Esophageal variceal ligation in patients on anticoagulation and factors that affect post-procedure bleeding risk

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Introduction

- Anticoagulation medication use in patients with cirrhosis has increased in recent years.
- The presence of esophageal varices and necessity of band ligation (EVL) complicates their use.
- Optimal agents and recommendations for periprocedural management are lacking.

Aim

- Better understand specific risk factors associated with post-EVL bleeding events in patients on anticoagulation.

Methods

- Retrospective chart review identified all patients with cirrhosis undergoing EVL and requiring concurrent periprocedural anticoagulant management from 1/1/2015-2/16/2022.
- Patients with non-cirrhotic portal hypertension were excluded.
- Information about bleeding events were collected four weeks after EVL.
- Major and minor bleeding events were defined by the International Society on Thrombosis and Haemostasis criteria.
- Comparative statistics were performed using the Fisher exact test and Wilcoxon test.

Characteristics	Bleeding group	Non-bleeding group	P-value
MELD-Na	24	12	<0.01
Child Pugh	11	7	<0.01
Avg # days AC discontinued prior	2.8	2.7	0.3
Avg # days until AC restarted	3.0	3.7	0.6
Avg Na	135	138	0.03
Avg Bilirubin	8.0	1.2	<0.01
Avg Creatinine	1.0	0.9	0.6
Avg INR	2.3	1.4	<0.01
Avg Platelets	117	119	0.8
Avg Hgb	11.7	11.8	1

Table 1. Characteristics of bleeding and non-bleeding group.

Characteristics	Bleeding group	Non-bleeding group	P-value
Gender	M 100% W 0%	M 70% W 30%	0.3
Indication for Endoscopy	Primary Prophylaxis - 4 Secondary Prophylaxis - 1 Active Bleeding - 1	Primary Prophylaxis - 24 Secondary Prophylaxis - 14 Active Bleeding - 2	--
Subtherapeutic dosing	20%	27%	1
Choice of AC	DOAC 75% Other 25%	DOAC 81% Other 19%	0.6
Indication for AC	PVT - 3 DVT/PE - 2 Arrhythmia - 0 Other- 1	PVT - 27 DVT/PE - 9 Arrhythmia - 2 Other- 2	--
High Risk Esophageal Varices	100%	85%	0.6

Table 2. Characteristics of bleeding and non-bleeding group.

Bleeding Event	MELD-Na	Child Pugh Class	AC	Therapeutic AC	Days Discontinued Prior	Days Started After	Major bleed	Days Bleeding Started After Procedure	Cause of Bleed	6 Week Mortality
1	12	A (6)	Apixaban	Yes	2	Unknown	Yes	15	Post banding ulcer	Alive
2	30	C (13)	Enoxaparin	Yes	3	1	Yes	9	Post banding ulcer	Alive
3	30	C (11)	Enoxaparin	Yes	N/A	1	Yes	5	EV Rebleed	Alive
4	17	C (12)	Coumadin	Yes	4	1	Yes	20	PHG/GAVE	Alive
5*	25	B (9)	Apixaban	Yes	2	7	No	7	PHG/GAVE	Deceased
6*	27	B (9)	Apixaban	Yes	Unknown	5	Yes	12	Post banding ulcer	Deceased

Table 3. Characteristics of patients with bleeding events. Asterisk indicates bleeding event associated with the same patient.

Results

- Forty six procedures were identified that met inclusion criteria.
- There were six bleeding events (13%)
- Bleeding events occurred between 5-20 days post procedure.
- Bleeding events were associated patients with more severe liver disease, as represented by higher mean MELD-Na (24 vs. 12, $p<0.01$) and Child-Pugh score (11 vs. 7, $p<0.01$).
- Bleeding events were not associated with timing of pre-procedural anticoagulation discontinuation ($p=0.30$), timing of anticoagulation initiation or resumption ($p=0.60$), type of anticoagulant (DOAC vs. other, $p=0.60$), subtherapeutic dosing ($p=1.00$), or the presence of high-risk esophageal varices ($p=0.60$).

Conclusions

- Bleeding events were not associated with the timing of starting or resuming anticoagulation, type of anticoagulation, subtherapeutic dosing, or high-risk esophageal varices.
- Bleeding was associated only with severity of liver disease.
- Our results may help inform recommendations for EVL periprocedural anticoagulation management.
- Further research involving a larger sample size is needed to more fully characterize the risk factors for bleeding post-EVL.