1.98 (0.76-5.17)	0.16
• Hematemesis	11 (11.0%)	0.63 (0.15-2.66)	0.53
• Melena	50 (25.0%)	1.24 (0.61-2.53)	0.56
• Hematochezia	32 (32.0%)	0.62 (0.27-1.44)	0.26
Labs at time of GIB			
• Hemoglobin, per 1 g/dL	8.4 (6.7-10.1)	0.92 (0.79-1.07)	0.28
o Hemoglobin drop, per 1 g/dL	3.8 (2.7-5.5)	0.97 (0.83-1.13)	0.65
• Platelets, per 50 x 10 ³ /L	207 (167.8-272.8)	0.97 (0.81-1.17)	0.77
• INR, per 1 point	1.2 (1.1-1.9)	1.14 (0.94-1.37)	0.18
Endoscopy Performed			
• Inpatient Procedure	74/81 (91.4%)	0.44 (0.15-1.31)	0.14
• Normal endoscopy	9/81 (11.1%)	2.65 (0.89-7.93)	0.0814
• Esophageal varices	0	NA	NA
• Esophagitis	10/81 (12.4%)	0.47 (0.06-3.52)	0.46
• Gastritis	11/81 (13.6%)	1.80 (0.67-4.86)	0.25
• Ulcerations	33/81 (40.7%)	0.58 (0.24-1.42)	0.23
Source of Bleeding Found			
• Unknown	26 (32.1%)	1.79 (0.78-4.09)	0.17
• Intervention Performed	34/81 (42.0%)	0.69 (0.29-1.63)	0.40
Number of pRBCs transfused, per 1 unit	1 (0-3)	1.13 (0.97-1.31)	0.1081
Length of stay, per 1 day	3 (2-4)	1.02 (0.92-1.14)	0.66
Transfer to ICU during hospitalization	21 (21.0%)	2.62 (1.20-5.74)	0.0159
Death from GIB	1 (1.0%)	NA	NA
Severe GIB	26/100 (26.0%)	2.01 (0.94-4.28)	0.0711
P2Y12 Inhibitor Discontinued due to GIB	19/89 (21.3%)	0.59 (0.21-1.68)	0.32
Endpoint			
Major Adverse Cardiovascular Event (MACE)	32/100 (32.0%)	NA	NA
• Median time to MACE, days	121.0 (25.8-233.8)	NA	NA
Type of MACE			
• Acute Coronary Syndrome	2/32 (6.3%)	NA	NA
• Stroke or Transient Ischemic Attack	4/32 (12.5%)	NA	NA
• Hospitalization for Heart Failure	15 (46.9%)	NA	NA
• Need for revascularization	11 (34.4%)	NA	NA

Figure 1: Cumulative Incidence of MACE Following Coronary Stenting and Index GIB by ICU Admission



RESULTS

- ❖ A total of 32/100 patients (32.0%) had a MACE after their index GIB following coronary stenting at a median time to MACE of 121 days (IQR: 26-234).
- ❖ Of the 100 patients included, 89 (89.0%) were still on DAPT at the time of GIB. Of these 89 patients, 19 patients (21.3%) had their P2Y12 inhibitor discontinued at discharge from the hospital.
- ❖ Hospitalization for heart failure (15/32, 46.9%) was the most common MACE, followed by need for revascularization (11/32, 34.4%).
- ❖ On univariable Cox Proportional Hazards Regression analysis, requiring ICU admission during the index GIB was the strongest predictor of MACE, HR: 2.62, $p=0.0159$. At $p < 0.10$, labile INR, age > 65 years, alcohol use, anticoagulation, having had a normal endoscopy at GIB, and a severe GIB were associated with a subsequent MACE. **Table 1.**
- ❖ Following the index GIB, 25% of patients who were not transferred to the ICU during GIB had a MACE by 411 days compared to 37 days if ICU admission was required. Half of patients requiring ICU admission at GIB had a MACE by 173 days. **Figure 1.** A similar pattern was seen by severity of GIB. **Figure 2.**

Figure 2: Cumulative Incidence of MACE Following Coronary Stenting and Index GIB by Severity of GIB

