

SOUND PRACTICES TO PREVENT ANTICOAGULANT MEDICATION ERRORS

Anticoagulants are considered to be one of the most at risk classes of medication for adverse events. In fact, in U.S. emergency departments anticoagulants accounted for 33% of adverse drug events in the elderly, and approximately 34,000 medication errors are reported yearly in long term care facilities with warfarin alone. Given its high use, warfarin accounted for 83% of errors with anticoagulants in a 2010-2011 study. Enoxaparin (Lovenox®) came in second place with 13% of errors. Dabigatran (Pradaxa®) and rivaroxaban (Xarelto®) which are being used more and more in place of warfarin also have major risk of adverse events especially in the elderly and unlike warfarin do not have a reversal agent.

Medication errors with anticoagulants are most commonly associated with giving the wrong dose or errors in follow-up care such as failure to order lab tests, communicate lab results, or change dose in response to INR. Compared to medication errors with other classes of drugs, medication errors with anticoagulants tend to be more common in patients over 75 years of age, occur more often in the documentation and monitoring phases of medication use, occur more often with follow-up care, occur often within 7 days after a transition into the LTC facility, and are more likely to be repeated.

There also are several other risk factors for errors in anticoagulation therapy.

COMMUNICATION

Safe use of anticoagulants depends on communication between multiple healthcare professionals internal and external to the LTC facility. Nurses serve a central role in coordinating care between external prescribers, dispensing and clinical pharmacists, consultant pharmacists, and laboratory staff.

INFLUENCES ON RESIDENT RESPONSE

A resident's response to warfarin can be constantly changing due to changes in diet, new drug therapies such as commonly used antibiotics, prior use of reversal agents, and changes in resident health status. It cannot be assumed that a resident will stay on a certain dose of warfarin once steady on therapy.

COMPLEX MANAGEMENT DURING TRANSITIONS AND CONCURRENT THERAPY

Elderly patients are at a particularly high risk when transitioning from one anticoagulant to another. For example, switching a resident from warfarin onto enoxaparin after surgery and then transitioning him back. Transition phases require intensive monitoring and communication with all care providers.

LAPSES WITH "HOLD" ORDERS

When a temporary hold order for warfarin is ordered for an elevated INR, often the dose is forgotten to be resumed.

INFREQUENT FOLLOW-UP

Nurses cannot rely solely on consultant pharmacists to review INR levels as their visits are only once every 30 days. Patients who have highly fluctuating INR levels need to be monitored every 1-2 weeks.

The following are strategies to help prevent errors in residents who are on anticoagulation.

STANDARDIZE ANTICOAGULATION THERAPY

A facility-based anticoagulation protocol should be utilized to help ensure consistent and appropriate initiation, dosing, monitoring, and adjustment of anticoagulation therapy.

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There also should be protocols for planned and emergency reversal for anticoagulation therapy. Grane Rx consultant and clinical pharmacists can be consulted to help your facility develop appropriate guidelines.

REQUIRE INITIAL AND SCHEDULED LAB TESTS

INR draws should be utilized for residents newly prescribed warfarin, new admissions on warfarin, and residents returning from the hospital on warfarin therapy. Baseline hemoglobin, hematocrit, platelet count, liver function tests, and renal function tests should be performed on residents prior to initiating warfarin and periodically while resident is on warfarin therapy. A set protocol should be developed for monitoring and follow-up of INR levels for residents on warfarin therapy.

KNOW INR GOALS

All residents should have a set INR goal determined by prescribers based upon clinical indication. This goal should be communicated to clinical and dispensing pharmacists as well as written on the resident's MAR.

ENSURE TIMELY COMMUNICATION OF LAB RESULTS

A standardized process for communicating lab results to the prescriber and pharmacist within 2 hours of receipt should be established. Nurses should directly consult the prescriber and pharmacist anytime the INR is outside of target range, or when renal function tests, liver function tests, hemoglobin/hematocrit, or platelet count results are outside of established limits.

DOCUMENT THE INR

Anticoagulation logs or flow sheet should be used to help track the dose and INR for residents on warfarin, so trends can be easily seen.

DISPENSE EXACT DOSES

The pharmacy should dispense exact doses needed whenever possible. Clear dosing instructions should be listed on the MAR.

STANDARDIZE ADMINISTRATION TIME FOR WARFARIN

Warfarin should be administered at a time which allows for appropriate review of test results and dose adjustments before administration time.

VERIFY INR PRIOR TO WARFARIN

As a last line of safety, nurses should review the previous INR and any documented dose changes prior to warfarin administration to make sure necessary interventions have not been overlooked.

ESTABLISH AND FOLLOW A POLICY FOR HANDLING "HOLD" ORDERS

When a hold order is written, the prescriber should indicate the reason for the hold, when and what dose to resume, and any other resident specific instructions. These instructions should be included in the pharmacy profile and in the nursing MAR. INR draws should be continued according to prescriber instruction and physicians and pharmacists should be notified when levels return to normal.

EVALUATE THE POTENTIAL FOR INTERACTIONS WITH OTHER MEDICATIONS

Warfarin has the potential to interact with numerous other medications which may result in subsequent increases or decreases in INR. When new orders are being received for residents on warfarin, remind physicians of the resident's warfarin therapy and last INR. Additionally, watch for communications from the pharmacy concerning potential interactions and management strategies.

ABOUT GRANE RX

For nearly 20 years, Grane Rx has been a leading pharmacy supplier and professional clinical group for long-term care communities and PACE providers throughout Pennsylvania and beyond. Every day, we help improve care for thousands of residents, improving medication adherence while expanding efficiencies and lowering costs. We really do know how to Make Pharmacy Simple.

HAVE QUESTIONS ABOUT ANTICOAGULANT MEDICATION ERRORS?

Contact your Grane Rx representative at **866-824-MEDS** or visit **www.GraneRx.com** for more information.

SEE SUMMARY CHART OF WARFARIN INTERACTIONS ON THE NEXT PAGE

SUMMARY CHART OF WARFARIN INTERACTIONS

The following chart lists many of the drug, herbal, and dietary interactions that may cause a resident's INR to fluctuate and potentially go outside of the therapeutic INR range of 2 to 3 or 2.5 to 3.5. The chart is by no means all inclusive, but lists the most prominent drug interactions that you should monitor for in your practice setting. It also gives information on how these interactions will affect the INR as well to what clinical signs to look for and how to manage them.

	Drugs/Natural Products	Mechanism of Action	Clinical Implications	Clinical Mangement	Other Factors that affect INR
Drugs that result in increased INR	Antifungal agents	Reduces warfarin clearance	Bleeding When INR > 3 patient is over-anticoagulated Signs of bleeding: persistent nausea, nose-bleed, dark red/ brown urine and blood in bowel movement The longer it takes the blood to clot, the higher the PT and INR	Monitor INR	Lifestyle changes: Increase in alcohol use or binge drinking Decrease in consumption of vitamin K containing foods
	Bactrim			Avoid combination	
	Amiodarone			Give ½ usual dose of Warfarin	
	Acetaminophen			Use doses below 2g/day	
	Ethanol			Avoid binge drinking	
	H2-Blockers, Statins, & Fibrates			Monitor INR if meds are added, discontinued or altered	
	Pradaxa, Xarelto, low molecular weight Heparin	Interrupts clotting cascade	Monitor, may increase life threatening bleeding		
	Aspirin, Plavix	Inhibits platelet aggregation	Use low ASA or avoid use		
	Vitamin E	Interfere with clotting factors	Monitor Vitamin E above 800 IU per day		
Drugs that result in decreased INR	Barbiturates	Increases or enhances Warfarin clearance	Clotting When INR < 2 there is a risk for blood clot. Patient is (under-anticoagulated).	Monitor INR if medications are added, discontinued or altered	Lifestyle changes: Decrease in baseline alcohol use increase in consumption of vitamin K containing foods
	Phenytoin				
	Dicloxacillin, Nafcillin				
	St. Johns Wort				
	Green tea, Vitamin K	Antagonism of Warfarin's mechanism of action		Instruct patient to keep amount of supplement in diet consistent as possible	
	Spironolactone	Increase concentration of clotting factors		Monitor INR closely when dug is initiated, discontinued or dose is changed	