COUMADIN ASSISTED DOSING

Purpose:
To provide guidelines to Wheaton Franciscan Healthcare Iowa inpatient pharmacists for independently dosing and monitoring warfarin.

Who Can Perform:
Physician, Pharmacist

Equipment:
Coumadin Tracking Form

General Statement:
All patients receiving warfarin will be monitored daily for appropriate dosing based on INR by pharmacists. Physicians may initiate “pharmacist to dose” warfarin by writing a physician order.

Procedure:

INITIAL ORDER OR ON ADMISSION: Pharmacy will collect patient information prior to dosing.

A. Indication/Goal INR
B. Patient’s Weight, Gender, Allergies,
C. Baseline INR, HGB, HCT

Baseline INR definition:

1. Hospitalized patient:
   a. At admit for any person currently on Coumadin – prior to dose administered
   b. Before starting initial dose of Coumadin on a new Coumadin therapy patient.
   c. If no baseline INR is available (within the last 7 days) one will be ordered, by pharmacist.
   d. Pharmacist will recommend that HGB/HCT be ordered if not done.
2. Outpatients/Home Health patients
   a. For patients who have had no disease state change – Physician request sent to draw INR if no INR has been drawn in 4 weeks.
   b. Physician request to draw INR if patient has recently been started or discontinued on drugs that fall in the “Major” and the “bolded Moderate” interaction list.
   c. Physician request sent to draw an INR if there is a change in patient condition, with certain types of cancer, worsening or acute heart failure, hyper and hypothyroidism, liver disease.

D. Current and/or Previous Dosing
E. Contraindications, increased risks of bleeding, history of significant bleeds (contact physician if significant).
F. Dietary status, previous vitamin K administration, and blood transfusions
G. Current medication therapy for potentially significant Interacting Medications / Disease States

PHYSICIAN DOSING:
A. Discontinue as needed (PRN) orders for aspirin, salicylates, non-steroidal anti-inflammatory agents. Regularly scheduled doses of above medications may continue. The Pharmacists will write order if not done by physician.

PHARMACIST DOSING:
A. Initiate warfarin protocol and write initial order in chart if not already done. INR daily x 6 days or as ordered by pharmacist. Maintenance therapy: Baseline and every other day or as ordered by pharmacist
B. Discontinue as needed (PRN) orders for aspirin, salicylates, non-steroidal anti-inflammatory agents. Regularly scheduled doses of above medications may continue. See attached warfarin protocol.
C. Initiate warfarin monitoring form.

SUBSEQUENT DAYS:
A. Review available data and labs, starting or stopping interacting medications.
B. Contact prescriber for any questions or concerns about indication, efficacy or safety.

1. PHYSICIAN DOSING
   Daily monitor INR levels – **If no level drawn initially and for 3 days or per specified order,** **Pharmacist to order level per Medical Executive /Pharmacy and Therapeutics authorization.**
   A. Maintenance therapy: Baseline and every other day or as ordered by pharmacist.
   B. Review Daily Elevated INR level report for physician response. Contact floor/office to follow-up if no response.
   C. Potential Medication Interactions – Pharmacy will place a Communication form on chart for physician review and dosage adjustment/lab draw orders. See Warfarin Drug Interactions.
   D. Pharmacist to discontinue IV or SQ anticoagulation after 5 days if INR is >= 2 for 2 consecutive days or as indicated by physician.
   E. Pharmacist to contact physician if INR falls below 1.7 to see if IV or SQ anticoagulation is needed until INR >= 2 for two consecutive days.

2. PHARMACIST DOSING
   Daily monitor and chart INR, follow protocol for dose adjustments, write order on chart if needed.
   A. Discontinue IV or SQ anticoagulation after 5 days if INR is >= 2 for 2 consecutive days or as indicated by physician.
   B. Dosing adjustments per attached warfarin protocol
   C. Potential Medication Interactions – Based on interaction severity and patient response more frequent monitoring may be required. See Warfarin Drug Interactions
   D. Pharmacist to contact physician if INR falls below 1.7 to see if IV or SQ anticoagulation is needed until INR >= 2 for two consecutive days.

**MANAGEMENT OF EXCESSIVE ANTICOAGULATION**

1. PHYSICIAN DOSING
COUMADIN ASSISTED DOSING

A. Physician to be called per Critical Lab protocol. Contact physician for INR >4.0 AND initiate Management of Excessive Anticoagulation Protocol
B. Pharmacist to review Daily Elevated INR level report for physician response. Contact floor/office to follow-up if no response.
C. Oral Vitamin K is preferred unless excessive bleeding. SQ, IM Vitamin K orders will automatically be converted to IV route (in 50ml Normal Saline over 30 mins.) per Medical Executive/Pharmacy and Therapeutics Committee authorization.

2. PHARMACIST DOSING
   B. INR daily x 6 days or as ordered by pharmacist.
   C. Maintenance therapy: Baseline and every other day or as ordered by pharmacist.

Perioperative Management
The Pharmacist will contact the physician regarding need for therapy guidelines.

Discharged Dosing:
1. Pharmacist to order INR on day of discharge, if needed.
2. Pharmacists will write home Coumadin order.
3. Pharmacist to indicate day for repeat INR.

Dosing Protocol:

TARGET INR:
Default to 2-3 unless other box checked. □ 2.5-3.5 □ Other: _________

DIAGNOSTIC TESTS:
1. Obtain baseline labs if not available: INR prior to first dose. Hemoglobin / Hematocrit
   (Dialysis patients new to coumadin may defer INR to next AM.)
2. Initiation of therapy: INR daily x 6 days or as ordered by pharmacist or ________________.
3. Maintenance therapy: Baseline and every ________ days (minimum every 3 days in-patient; 7 days Rehab, Senior Behavioral Health), or as ordered by pharmacist.

MEDICATIONS:
1. Discontinue IV or subcutaneous anticoagulation after 5 days if INR is ≥ 2 for 2 consecutive days or ____________
2. INR < 1.7 consider IV or SC anticoagulation until INR in range
3. Discontinue as needed (PRN) orders for aspirin, salicylates, and non-steroidal anti-inflammatory agents. Regularly scheduled doses of above medications may continue.

INITIATION OF THERAPY:
GOAL INR 2-3 2.5-3.5 2-3 2.5-3.5 2-3 2.5-3.5

<table>
<thead>
<tr>
<th>Day</th>
<th>INR</th>
<th>High Sensitivity*</th>
<th>Moderate Sensitivity*</th>
<th>Low Sensitivity*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline INR</td>
<td>2-5 mg</td>
<td>5 mg</td>
<td>7.5 mg</td>
</tr>
<tr>
<td>Day 1</td>
<td>&lt; 1.5</td>
<td>2-5 mg</td>
<td>5 mg</td>
<td>5-7.5 mg</td>
</tr>
<tr>
<td>Day 2</td>
<td>1.5 - 1.9</td>
<td>2 mg</td>
<td>2.5 mg</td>
<td>2.5-5 mg</td>
</tr>
<tr>
<td></td>
<td>2 - 2.5</td>
<td>1-2mg</td>
<td>1-2.5 mg</td>
<td>1-2.5 mg</td>
</tr>
<tr>
<td></td>
<td>2.5 – 3.0</td>
<td>No Dose</td>
<td>1-2.5 mg</td>
<td>1-2.5 mg</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

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## COUMADIN ASSISTED DOSING

<table>
<thead>
<tr>
<th>Day 3</th>
<th>INR</th>
<th>Dosage Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1.5</td>
<td>2-2</td>
<td>Increase weekly dose by 10% and give one time top-up additional amount equal to 20% of weekly dose</td>
</tr>
<tr>
<td>1.5 - 1.9</td>
<td>2.5 - 3</td>
<td>Increase weekly dose by 20% and give one time top-up additional amount equal to 20% of weekly dose</td>
</tr>
<tr>
<td>2 - 2.5</td>
<td>3 - 3.5</td>
<td>No change - recheck within 1 day. If persistent, decrease weekly dose by 10-20%</td>
</tr>
<tr>
<td>2.6 - 3</td>
<td>&gt; 3.5</td>
<td>Omit 1 dose; decrease weekly dose by 10-20% and recheck within 2 days</td>
</tr>
</tbody>
</table>

## Baseline INR > 1.5
- Age > 65
- Significant Hepatic Disease
- Decompensated CHF
- Malignant Malabsorption Syndrome/chronic diarrhea
- Cancer
- Thyrotoxicosis
- Drug Interactions that increase warfarin effect

### High Sensitivity
- See management of excessive anticoagulation protocol.

### Moderate Sensitivity
- Baseline INR 1.2 - 1.5
- Concurrent CYP-450 enzyme inhibitor
- Drug interactions that increase warfarin effect

### Low Sensitivity
- Baseline INR < 1.2
- Age < 50 and no other risk factors
- No identified bleeding risk
- No drug interactions that increase warfarin effect

*See management of excessive anticoagulation protocol.

## AFTER DAY SIX

<table>
<thead>
<tr>
<th>INR</th>
<th>Dosage Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1.5</td>
<td>&lt;2</td>
</tr>
<tr>
<td>1.5-1.9</td>
<td>2-2.4</td>
</tr>
<tr>
<td>2.0-3.0</td>
<td>2.5-3.5</td>
</tr>
<tr>
<td>3.1-3.9</td>
<td>3.5-4.0</td>
</tr>
<tr>
<td>4.0-5.0</td>
<td>4.1-6.0</td>
</tr>
<tr>
<td>&gt;5.0</td>
<td>&gt;6</td>
</tr>
</tbody>
</table>

### Major Warfarin Drug Interactions

<table>
<thead>
<tr>
<th>Increase warfarin effect</th>
<th>Decrease warfarin effect</th>
</tr>
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<tbody>
<tr>
<td>Amiodarone</td>
<td>Metronidazole</td>
</tr>
<tr>
<td>Azole antifungals (fluconazole/voriconazole)</td>
<td>Phenytoin</td>
</tr>
<tr>
<td>H-2 antagonists (cimetidine)</td>
<td>Quinolone antibiotics (levofloxacin)</td>
</tr>
<tr>
<td>Macrolide antibiotics (erythromycin)</td>
<td>Sulfinpyrazone</td>
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Note: This is not a complete list of ALL warfarin associated drug interactions. If drug not listed, further investigation is warranted or consult pharmacist.
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### Home Maintenance Therapy

<table>
<thead>
<tr>
<th>INR</th>
<th>Dosage Adjustment</th>
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<tbody>
<tr>
<td>1.5-1.9</td>
<td>Increase weekly dose by 10%</td>
</tr>
<tr>
<td>2.0-3.0</td>
<td>No change</td>
</tr>
<tr>
<td>3.1-3.9</td>
<td>No change – recheck within 1 day. If persistent, decrease weekly dose by 10-20%</td>
</tr>
<tr>
<td>4.0-5.0</td>
<td>Omit 1 dose; decrease weekly dose by 10-20% and recheck within 2 days</td>
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</tbody>
</table>

### Management of Excessive Anticoagulation


<table>
<thead>
<tr>
<th>INR</th>
<th>No Bleeding</th>
<th>Minor Bleeding</th>
<th>Major Bleeding (any INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above therapeutic range but &lt; 5.0</td>
<td>Omit dose</td>
<td>Omit dose</td>
<td>Hold warfarin, Vitamin K up to 10mg slow IV infusion</td>
</tr>
<tr>
<td>&gt; 5.0 but &lt; 9.0</td>
<td>Hold dose</td>
<td>Vitamin K 2.5 orally</td>
<td>Vitamin K can be repeated every 12 hours</td>
</tr>
<tr>
<td>NR &gt; 9.0</td>
<td>Hold dose</td>
<td>Vitamin K 5mg orally</td>
<td>Repeat INR every 12 hours</td>
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If warfarin therapy is indicated after high doses of vitamin K, heparin or enoxaparin can be given until the effects of vitamin K have been reversed and the patient becomes responsive to warfarin therapy. (May continue for 7 days or more after vitamin K administration)

### Patient Education:

1. Nursing will provide patient education. Education preferred prior to day of discharge. Pharmacists or Dieticians may participate upon request.

2. Information will include Vitamin K Food Guidelines and Coumadin Information Booklet

3. Pharmacist will document in Interdisciplinary Notes when completed.

### Chart Documentation

1. The pharmacist will write medication orders on the physician order sheet for subsequent signature by physician. Pharmacist will follow Health System guidelines for chart documentation. (Refer to policy PFB010 and PFB012 and PFB022)

2. Pertinent clinical notes will be written on the physician progress notes for continuity of patient care.

**References:**

J Hirsh, G guyatt, G Albers, R Harrington, and H. Schunemann; Executive Summary: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition); Chest 2008;
COUMADIN ASSISTED DOSING

133:71S-105S, 6/2008; UNC Center for Excellence in Chronic Illness 2001
Managing Anticoagulation Patients in the Hospital The Inpatient Anticoagulation Service (ASHP) Gulseth 2007
JCAHO MM 07.01.01
National Patient Safety Goal 3E

SEE ALSO:

DATE OF ORIGIN: 10/99

<table>
<thead>
<tr>
<th>OTHER COMMITTEE REVIEW/APPROVALS: Med Executive Committee: 9-2008</th>
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<tr>
<td>Pharmacy &amp; Therapeutics Committee</td>
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