New Hanover Regional Medical Center

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Evaluation of phytonadione prescribing practices

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Background

- American College of Chest Physicians and Surgical Critical Care recommend phytonadione to reverse oral vitamin-K antagonists
- Dose and route are dependent on the presence of bleeding, time to surgical intervention, and the patient's international normalized ratio (INR)

Purpose

- Assess the safety and effectiveness of phytonadione dosing strategies

Study Design

- Design: Single-center, retrospective observational cohort
- As a quality improvement project, IRB review was not required
- Study Site: 855-bed Regional Referral Community Teaching Hospital
- Study Period: April 1 to June 30, 2019

Inclusion	Exclusion
• Age ≥ 18 years (yr) • Phytonadione Administered	• Pregnancy • Incarcerated

Endpoints

Primary
- Appropriateness of reversal of bleeding

Secondary
- INR reduction post-phytonadione dose
- Prevalence of adverse effects associated with phytonadione use

Definitions

Appropriateness of reversal: Appropriate dose and route based on indication and INR according to the CHEST guidelines

Results

Baseline Characteristics	ALL N = 45	Active Bleeding N = 18	Emergent Surgery N = 15	Supra-Tx INR N = 12
Age, yr*	73 ± 11	73 ± 12	73 ± 8.2	72 ± 12.2
Male**	22 (48.9)	8 (44.4)	12 (80)	2 (16.7)
Anticoagulation with warfarin**	42 (93.3)	18 (100)	13 (87)	11 (91.6)
Anticoagulation for atrial fibrillation**	31 (68.9)	11 (61.1)	11 (80)	9 (75)
Hemoglobin, g/dL*	10.6 ± 2.3†	10.1 ± 2.5	11.7 ± 3.3‡	10.2 ± 2.1

Supra-Tx INR = supra-therapeutic INR without bleeding; *mean ± SD; **n (%); †n = 44; ‡n = 14

Active Bleeding Dosing Strategy Summary

Type of Bleed	INR Range	Dose	n (%)
Head	< 2	10 mg IV	2 (11.1)
	2 – 2.9	10 mg IV	2 (11.1)
Gastrointestinal Tract	< 2	5 mg IV	1 (5.6)
	2 – 4.99	2.5 mg PO 5 mg PO	1 (5.6) 1 (5.6)
	5 – 7.49	3 mg IV 5 mg PO 10 mg IV	1 (5.6) 1 (5.6) 3 (16.7)
Skin	2 – 4.99	5 mg PO	1 (5.6)
	> 10	10 mg IV	1 (5.6)
Nose	7.5- 9.99	1 mg IV	1 (5.6)
	> 10	5 mg PO 10 mg IV	1 (5.6) 1 (5.6)
Hepatic	5 – 7.49	10 mg IV	1 (5.6)

Emergent Surgery Dosing Strategy Summary

Dose, n (%)	
2.5 mg PO 5 mg PO 10 mg IV 10 mg PO 10 mg SQ	4 (26.7) 4 (26.7) 4 (26.7) 2 (13.3) 1 (6.7)
Multiple Doses, n (%)	1 (5.6)

Supra-Tx INR Dosing Strategy Summary

INR Range	Dose	n (%)
2 – 2.99	10 mg IV	1 (8.3)
5 – 7.49	5 mg PO	1 (8.3)
7.5 – 9.99	10 mg PO	2 (16.7)
>10	2.5 mg PO 5 mg PO 10 mg PO 10 mg SQ 10 mg IM	1 (8.3) 4 (33.3) 1 (8.3) 1 (8.3) 1 (8.3)

INR Reduction Post-Phytonadione

	Active Bleeding N = 18	Emergent Surgery N = 15	Supra-Tx INR N = 12
Baseline INR*	6.1 ± 4.4	2.8 ± 1.6	11.2 ± 3.9
Repeat INR ordered, n (%)	18 (100)	12 (80)	12 (100)
INR at 24-hr*	1.7 ± 0.8	1.7 ± 0.7**	4.8 ± 4.9
INR < 1.5 at 24-hr, n (%)	10 (58.8)	6 (50)	4 (33.3)

*mean ± SD; **n = 12

Discussion

- Twelve patients (80%) were appropriately reversed for emergent surgery
- Six patients (50%) were appropriately reversed for Supra-Tx INR with no bleeding
- Three adverse reactions (N = 2) occurred post-phytonadione administration
- A patient developed a hematoma after intramuscular injection of phytonadione for Supra-Tx INR

Conclusions

- Phytonadione was safe and effective for anticoagulation reversal
- Results will lead to a review of the anticoagulant reversal order set
- Identified need for education for INR reversal without bleeding

References

1. Holbrook A, et al. Evidence-based management of anticoagulant therapy. *CHEST*. 2012; 141(2).
2. Surgical Critical Care. Warfarin reversal guidelines. Available at www.surgicalcriticalcare.net/Guidelines/Warfarin%20Reversal%202017.pdf.

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