Anticoagulation in Cirrhosis Patients with Coagulopathies and Venous Thromboembolisms

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BACKGROUND

- Portal vein thrombosis (PVT) is an uncommon type of venous thromboembolism (VTE) that occurs primarily in patients with decompensated liver cirrhosis.[1,2]
- Coagulopathies commonly develop with the progression of cirrhosis, due to a decrease in the synthesis of clotting factors and platelet production stimulators by the liver.[1]
- The mainstay of pharmacological therapy in PVT and other VTEs is anticoagulation, historically with enoxaparin or warfarin, but the coagulopathies present in patients with liver cirrhosis make anticoagulation selection and management difficult.[1,2]
- There is minimal guidance available to physicians on which anticoagulant, if any, is recommended in patients with liver cirrhosis that need anticoagulation.[2]
- Direct oral anticoagulants (DOAC) clinical trials have excluded those with hepatic disease. Their use in decompensated liver disease is unknown.[2]

PURPOSE

- The objective of this study was to identify inpatient anticoagulation use among patients with portal vein thrombosis or other VTE with liver cirrhosis.

METHODS

Study design:
- Single-center retrospective chart review

IRB approval:
- Springfield Committee for Research Involving Human Subjects Institutional Review Board

Inclusion criteria:
- Patients with liver cirrhosis, ages 18-89, admitted to the hospital between May 1, 2014 and May 1, 2021
- A new diagnosis of PVT, deep vein thrombosis (DVT) or pulmonary embolus (PE) during admission

Exclusion criteria:
- Patients pursuing hospice or comfort care

Data analysis:
- Data was analyzed using Wilcoxen and t-tests for continuous variables, Fisher exact and X² test for categorical variables, and descriptive statistics

RESULTS

Table 1: Baseline characteristics

	PVT (N = 73)	DVT/ PE (N = 44)	Overall (N = 117)
Age	61.5 ± 10.0	62 ± 10.8	61.6 ± 10.3
Male sex	45 (61.6)	31 (70.4)	76 (64.9)
Child-Pugh Classification			
A	15 (20.5)	15 (34)	30 (27.3)
B	27 (37.0%)	19 (43.2)	46 (41.8)
C	24 (32.8)	10 (22.7)	34 (30.9)
Platelets (10⁹/L)	154.4 ± 117.2	177.5 ± 89.8	163.1 ± 107.9
Hemoglobin (g/dL)	11.4 ± 2.7	11.9 ± 2.8	11.6 ± 2.7
Hypercoaguable State Present	29 (39.7)	8 (18.2)	37 (31.6)
Received Anticoagulation	30 (41)	39 (89)	67 (57.3)

*Mean ± SD or N (%)

Table 2: Degree of occlusion in PVT

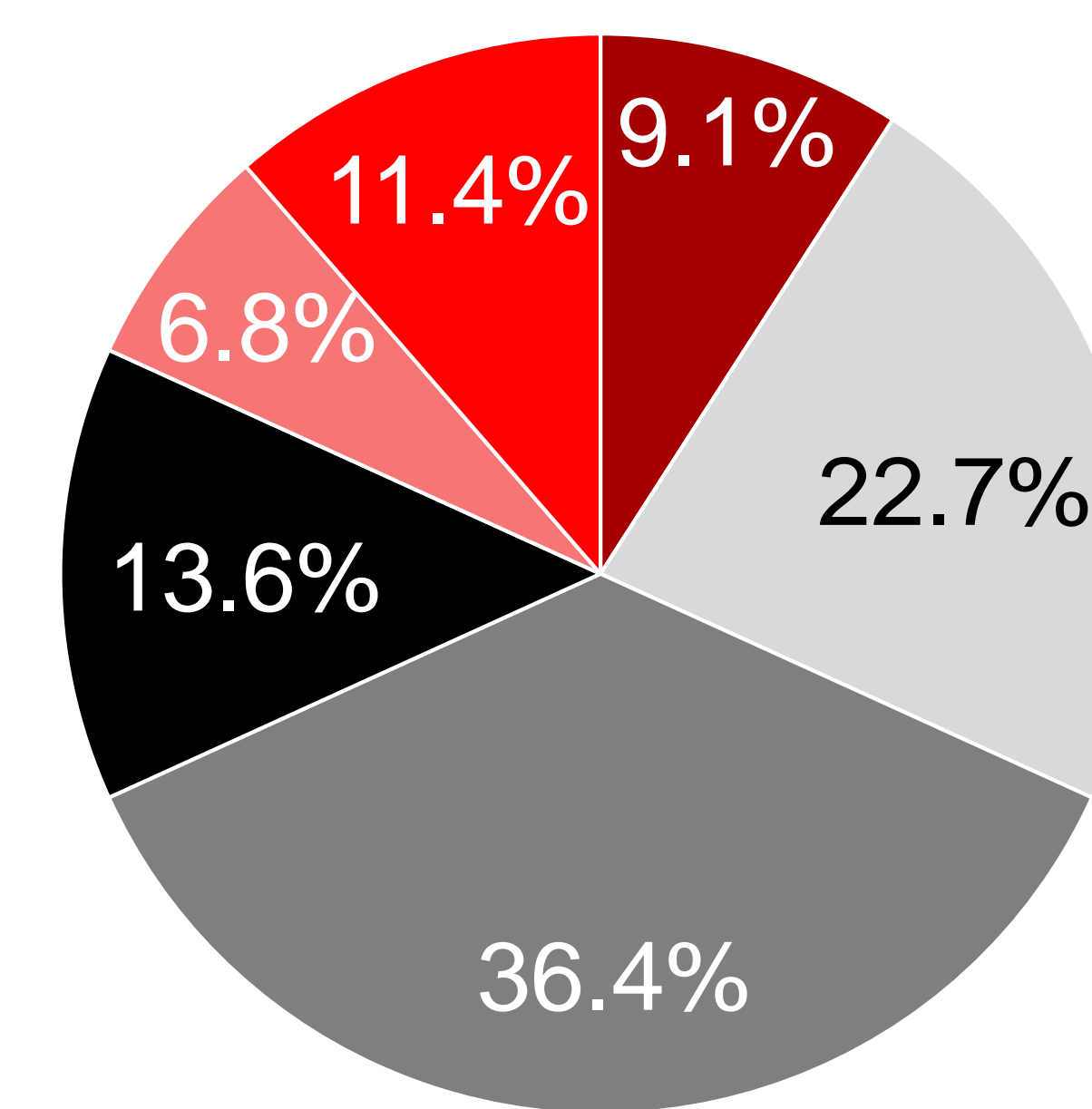|	
Occlusive, N (%)	16 (21.9)
Non-occlusive, N (%)	24 (32.9)
Unknown, N (%)	33 (45.2)

Figure 1: Anticoagulant Use In PVT N = 73
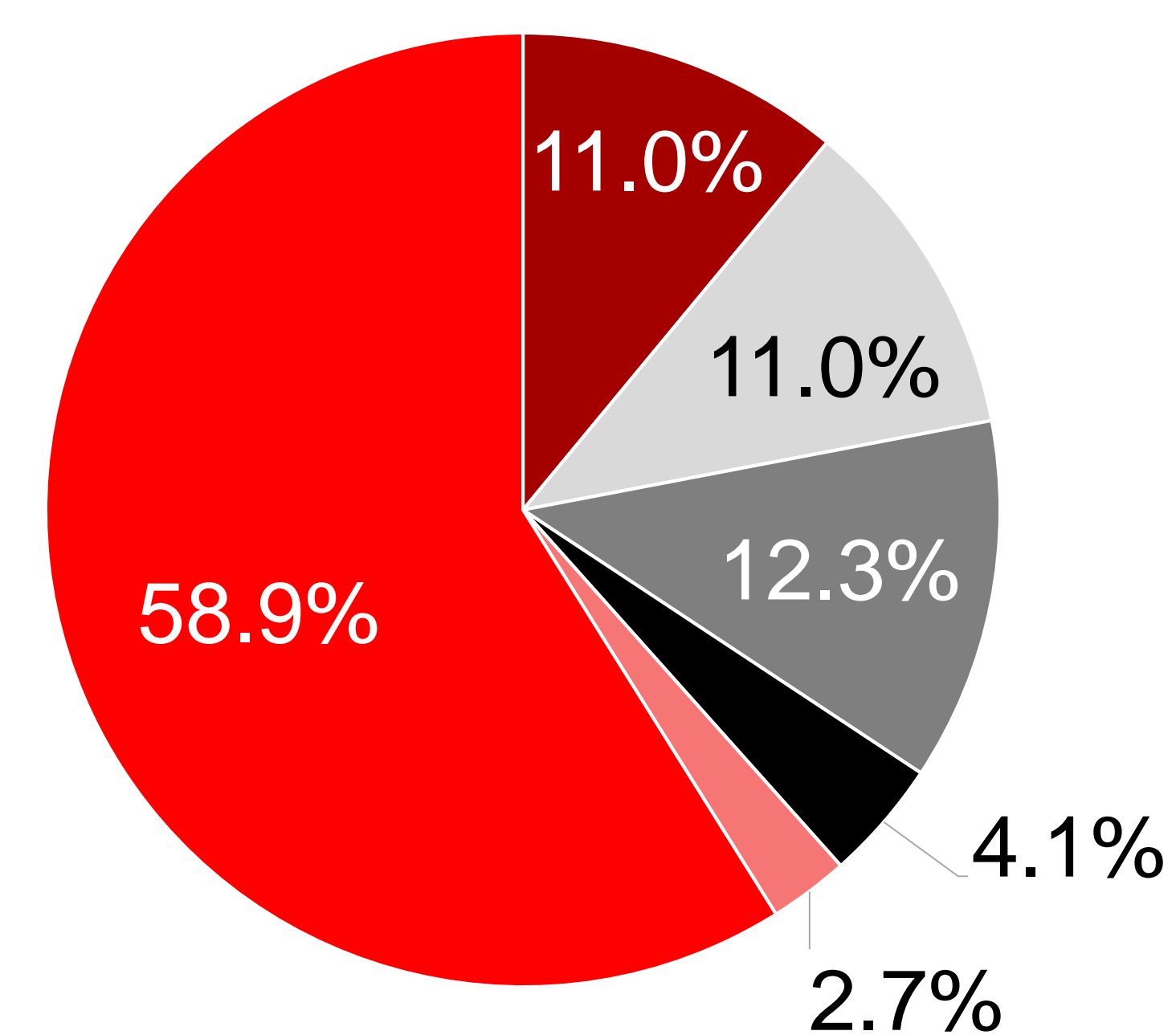
- Heparin (N = 8)
- Enoxaparin* (N = 8)
- Warfarin (N = 9)
- Apixaban (N = 3)
- Rivaroxaban (N = 2)
- None (N = 43)

Figure 2: Anticoagulant Use in DVT/PE N = 44

- Heparin (N = 4)
- Enoxaparin* (N = 10)
- Warfarin (N = 16)
- Apixaban (N = 6)
- Rivaroxaban (N = 3)

*excludes enoxaparin used for bridging another agent

RESULTS

Table 3: Receipt of anticoagulation by specific factors

	Anticoagulation received Yes	No	P-value
Degree of Occlusion, N (%)			0.296
Occlusive	9 (56.3)	7 (43.8)	
Non-occlusive	9 (37.5)	15 (62.5)	
Unknown	11 (33.3)	22 (66.7)	
Child Pugh Classification, N (%)			0.001
A	25 (83.3)	5 (16.7)	
B	25 (54.4)	21 (45.7)	
C	12 (35.3)	22 (64.7)	
Hypercoaguable State	24 (64.9)	13 (35.1)	0.258
Platelets, median (IQR)	154 (115, 231)	125 (66, 172)	0.003
Hemoglobin, mean (SD)	12.2 (2.6)	10.7 (2.7)	0.001

t-tests/ Wilcoxon test for continuous variables. Chi-square test for categorical variables.

Table 4: Anticoagulant use based on Child-Pugh class

	No anticoagulation N (%)	DOAC N (%)	SOC N (%)	P-value
Child Pugh Classification for PVT patients (N = 66)*				0.008
A	6 (40.0)	4 (26.7)	5 (33.3)	
B	21 (77.8)	0 (0.0)	6 (22.2)	
C	20 (83.3)	1 (4.2)	3 (12.5)	

Fisher exact test for categorical variables.

*7 patients could not have a Child-Pugh Score calculated, their data was excluded from this table
SOC – standard of care (enoxaparin or warfarin)
No statistical significance between anticoagulant use and Child-Pugh class in those w/ DVT/PE

LIMITATIONS

- Small sample size, single institution, retrospective design
- Some components of the Child-Pugh score are subjective

CONCLUSION

- Physicians prescribed DOACs to a small percentage of patients with liver impairment.
- Patients are less likely to receive anticoagulation for PVT treatment with each advancement in their Child-Pugh score
- The risks of anticoagulation often outweigh the potential benefit in the treatment of PVT, leaving physicians to avoid the use of anticoagulation in many of these patients.
- **Acknowledgement:** Thank you to Dr. Maithili Deshpande, Ph.D. for completion of the statistical analysis.

References:
1. Gastroenterology. 2017 Aug;153(2):480-487.e1. doi: 10.1053/j.gastro.2017.04.042. Epub 2017 May 4.
2. Gastroenterology. 2019 Jul;157(1):34-43.e1. doi: 10.1053/j.gastro.2019.03.070. Epub 2019 Apr 12.