

Correspondence Course



United States Department of Veterans Affairs

Anticoagulation Education for Prescribers Independent Study



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Overview

Purpose

Anticoagulation is a high risk treatment, which commonly leads to adverse drug events due to the complexity of dosing these medications, monitoring their effects, and ensuring patient adherence. Being more familiar with standardized procedures, recognizing adverse drug events associated with the use of heparin, low molecular weight heparin, warfarin and other anticoagulant is beneficial in preventing errors related to the usage of these agents. The purpose of this program is to:

1. Provide education regarding anticoagulant therapy to all prescribers who may be involved in caring for patients receiving anticoagulant therapy; and
2. Enhance patient safety by familiarizing clinical staff of the risks and benefits associated with anticoagulation therapy.

Outcome Objectives

At the completion of this program, the learner will be able to:

Identify at least two of the implementation expectations recommendations regarding safe anticoagulation from The Joint Commission;

Describe at least three appropriate actions to reduce the potential for errors associated with anticoagulants;

Describe at least three patient specific situations that indicate the need to call for medical attention; and

Provide key elements of outpatient anticoagulation therapy that need to be communicated to the patient and/or family member by the provider to enhance patient adherence.

Target Audience

This program is targeted to health care professionals that provide direct management of anticoagulation therapy (e.g. MDs, pharmacists, nurses)

Background: United States Pharmacopoeia (USP) Data

Heparin, warfarin, and enoxaparin were among the top twelve medications listed within USP's top 50 drug products most often associated with medication errors **Between 1/1/01-12/31/06, — 59,316 medication errors** related to anticoagulants were reported to USP's MEDMARX® program. Of the errors:

- 32% were intercepted before reaching the patient

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- 59.8% reached the patient
- 2.9% resulted in harm to, or death of the patient
 - Percentage of harm is approximately 2 times higher than the percentage of harm seen for all errors reported for the corresponding reporting period

Involved Problems with Medication Errors Related to Anticoagulants

- Prescribing 17%
- Transcribing and Documenting 27%
- Administering 36%
- Dispensing 17%
- Monitoring 3%

Background Events

Institute of Safe Medication Practices (ISMP) — Identified anticoagulants as "High–Alert Medications"

Institute for Healthcare Improvement (IHI) — Safe use of anticoagulants is part of the 5 Million Lives Campaign

The Joint Commission developed the National Patient Safety Goal for safe anticoagulation

Sentinel Event Alert was issued on September 24, 2008 — Preventing errors relating to commonly used anticoagulants

Anticoagulation Therapy: 2009 National Patient Safety Goal

Requirement: Reduce the likelihood of patient harm associated with the use of anticoagulation therapy

Rationale: "Anticoagulation is a high–risk treatment, which commonly leads to adverse drug events due to the complexity of dosing these medications, monitoring their effects, and ensuring patient compliance with outpatient therapy."

The use of standardized practices that include patient involvement can reduce the risk of adverse drug events associated with the use of heparin (unfractionated) low molecular weight heparin (LMWH), and warfarin and other anticoagulants."

The Joint Commission: Elements of Performance

1. Implement a defined anticoagulation management program to individualize the care provided to each patient receiving anticoagulant therapy

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2. Reduce compounding and labeling errors
 - hospital should use only unit dose products, pre-filled syringes, or pre-mixed infusion bags when these types of products are available
3. Use approved protocols for the initiation and maintenance of anticoagulant therapy appropriate to the medication used, to the condition being treated, and to the potential for medication interactions
4. For patients starting on warfarin, a baseline International Normalized Ratio (INR) is available, and for all patients receiving warfarin therapy, a current INR is available and is used to monitor and adjust this therapy

The Joint Commission: Elements of Performance (Continued)

5. When dietary services are provided by the hospital, the service is notified of all patients receiving warfarin and responds according to its established food/medication interaction program
6. When heparin is administered intravenously and continuously, the hospital uses programmable infusion pumps in order to provide consistent and accurate dosing
7. Have a written policy that addresses baseline and ongoing laboratory tests that are required for heparin and low molecular weight heparin therapies
8. Provides education regarding anticoagulant therapy to prescribers, staff, patients, and families
9. Evaluate anticoagulation safety practices, takes appropriate action to improve its practices, and measures the effectiveness of those actions on a regular basis

Anticoagulants

Examples:

- Unfractionated Heparin (UFH)
- Low Molecular Weight Heparin (LMWH)
 - enoxaparin (Lovenox®)
 - dalteparin (Fragmin®)
 - tinzaparin (Innohep®)
- Factor Xa Inhibitor
 - fondaparinux (Arixtra®)
- Vitamin K Antagonist
 - warfarin (Coumadin®)

Unfractionated Heparin (UFH)

Mechanism of Action: UFH prevents the propagation and growth of a clot by potentiating the action of antithrombin

FDA Indications:

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- Treatment
 - venous thrombosis and its extension; pulmonary embolism (PE); peripheral arterial embolism; atrial fibrillation with embolization
 - acute and chronic consumption coagulopathies (disseminated intravascular coagulation — DIC)

Unfractionated Heparin (UFH) (Continued)

Mechanism of Action: UFH prevents the propagation and growth of a clot by potentiating the action of antithrombin

FDA Indications:

- Prophylaxis
 - venous thrombosis and its extension; pulmonary embolism (PE); peripheral arterial embolism; atrial fibrillation with embolization
 - low-dose regimen for prevention of postoperative deep venous thrombosis and PE in patients undergoing major abdominothoracic surgery or who are at risk of developing thromboembolic disease
 - prevention of clotting in arterial and heart surgery, blood transfusion, extracorporeal circulation, dialysis procedures and blood samples

Unfractionated Heparin (UFH) (Continued)

Routes:

- continuous intravenous (IV) infusion
only use pre-mix solutions when available
- intermittent IV injection
Heparin vials should be stored separately from insulin products and from each other (if different concentrations)
- deep subcutaneously i.e., above the iliac crest of abdominal fat layer, arm, or thigh

Avoid IM injection due to the risk of hematoma formation

Intravenously bolus and continuous infusion should be administered via programmable infusion pump with double checks made by two independent checkers (provider/nurse/pharmacist)

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UFH: Dosing

Institutions should have standardized protocols

- Non–weight based or weight–based heparin dose protocols
- Institution determines aPTT goals (based on laboratories lot of coagulation reagent)

Bolus dosing for IV UFH initiation varies considerably by condition being treated as **does the dose infusion rates**

Adjust dosage according to coagulation test results prior to each injection

Refer to your facility’s protocol

UFH: Side Effects

Hemorrhage

- Can occur at virtually any site
- An unexplained fall in hemoglobin (Hgb) and hematocrit (Hct), fall in BP or any other unexplained symptom should lead to serious consideration of a hemorrhagic event

Thrombocytopenia

- Incidence up to 30%
- Exclude potential causes for thrombocytopenia before implicating heparin
- Incidence is higher with bovine than with porcine heparin
- Severity appears to be related to heparin dosage, with low–dose therapy resulting in fewer complications

Osteoporosis (with chronic therapy)

Others: fever, headache, cutaneous necrosis, hyperkalemia, elevated liver enzymes, anaphylactoid reactions

UFH: Contraindications and Monitoring

Contraindications

- Hypersensitivity to heparin
- Severe thrombocytopenia
- Suspected intracranial hemorrhage

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- Uncontrolled active bleeding

Lab Monitoring includes:

- Complete Blood Count (CBC) — platelets, hemoglobin, hematocrit
- aPTT — activated partial thromboplastin time, which is used as a surrogate measurement for the anti-Xa activity. The therapeutic range for high intensity treatment heparin is an anti-Xa activity level between 0.3 and 0.7 units/ml.
- Serum creatinine or glomerular filtration rate (GFR)
 - no need to monitor coagulation parameters in patients receiving low-dose heparin

UFH: Drug Interactions/Treatment of Overdose

Increased effect: (similar to LMWH)

- Drugs: (e.g., cephalosporins, penicillin, platelet inhibitors (ibuprofen, indomethacin, dipyridamole, hydroxychloroquine, aspirin, clopidogrel, warfarin, thrombolytics)

Decreased effect:

- Drugs (e.g., digitalis, tetracyclines, nicotine, antihistamines)

Treatment of Overdose

- Protamine sulfate — Check your facility's protocol
 - Each mg of protamine neutralizes approximately 100 USP heparin units

Enoxaparin (Lovenox®) and Dalteparin (Fragmin®)

Mechanism of Action

- prevents clot formation by activating antithrombin, an endogenous inhibitor of various activated clotting factor

Pharmacokinetics

- Compared to UFH, LMWH have a longer half-life and excellent bioavailability which allow for lower doses, less frequent injections, and less laboratory monitoring
- Near 100% bioavailability via the subcutaneous route and low plasma protein binding allows for consistent anticoagulation with fixed, weight-based dosing without monitoring in most patient populations

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Cannot be used interchangeably (unit for unit) with one another or with unfractionated heparin

Factor Xa Inhibitor

Fondaparinux (Arixtra®)

Mechanism of Action

selectively binds to antithrombin, thereby neutralizing Factor Xa. This disrupts the blood coagulation cascade and inhibits thrombin formation and thrombus development

Monitoring parameters and adverse drug reactions (ADRs) are similar to LMWHs

LMWH: Indications

FDA approved Indications for both enoxaparin and dalteparin:

- **Prophylaxis of DVT which may lead to PE**

In patients undergoing abdominal surgery who are at risk for thromboembolic complications, hip replacement, severely restricted mobility during acute illness
- **Prophylaxis of ischemic complications in unstable angina & non-Q-wave MI when concurrently administered with aspirin therapy**

LMWH: Administration

Verify the following prior to administration

Route

- IV (ACS loading dose only) vs. Subcutaneous

Dose

- Independent double check should be part of facility's protocol

Concentration Used

- Pre-filled syringe vs. multi-dose vial

Administration

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Enoxaparin, dalteparin, and fondaparinux come in prefilled syringes to be injected subcutaneously. Verify prior to administration.

Proper administration

1. Wash hands
2. Clean the injection site with soap and water, or an alcohol swab, and let it dry thoroughly. Do not inject through a residue of alcohol!
3. Pinch fold of skin on abdomen, push entire needle into the skin straight down and inject contents of syringe by pressing down on the plunger

For dalteparin only: alternate administration sites include the upper outer side of the thigh and the upper outer quadrangle of the buttock

4. Firmly push down on the plunger to activate the safety shield
5. Discard the used syringe in a sharps container
6. Do not rub the site after injection
7. Counsel patients to rotate injection sites

LMWH: Adverse Effects

Bleeding/bruising

Thrombocytopenia

- Heparin induced thrombocytopenia (HIT) is less likely to occur with LMWH compared to UFH

Injection site reactions

Other: Skin necrosis, pulmonary edema, heart failure, pneumonia, pruritis, rash, anemia, nausea, elevation of serum aminotransferases, anaphylactoid reaction

LMWH: Black Box Warnings

When neuraxial anesthesia (epidural/spinal anesthesia) or spinal puncture is employed, patients anticoagulated or scheduled to be anticoagulated with LMWH or heparinoids for the prevention of thromboembolic complications are at risk of developing an epidural or spinal hematoma which can result in long-term or permanent paralysis

The risk of these events is increased by the use of indwelling epidural catheters for administration of analgesics or by the concomitant use of drugs affecting homeostasis such as NSAIDs, platelet inhibitors, or other anticoagulants. The risk also appears to be increased by traumatic or repeated epidural or spinal puncture.

LMWH: Contraindications

Active major bleeding

Thrombocytopenia associated with a positive antiplatelet antibody test

Pregnant women with mechanical heart valves (have not been studied with enoxaparin)

Hypersensitivity to the drug, heparin, or pork products

LMWH: Precautions

Conditions with increased risk of hemorrhage

History of recent gastrointestinal (GI) bleed/ulceration

History of heparin-induced thrombocytopenia (HIT)

Severe liver or kidney insufficiency

- Must be adjusted for renal impairment, avoid in CrCl<15ml/min or dialysis

Diabetic retinopathy

LMWH should not be mixed with other injections or infusions

LMWH and heparins are not interchangeable

Multi-dose vials contain benzyl alcohol as the preservative — caution in pregnant women

LMWH: Lab Monitoring

CBC—platelets, Hgb, Hct

Serum creatinine

Prolongs the aPTT only minimally because of the low anti-IIa activity relative to anti-Xa activity; therefore anti-Xa activity must be measured directly

Anti factor Xa level may be monitored in select patients

- Morbidly obese patient

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- CrCL <30 ml/min
- Patients on long-term therapy with LMWH
- Pregnant women receiving treatment doses (e.g. not prophylaxis doses)

Monitoring prophylactic dose LMWH is not routinely performed. Routine coagulation monitoring is not recommended.

LMWH: Drug Interactions

Agents that will increase the risk of bleeds:

- Thrombolytics
- Warfarin
- Platelet inhibitors:
 - Aspirin
 - NSAIDs
 - Dipyridamole
 - Sulfinpyrazone
 - Clopidogrel

LMWH: Treatment of Overdose

Protamine sulfate

- not as effective at reversal as it is for heparin due to more activity at the Xa clotting factor
 - anti-Factor Xa activity is never completely neutralized
 - ~60% maximum per enoxaparin and tinzaparin package inserts
 - 60–75% per dalteparin per package insert

There is no known antidote for fondaparinux injection!

Warfarin

Mechanism of Action

- Exerts its anticoagulant effect by interfering with the hepatic synthesis of vitamin K-dependent clotting factors

Pharmacokinetics

- Onset of action: 3–4 days for anticoagulant effect (takes about 6–7 days to see antithrombotic effect)

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Thromboembolism (DVT, PE) Table

Check your local policy and review the guidelines for the grading of evidence.
 (use warfarin with concurrent UFH/LMWH/fondaparinux for at least 5 days and until INR > 2 for ≥ 24 hours)
 (for DVT, add elastic compression stockings with 30–40mmHG at ankle for 2 years)

Warfarin Indications

Indication	Target INR (Range)	Duration	Comment
Treatment/prevention of recurrence (including calf vein DVT, UE DVT, UE DVT associated with catheter use, and asymptomatic DVT/PE)			
–transient (reversible) risk factors	2.5 (2.0–3.0)	3 months	
–unprovoked/first event			
–proximal DVT or PE	2.5 (2.0–3.0)	Chronic	
–distal DVT	2.5 (2.0–3.0)	3 months	consider chronic therapy
–unprovoked/second event	2.5 (2.0–3.0)	Chronic	
–with malignancy	2.5 (2.0–3.0)	Chronic	preceded by LMWH x 3 months
Chronic thromboembolic pulmonary HTN	2.5 (2.0–3.0)	Chronic	
Cerebral venous sinus thrombosis	2.3 (2.0–3.0)	Up to 12 months	
Spontaneous superficial vein thrombosis	2.5 (2.0–3.0)	4 weeks	or prophylactic LMWH x 4 weeks

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Artrial Fibrillation (AF) / Artrial Flutter Table

Indication	Target INR (Range)	Duration	Comment
Age ≤ 75 with no risk factors	None	Chronic	Use ASA 81–325mg daily
With 1 risk factor (Risk factors include: age>75; history HTN, diabetes; CHF or moderate/severe LV systolic function and/or heart failure)	2.5 (2.0–3.0)	Chronic	Or ASA 81–325mg daily
With 2 or more risk factors	2.5 (2.0–3.0)	Chronic	
With mitral stenosis	2.5 (2.0–3.0)	Chronic	
With prior history of stroke/TIA/systemic embolism	2.5 (2.0–3.0)	Chronic	
Following open heart surgery (in NSR)	2.5 (2.0–3.0)	4 weeks	
Pre-cardioversion (Afib or flutter ≥ 48 hours)	2.5 (2.0–3.0)	3 weeks	Or 5 days if TEE is negative
Post-cardioversion (in NSR)	2.5 (2.0–3.0)	4 weeks	

Ischemic Stroke Table

Indication	Target INR (Range)	Duration	Comment
Non-cardioembolic stroke or TIA	None	Chronic	Use antiplatelet therapy
Cardioembolic stroke or TIA	2.5 (2.0–3.0)	Chronic	
–with contraindications to warfarin	None	Chronic	Use ASA 81–325mg daily
–associated with aortic atherosclerotic lesions	None	Chronic	Use antiplatelet therapy
–associated with mobile aortic arch thrombi	2.5 (2.0–3.0)	Chronic	Or antiplatelet therapy
–associated with patent foramen ovale	None	Chronic	Use antiplatelet therapy

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Myocardial Infraction Table

Indication	Target INR (Range)	Duration	Comment
Following MI	3.5 (3–4) or 2.5 (2.0–3.0)	Long-term (Up to 4 years)	Without ASA or With ASA 81mg daily
Following MI in high risk patients [large anterior MI, significant heart failure, intracardiac thrombus, AF, history TE]	2.5 (2.0–3.0)	At least 3 months	And ASA 81mg daily

Valvular Disease Table

Indication	Target INR (Range)	Duration	Comment
Mitral valve prolapse			
–with TIAs or ischemic stroke	None	Chronic	Use ASA 81mg every day
–with recurrent TIA despite ASA therapy	2.5 (2.0–3.0)	Chronic	
Mitral annular calcification with AF	2.5 (2.0–3.0)	Chronic	
Rheumatic mitral valve disease:			
–with AF, history systemic embolism, or LA thrombus	2.5 (2.0–3.0)	Chronic	
–with AF, history systemic embolism, or LA thrombus despite therapeutic anticoagulation therapy	2.5 (2.0–3.0)	Chronic	Add ASA 81mg or INR 2.5–3.5

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Indication	Target INR (Range)	Duration	Comment
Aortic	None	Chronic	ASA 81mg daily alone
Mitral	2.5 (2.0–3.0)	3 months	Followed by ASA 81mg daily
With LA thrombus	2.5 (2.0–3.0)	Until resolution	
With prior history systemic embolism	2.5 (2.0–3.0)	At least 3 months	
With additional risk factors for thromboembolism [AF, hypercoagulable condition, low EF]	2.5 (2.0–3.0)	chronic	Add ASA 81mg daily if low bleed risk

Valve Replacement–Mechanical Table

Indication	Target INR (Range)	Duration	Comment
Aortic			
–bileaflet in NSR w/ nl LA size	2.5 (2.0–3.0)	Chronic	
–Medtronic Hall tilting disk in NSR w/ nl LA size	2.5 (2.0–3.0)	Chronic	
–following prosthetic valve thrombosis	3.5 (3.0–4.0)	Chronic	Plus ASA 81mg daily
Mitral			
–Bileaflet or tilting disk	3.0 (2.5–3.5)	Chronic	
–following prosthetic valve thrombosis		Chronic	Plus ASA 81mg daily
Caged ball or caged disk (aortic or mitral)	3.0 (2.5–3.5)	Chronic	
With additional risk factors for thromboembolism [AF, MI, LA enlargement, hypercoagulable condition, low EF]	3.0 (2.5–3.5)	Chronic	Add ASA 81mg daily if low bleed risk
With systemic embolism despite adequate anticoagulation	Increase INR goal	Chronic	Or add ASA 81mg daily

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Initiating Warfarin

- Loading doses are not recommended
- Ensure baseline lab tests have been obtained
- In the outpatient setting, patients should only have one strength; may require use of half and full tablets
- Most patients will reach INR of 2.0 or greater in 4–5 days when starting with a dose of 5mg daily
- Doses less than 5mg daily may be appropriate in the elderly and in patients with congestive heart failure (CHF) or liver disease, debilitated, or malnourished
- Patients with known Protein C deficiency, or another thrombophilic state should be treated with heparin before or at the same time as warfarin to protect against possible early hypercoagulable state

Be careful ordering warfarin through the computer because it comes in several strengths.

Safety Tips: Outpatient Ordering of Warfarin

1. Consider adding warnings to the drug file to alert prescribers the drug is high alert
2. Populate patient instruction field in the drug file so that indication appears on outpatient Rx's
3. Always view the box in the lower left hand corner to see which tablet strength the system assigns

Warfarin: Lab Monitoring

INR (International Normalized Ratio)

- $INR = (\text{patient PT} / \text{mean normal PT})^{ISI}$
- PT = Prothrombin Time
- ISI (International Sensitivity Index)
 - reflects the responsiveness of a given thromboplastin to the reduction of vitamin K–dependent coagulation factors compared to the WHO international reference preparations.
 - "Standard" reagent is assigned ISI of 1.0
 - Higher the ISI—less "sensitive" the thromboplastin

Therapeutic Lab Values

- Varies by indication/diagnosis (see ACCP/ACC guidelines)

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Critical Lab Values

- Needs to be communicated to the responsible caregiver in a timely manner. Check with your facility's protocol.

Patient Transition

There needs to be consistent and effective communication between all levels of care including admission, transfer, and discharges

Follow-up: It is very important for all inpatients who are discharged on warfarin therapy to receive appropriate and timely follow-up monitoring

- Make sure follow-up care is arranged before patient leaves the hospital. Example: If your institution have an anticoagulation clinic, ensure referral/consult is made PRIOR to discharge

Warfarin: Patient Management

Bridging Therapy

- Defined as: Temporary use of UFH or LMWH for a patient on long-term anticoagulation about to undergo a surgical procedure
- Decisions regarding discontinuation of warfarin or bridging with LWMH should be based on the surgical bleeding risk vs. risk of thromboembolism
- Check the current ACC/ACCP guidelines for recommendations
- Special care should be taken with ALL patients who have mechanical valves. These patients should **not** have warfarin stopped without initiation of a bridging therapy in order to prevent a thromboembolic event.

Warfarin: Patient Assessment

At the time of INR evaluation, the patient should be assessed for:

- Indication, recommended therapeutic range, and duration of therapy
- Verification of current warfarin dose
- Changes in medications (Rx, OTC, herbal)
- Adherence with anticoagulation regimen
- Recent acute illnesses (can alter INR results)
- Changes in diet (especially foods rich in vitamin-K or decreased oral intake)
- Alcohol use
- Assessment of educational needs

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Warfarin: Patient Assessment (Continued)

At the time of INR evaluation, the patient should be assessed for signs and symptoms of thromboembolism:

- Weakness, numbness, tingling
- Blurred vision/dizziness
- Slurred speech
- Extremity pain/swelling
- Dyspnea/chest pain

Warfarin: Contraindications and Precautions

Contraindications

- Abortion, eclampsia, preeclampsia
- Alcoholism
- Anesthesia
- Aneurysms
- Bacterial endocarditis
- Any bleeding tendencies
- Recent or planned surgery
- Inadequate lab facilities
- Hypersensitivity to warfarin or any component
- Pericarditis and pericardial effusion
- Malignant hypertension
- Known or suspected pregnancy
- Lack of patient cooperation

Precautions

- Anemia
- Cardiovascular/cerebrovascular disease
- Hepatic or renal impairment
- Trauma
- Malignancy
- Vascular diseases
- Diabetes
- Vitamin K intake
- Diarrhea
- Edema
- Elderly
- Fever
- Thyroid disease
- Infectious diseases

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- Malnutrition
- Deficiencies of clotting factors/proteins

Medications that Interact with Warfarin

Drugs/OTCs that Increase INR

- Alcohol
- Antibiotics (SMZ–TMP, erythromycin, ciprofloxacin)
- NSAIDS
- Amiodarone
- ASA or ASA containing products
- Phenylbutazone
- Phenytoin
- Prednisone
- Tetracycline
- Thyroid Medications

Drugs/OTCs that Decrease INR

- Alcohol
- Carbamazepine
- Colestipol/cholestyramine
- Contraceptives
- Estrogen
- Dicloxacillin
- Nafcillin
- Phenytoin
- Vitamin K

Drug–Drug Interactions

Herbal/dietary supplements that **may** interact with warfarin include:

- Alfalfa
- Chamomile
- Chondroitin
- Coenzyme Q10
- Dong Quai
- Feverfew
- Garlic
- Ginger
- Gingko
- Gingseng
- Licorice Root

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- Passionflower Herb
- Vitamin E

Management of Excessive Anticoagulation with Vitamin K

Vitamin K may be given to reverse the anticoagulant effects of warfarin

The decision to use vitamin K should be based on the level of anticoagulation and whether or not there is bleeding

- Should be given orally, rarely intravenously
- Subcutaneous administration is not recommended

Black Box Warning:

- Severe reactions including fatalities have occurred during and immediately after **intravenous** injection of phytonadione
- Severe reactions including fatalities have also been reported following **intramuscular** administration
 - **intravenous and intramuscular routes should be restricted to those situations where the subcutaneous route is not feasible and the serious risk involved is considered justified**

Patient Safety: Obtain Medical Assistance Immediately

- Serious fall or hard bump to the head
- Constant headache
- Unusual bruising
- Bleeding from gums, nose or cuts that does not stop promptly with typical care (i.e. direct pressure)
- Dark brown or reddish-colored urine
- Black tarry stool
- Pain, redness, and/or swelling in feet or legs
- Chest pain
- Difficulty breathing
- Noticeable drop in blood pressure sitting vs. standing (possible internal bleeding)

Dietary Considerations with Warfarin

Avoiding alcohol is best

- Consuming alcohol while on warfarin increases the risk of bleeding
- No binge drinking

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- Alcohol intake and any changes in alcohol intake should be discussed with the provider

Many nutritional/herbal supplements contain vitamin K and can interfere with warfarin

It is important for patients to understand that they do not need to avoid foods containing vitamin K; however, it is important to keep their vitamin K intake consistent from week to week

A change in diet will impact INR levels

Patient and Family Education

Counseling to the patient and family should include the following:

Condition Treated/Prevented

Medications

- Indication
- Dose and frequency
- Precautions–signs/symptoms for seeking medical care
- Self–administration (LMWH)

Lab Testing Required

Dietary Considerations

Importance of Close Follow–up

- Time/Place of appt
- Adherence
- Change in your current medications
- Develop fever or a significant illness (vomiting, diarrhea, infection, pain, swelling)
- Point of Contact

Enhancing Patient Safety

Be familiar with the anticoagulation management program at your facility

Use approved protocols for the initiation and maintenance of anticoagulation therapy

Follow high–alert medication policies for anticoagulants

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Use programmable infusion pumps for heparin administration in order to provide consistent and accurate dosing

Before starting a heparin infusion and with each change of the container or rate of infusion, double check the drug, concentration, dose calculation, rate of infusion, pump settings, line attachment and patient identity

Enhancing Patient Safety (Continued)

Be aware of look alike products with heparin infusion bags

Follow proper BCMA (Bar Code Medication Administration) procedures

Clearly label and store warfarin strengths separately so they are not mistaken for one another

Be aware that patients receiving anticoagulant therapy may be at increased fall risk so follow proper fall risk procedures

Patient and Family Education (Continued)

Ensure that a baseline and current International Normalized Ratio (INR) is available for all patients taking warfarin

Notify Dietary Service of inpatients on warfarin

Maintain a complete and accurate list of the patient's medications. This is key in preventing drug–drug and drug–food interactions.

Report signs and symptoms of bleeding or thromboembolism to the responsible caregiver ASAP and instruct patients to report these signs and symptoms too!

Factor Xa Inhibitor

Fondaparinux (Arixtra®)

Mechanism of Action

- selectively binds to antithrombin, thereby neutralizing Factor Xa. This disrupts the blood coagulation cascade and inhibits thrombin formation and thrombus development

Monitoring parameters and adverse drug reactions (ADRs) are similar to LMWHs

Fondaparinux: FDA Indications

Prophylaxis of DVT, which may lead to PE, in patients undergoing

- hip fracture surgery, including extended prophylaxis
- hip replacement surgery in patients undergoing
 - knee replacement surgery;
 - abdominal surgery who are at risk for thromboembolic complications

Treatment

- acute DVT when administered in conjunction with warfarin; and
- acute PE when administered in conjunction with warfarin with initial therapy is administered in the hospital

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Certificate of Completion

This certifies that

_____ *(Fill in your name)*

Has successfully completed the following course by reading the required document

Anticoagulation Training

On _____ *(Fill in the date)*

Signed certification by participant: _____ *Your Signature*



To receive credit, please give this completed certificate to your VA Service Training Coordinator or the VASDHS Education Service