

Post-Surgical Anticoagulation Re-initiation by Pharmacists at Vancouver General Hospital (POST-SCRIPT-VGH)



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Background

- Pharmacist management of patients on warfarin is associated with reduced time to therapeutic INR, lower frequency of supratherapeutic INR, and decreased length of hospital stay¹
- Limited studies of pharmacist management of anticoagulation in post-op patients are available
- Previous studies suggest discontinuation of anticoagulation post surgical procedures is more frequent than other medications due to increased risk of bleeding post-op
- Failure to re-initiate anticoagulation increases risk of stroke/VTE

Objectives

- To develop a formalized process for pharmacists to assess and re-initiate anticoagulation post-operatively
- To characterize pharmacist involvement in the management of post-operative anticoagulation pre- and post-intervention
- To assess concordance of post-operative anticoagulation utilization with current guidelines
- To survey perceptions of pharmacists on the post-operative anticoagulation management intervention
- To monitor any bleeding events that occur as a result of re-initiation of post-operative anticoagulation

Methods

Setting: Single-centre study on surgical units at VGH

Inclusion: Patients undergoing orthopedic, vascular and general surgeries with indications for therapeutic anticoagulation

Phase I - Pre-intervention (3 weeks): Pharmacists characterized level of involvement in post-op anticoagulation management, using pre-intervention monitoring form

Phase II - Intervention (3 months): 3 components of intervention

- Pharmacist intervention form
- Supplemental education materials
- Patient education handout



Phase III - Post-intervention Survey (4 weeks): Survey of participating pharmacists to obtain intervention feedback

References

¹ Chilipko A et al. 2014. Evaluating Warfarin Management by Pharmacists in a Community Teaching Hospital. The Consultant Pharmacist. 29(2):95-103.
² Perioperative Management of Antiplatelet Therapy. Thrombosis Canada. 2020. Available from: <https://thrombosiscanada.ca/clinicalguides/>

Table 1: Baseline Characteristics of Surgical Patients Receiving Anticoagulation (AC) Pre- and Post-Intervention

Characteristics	Pre-intervention (N=37)		Post-intervention (N=71)		
	On AC Pre-op (N=32)	New AC Start Post-op (N=5)	On AC Pre-op (N=55)	New AC Start Post-op (N=16)	
Age (years), mean ± SD	69.8 ± 16.0	60.2 ± 17.5	74.0 ± 11.3	79.6 ± 9.6	
Sex (Male), n (%)	16 (50.0)	4 (80.0)	35 (63.6)	8 (50.0)	
Duration of Hospitalization (days), mean ± SD	15.8 ± 16.6	20.0 ± 11.2	13.1 ± 17.1	22.4 ± 10.9	
Type of Surgery n (%)	Moderate Risk	4 (12.5)	3 (60.0)	16 (29.1)	2 (12.5)
	High Risk	28 (87.5)	2 (40.0)	39 (70.9)	14 (87.5)
Indications for Anticoagulation n (%)	A-fib	19 (59.4)	-	40 (72.7)	4 (25.0)
	DVT	5 (15.6)	3 (60.0)	4 (7.3)	1 (6.3)
	PE	3 (9.4)	1 (20.0)	7 (12.7)	6 (37.5)
	Other	5 (15.6)	1 (20.0)	4 (7.3)	5 (31.3)
Anticoagulant Agent used n (%)	Apixaban	13 (40.6)	1 (20.0)	21 (38.2)	5 (31.3)
	Dabigatran	3 (9.4)	-	2 (3.6)	1 (6.3)
	Rivaroxaban	10 (31.3)	1 (20.0)	18 (32.7)	1 (6.3)
	Warfarin	5 (15.6)	-	13 (23.6)	-
LMWH	1 (3.1)	2 (40.0)	1 (1.8)	9 (56.3)	

Table 2: Concordance of Anticoagulation (AC) Reinitiation Post-Operatively with Thrombosis Canada Guidelines²

AC Agent	Indication	Time to AC Reinitiation Compared to Thrombosis Canada, n (%)			
		Shortened (n=5)	Concordant (n=21)	Prolonged (n=26)	
Apixaban n=24	A-fib	CHADS ₂ ≤ 2	-	2 (9.5)	4 (15.4)
		CHADS ₂ ≥ 3	2 (40.0)	5 (23.8)	4 (15.4)
	VTE	Provoked	-	2 (9.5)	-
		Unprovoked	1 (20.0)	-	-
Dabigatran n=1	A-fib	CHADS ₂ ≥ 3	-	-	1 (3.8)
		Other	-	-	1 (3.8)
Rivaroxaban n=18	A-fib	CHADS ₂ ≤ 2	2 (40.0)	3 (14.3)	6 (23.1)
		CHADS ₂ ≥ 3	-	1 (4.8)	2 (7.7)
	VTE	Provoked	-	-	1 (3.8)
		Unprovoked	-	1 (4.8)	-
Warfarin n=8	A-fib	CHADS ₂ ≤ 2	-	2 (9.5)	-
		CHADS ₂ ≥ 3	-	1 (4.8)	3 (11.5)
LMWH n=1	Other	Unprovoked	-	-	1 (3.8)
		Other	-	1 (4.8)	-
Total (N = 52)			5 (9.6)	21 (40.4)	26 (50.0)

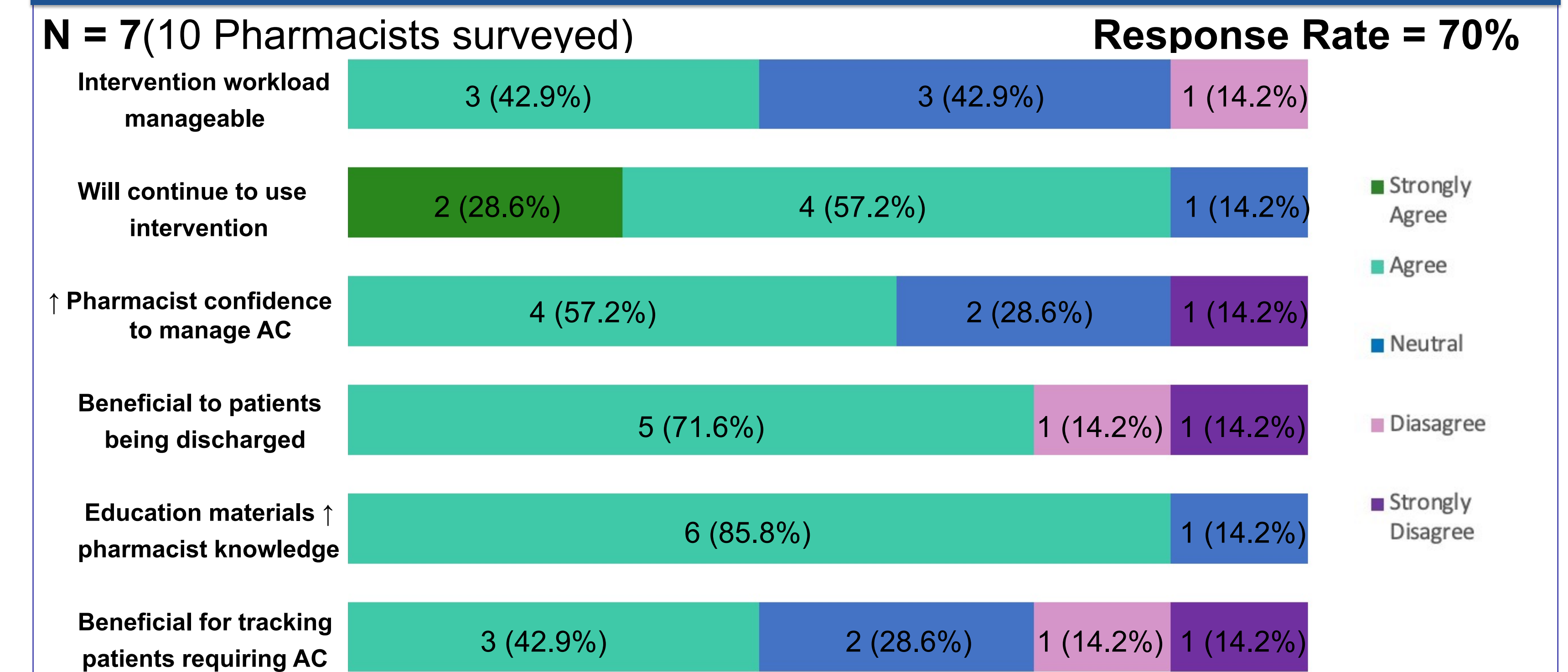
Acknowledgements

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Table 3: Clinical Activities of Pharmacists in Post-Operative Anticoagulation (AC) Management

Clinical Activities	On AC Pre-op (N = 84)			New AC Indication Post-op (N = 21)		
	Pre-intervention (n = 32)	Post-intervention (n = 52)	p-value	Pre-intervention (n = 5)	Post-intervention (n = 16)	p-value
Discharge Prescription, n (%)	9 (28.1)	20 (38.5)	<0.0001	5 (100.0)	12 (75.0)	0.007
Discharge Counselling Performed, n (%)	12 (37.5)	39 (75.0)	<0.0001	3 (60.0)	14 (87.5)	0.02
Special Authority Submission, n (%)	-	-	-	4 (80.0)	13 (81.3)	0.04
GP Faxed, n (%)	-	24 (46.2)	-	-	1 (6.3)	-
Phone Consults, n (%)	-	4 (7.7)	-	-	0	-

Figure 1: Surgical Pharmacist Feedback Survey



Limitations

- Reasons for holding anticoagulation were not correlated with patient specific factors (i.e. concurrent medications that ↑ bleeding, post-op complications)
- Subjectivity of pharmacists in completing intervention forms
- Inability to assess adverse outcomes in patients who had anticoagulation held for longer periods post-operatively

Discussion

- Anticoagulation was held inappropriately for 60% of patients post-operatively
- Post-op anticoagulation was held more extensively in patients with increased lengths of hospitalization and high-risk surgeries
- Formalized intervention process increased pharmacist involvement in discharge counselling, prescriptions and special authority applications
- Risk of adverse events with anticoagulation re-initiation post-op were 1.9%

Conclusions

- Intervention increased pharmacist role in managing post-op anticoagulation re-initiation and facilitating patient discharge
- Further investigation is required to determine factors that can contribute to prolonged holding of anticoagulation post-operatively