



Gastrointestinal Hemorrhage during MCS: A Clinical Challenge

Kelsey Gore, MA, BS, RRT, CES-A, Dean Linder Jr., CCP, LP, Juan José Martinez Duque, MD, Junxi Bragg, MD, Connor Rudnicki DO, Adrian Alexis Ruiz, MD, Shaun Yockelson, MD, Manila Singh, MD, and Bobby D. Nossaman, MD

Extracorporeal Technology & Critical Care Medicine, Department of Anesthesiology & Perioperative Medicine, 1514 Jefferson Hwy, New Orleans, Louisiana 70121

Introduction

End-organ hypoperfusion from cardiopulmonary shock may require mechanical circulatory support (MCS). However, patients receiving MCS risk development of hemorrhagic complications including gastrointestinal bleeding. Examining the relationships of risk factors for these complications may improve our understanding of the adverse events. The purpose of this investigation was to assess the risk of previously reported comorbidities for the development of gastrointestinal (GI) bleeding in patients receiving MCS.

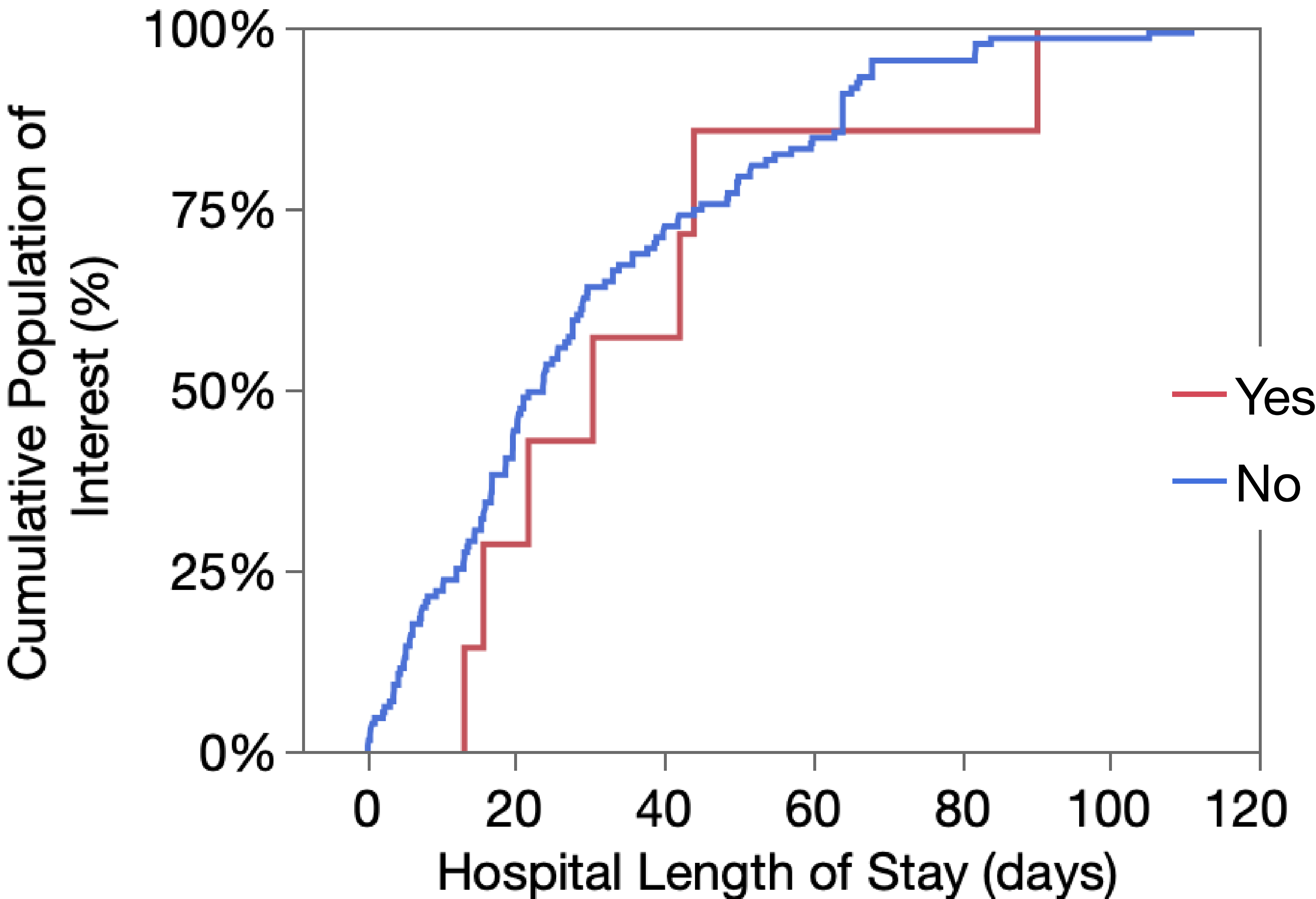
Table 1: Baseline Characteristics and Previously Reported Co-morbidities for Gastrointestinal Bleeding in 156 Patients Requiring Mechanical Circulatory Support				
Terms	Estimates	Std Error	ChiSquare	P values
Intercept	-4.64	2.49	3.5	0.0625
Age	0.03	0.03	1.4	0.2297
Sex[Female]	-1.12	0.69	2.7	0.1030
BMI	-0.07	0.07	1.1	0.3045
Insulin-dependent Diabetes	3.51	1.54	5.2	0.0228*
Chronic Renal Failure	1.05	0.72	2.2	0.1405
Chronic Cardiovascular Disease	0.29	0.46	0.4	0.5281
Immunomodulation	0.67	0.64	1.1	0.2948
Structural Lung Disease	-0.51	0.44	1.3	0.2545
ICD/Pacemaker	0.23	0.52	0.2	0.6629
Atrial Fibrillation	0.52	0.52	1.0	0.3169
Previous Cardiac Surgery	-0.14	0.43	0.1	0.7408
Congestive Heart Failure	-0.29	0.49	0.4	0.5537

BMI: Body mass index (kg/m²); ICD; Internal cardiac defibrillator; c-index statistic=0.82; Misclassification rate=6.0%.

Methods

Following institutional review board approval, previously reported comorbidities and the incidence of GI bleeding were studied in this population from January 2017 to October 2023. The clinical variables underwent machine learning.

Figure 1: Hospital Length of Stay in MCS Patients with Gastrointestinal Bleeding



Results

Insulin-dependent diabetic patients were associated with increased risk for GI bleeding. Moreover, the need for major transfusion is greater for this hemorrhagic complication. Further investigation into the need for continuous heparin therapy is warranted. Knowledge derived from this descriptive study could lead to the development of an institutional-specific protocol to improve the delivery of care in this important patient population.

Conclusions

In this study of 156 patients who underwent 284 MCS procedures, the incidence of GI bleeding was 6.0% CI 3.3-10.4%. Following logistic regression, patients with insulin-dependent diabetes were associated with an increased risk for GI bleeding (Table 1). The c-index statistic for this model was 0.83 and with a misclassification rate of 6%. The relative risk in the need of major transfusion (>2 packed red blood cell units/episode) was 1.7 CI 1.1-2.5. The majority (87%), but not all, of these patients received unfractionated heparin therapy. Finally, hospital length of stay was increased in patients with GI bleeding (Figure 1).

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