Anticoagulation

Indications for therapeutic anticoagulation

-afib
-PE
-DVT
-hypercoaguable state
-arterial thrombosis
-"high risk bypass graft" – one that has thrombosed in the past or is very distal – outflow to the tibial vessels or any other reason the surgeon is worried that the graft may fail like poor quality conduit or suboptimal anastomosis
-Critical limb ischemia
-mechanical valve
-low EF
-aneurysm

When to stop anticoagulation preop

-coumadin – 5 days prior to OR some patient populations may require longer than 5 days (elderly, liver dysfunction, low dose requirements, supratherapeutic INR)
- Prasugrel (Effient) – 7 days prior to OR
-Ticagrelor (Brilenta) – 5 days prior to OR
-Plavix 7 days prior to OR
-DOAC 24-36 hours prior to OR
-lovenox 12 -24 hour prior to OR
-heparin gtt off on call to OR

Helpful Links:

http://www.bwhpikenotes.org/policies/Pharmacy/Drug_Administration/DAG/Peri_Operative_AnticoagGuide.pdf

http://www.bwhpikenotes.org/policies/Pharmacy/Drug_Administration/DAG/Peri-Op_DOACGuide.pdf

A Bridge To And From Coumadin Therapy

Preoperatively

Coumadin therapy must be stopped prior to major surgical interventions because of increased bleeding risk. Some of our surgeons will perform certain procedures like AVF side branch ligation, minor surgical debridements and toe amputations on therapeutic anticoagulation. Always check with the surgeon for guidance on anticoagulation management for such procedures.

Since Coumadin is long acting, it takes several days for the INR to drift down below therapeutic levels once it has been discontinued. For planned procedures, we usually ask patients to stop Coumadin 5

days prior to surgery. For some patients, this window of subtherapeutic anticoagulation is acceptable. Other patients will need to be on a short acting anticoagulant while their INR drifts into the subtherapeutic level (INR<2). This is where "the bridge" comes into play. If the patient is coming from the community, the "bridge" anticoagulant is usually Lovenox. If the patient is already in the hospital, we use a heparin drip titrated to goal PTT of 60-80 as our "bridge".

The last dose of Lovenox should be 12hours prior to planned procedure and heparin drip is typically turned off on "on call to the OR".

Postoperatively

Our bridge postoperatively is usually always a heparin drip. Sometimes if we are concerned about postoperative bleeding, we may start a low dose heparin drip without titration. This has been coined "chicken heparin". It is usually a heparin drip at 500 units, NO titration. Once bleeding risk is lower, we may then titrate the heparin drip to goal PTT 60-80.

So, when do we restart Coumadin? If it is anticipated that the patient will need further surgical interventions during the admission, we will maintain a therapeutic heparin drip. Ideally, Coumadin should be restarted once no more surgical interventions are likely and postoperative risk of bleeding is low. This is typically 1-2 days after final surgical intervention. Heparin drip should be continued as a "bridge" to therapeutic coumadin therapy until INR is within goal range. Once INR reaches therapeutic levels, heparin drip can be discontinued.

Sometimes patients who require a bridge to Coumadin will have subtherapeutic INR at the time of discharge. We can continue to bridge these patients in the community with Lovenox until the INR reaches goal range. Once INR is in goal range, lovenox should be discontinued. If you are starting Lovenox while the patient is still in the hospital, you may stop heparin drip and start lovenox at the same time.

Who Needs A Bridge?

Typically, all of the indications for anticoagulation require a bridge EXCEPT afib, however this varies depending on the cardiologist. You can use CHAD2-VASC calculator for guidance on whether to bridge a patient with atrial fibrillation. This will calculate the risk of atrial fibrillation associated thromboembolic event/ year off anticoagulation.

INR Reversal

The type of procedure will dictate the need and degree of reversal.

Major surgery (i.e. open AAA, major limb amputation) INR<1.0/1.2

Minor surgery (i.e. toe amputation, debridement, angiogram) surgeons may tolerate any INR <1.8-1.5. Double check with the surgeon!

There are three therapies for reversal: FFP, Vitamin K and Kcentra. FFP is quick and short acting and therefore should be administered within a couple of hours before a planned procedure. You may or may not need to recheck INR after FFP administration depending on the degree of reversal needed. Vitamin K takes longer to work and lasts longer. Please note that vitamin K makes it harder to get to therapeutic INR levels once Coumadin is restarted. If you give vitamin K, please give it orally as it has the same bioavailability as IV vitamin K and is more readily available on the floor. Kcentra is expensive but can be used to reverse patients who are volume sensitive (i.e. ESRD pt's on HD). This medication is usually only given in the OR.

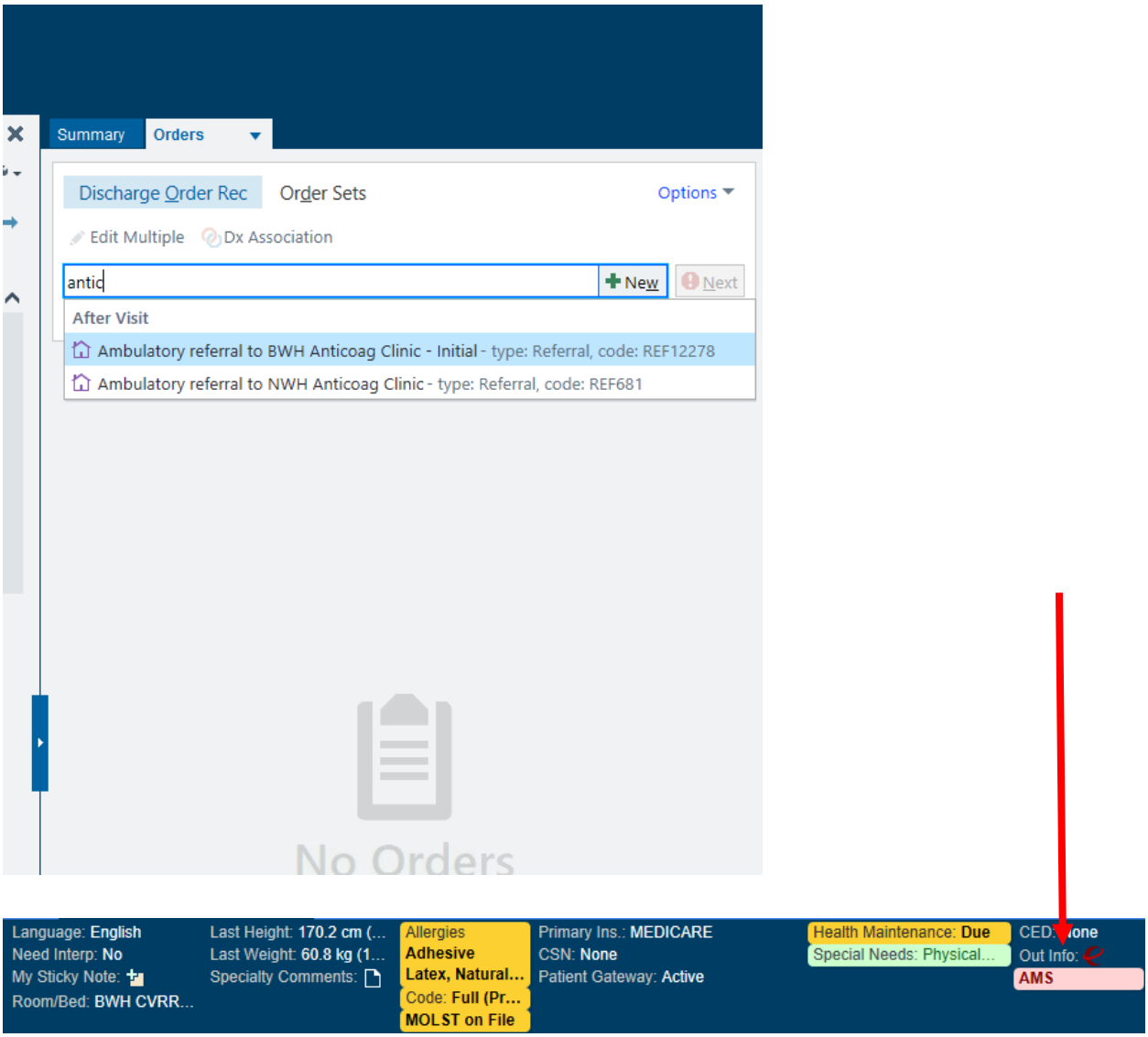
Anticoagulation On Discharge

Patients new to Coumadin

DO NOT let patients discharge this hospital without the appropriate coumadin follow up!!!!!!!!! The physician at rehab is NOT the appropriate managing physician long-term. They will manage the INR only while the patient is in rehab. Eventually, most patients will be discharged from rehab and if you have not set up the appropriate follow up, these patients will continue to take coumadin without a managing physician which is a recipe for disaster.

These are the options:

- If the patient has a BWH PCP or cardiologist, we can enroll them into the BWH anticoagulation management services.
  To make the referral you must order via the D/C med rec under "new orders." Type "anticoagulation" and find "ambulatory referral to BWH anticoagulation clinic – initial." Please note, you MUST have a documented follow up with the dosing provider in EPIC or the referral will not be processed. Please check for the pink AMS icon at the top right corner of patient's screen which will appear once the patient is officially enrolled.



- If the PCP is not affiliated with BWH, you must call them directly and ask if they are willing to manage.
- If the PCP is not willing to manage and the patient does not have a BWH PCP, we may ask the vascular surgical attending to be the referring MD though the BWH anticoagulation management services.

If you are discharging on a Lovenox bridge

- Please make sure the either the patient or family member is comfortable self-administrating the Lovenox (VNA will only come once a day and this medication is dosed BID)

- Please write a general order for Lovenox teaching. Ideally, they should get at least one dose while in the hospital under nursing supervision.

- Please call the outpatient pharmacy to make sure that:
  *the appropriate dose is available for pick up
  *the medication is affordable

OR

Utilize BWH bedside delivery program
https://hospitalpolicies.ellucid.com/documents/view/13449

Under inpatient orders type “bedside” find “IP consult to Pharmacy Bedside Delivery Program”
You must either tube rx to outpatient pharmacy (station number 210) or send the rx electronically to the BWH outpatient pharmacy

The following information should be made readily available in the discharge summary:

- Indication for anticoagulation
- Duration of therapy
- INR goal
- Current Coumadin dose
- INR on discharge
- Date of next INR level
- Name and phone number of dosing provider

Patients resuming Coumadin

Sometimes you can find the dosing provider in the last discharge summary. Do NOT rely solely on this information. Please double check with the patient or the dosing provider to ensure that this information is accurate.

For patients who are already enrolled in the Brigham and Women’s anticoagulation management services, you will be able to find all their dosing information on the AMS icon in pink at the top, left of their patient screen.

Choice Of Anticoagulant And Therapeutic Dosing

Injectables

Class: LMWH

MOA: Binds to antithrombin III to form a complex that irreversibly inactivates clotting factor Xa.

Lovenox (enoxaparin)

Half-life: 4.5 – 7 hours

cheapest but usually dosed twice daily

Dosing : 1mg/kg SC BID

*Please renally dose adjust for patients with CKD – check with pharmacy for dosing

- 1 mg/kg SC QD for Creatinine Clearance (CrCl) < 30 mL/min

*Use **EXTREME** caution prescribing for patients with ESRD. This medication is renally cleared and cannot be dialyzed off once taken. Normally ESRD is an absolute contraindication for this medication, but sometimes the vascular attending may approve a very low dose "pseudobridge" which is ¼ of the normal dose. (For example, an ESRD patient who weighs 80 kg would get Lovenox 40mg QD x3 days). You will probably get push back from pharmacy when writing Lovenox for ESRD. Explain that this is a short term bridge and make sure no to order BID. If all else fails then, refer the pharmacist to the appropriate attending so they can discuss the risks/benefits.

Dosing: 1.5mg/kg SC QD - not optimal as patient has periods of supratherapeutic and subtherapeutic levels over course of one day.

Fragmin (dalteparin)

Half-life: 3-5 hours

expensive but dosed daily

Dosing: 200 units/ kg up to 18,000 units SC QD

Arixtra (Fondaparinux) **(HIT patients)**

Half-life: 17-21 hours, prolonged in renal dysfunction. Avoid use with CrCl <30 mL/min.

Dosing: 5 mg SC QD for patients <50 kg

7.5mg SC QD for patients between 50-100 kg

10mg SC QD for patients >100kg

Drips

Heparin gtt

Class: UFH

MOA: binds antithrombin III and accelerates its inhibition of factor Xa

Half-life: 1-1.5 hours

Short acting, can be turned off on call to the OR

Dosing: weight based initial dosing, start anywhere between 500-1000 units/hour, for EPIC ordering must be written as units/kg/hr. PTT should be drawn 6 hours after initiation of drip. Titrate to goal PTT 60-80. Recheck PTT every 6 hours after each new adjustment. May check daily PTT's once patient has had 3 therapeutic PTT's at one dose.

*Sometimes you will get lab result PTT>150. If possible, check to see that the lab was not drawn off the arm in which the heparin drip is running as this could give a falsely elevated PTT. If it is a true PTT stop heparin drip from one hour and restart at a lower dosage.

Argatroban gtt (HIT patients)

Class: Direct thrombin inhibitor

MOA: direct thrombin inhibitor that reversibly binds to the thrombin active site

Half-life: 50-60 minutes

Short acting, for Hit patients

Dosing: Please check with pharmacy for appropriate dosing

*Please note that argatroban will falsely elevate INR. To get true INR, stop argatroban and check INR 4- 6 hours later

Bivalirudin gtt (HIT patients)

Class: Direct thrombin inhibitor

MOA: direct thrombin inhibitor that reversibly binds to the thrombin active site

Half-life:25- 60 minutes (depends on renal function)

Dosing: check with pharmacy

If you suspect your patient has HIT (heparin induced thrombocytopenia)

Drop in platelets >50% 5-10 days after exposure to heparin, please consult Hemostatic and Antithrombotic Stewardship for guidance in management. Please note the INR may be falsely elevated by bivalirudin. While on bivalirudin and warfarin, check an INR daily. Once the INR is therapeutic, discontinue bivalirudin and recheck INR 4 hours later. If subtherapeutic, restart bivalirudin and reassess the INR the next day. If therapeutic, continue warfarin monotherapy.

Previous Next

Displaying matches 1-1 of 1 for 'hemostatic'			
Name	**Department**	**Description**	**Number**
Hemostatic and Antithrombotic Stewardship	BWH / Pharmacy Services / Pagers	Pager PHS	35287

Previous Next

DOAC's (direct oral anticoagulants)

Eliquis (Apixaban) +/- 10 mg BID loading dose x 7 days then 5mg BID. Renal dosing for afib indication 2.5mg BID with at least 2/3 criteria of age ≥ 80, Scr ≥ 1.5, or weight ≤ 60 kg. There is no FDA-approved renal dosing for VTE, patients with Scr ≥ 2.5 or a CrCl ≤ 25 mL/min were excluded from trials.

Xarelto (Rivaroxaban) **+/-** 15mg BID loading dose x 21 days then 20mg QD. Avoid use with CrCl <30 mL/min. Approved dose for peripheral artery disease in combination with aspirin 81 mg is 2.5 mg BID in patients who do not require therapeutic anticoagulation or dual antiplatelet therapy for another indication.

Pradaxa (Dabigatran) 150mg BID . Avoid use with CrCl <30 mL/min.

Antiplatelets – do not always need to be dced before surgery, will be surgeon and procedure dependent.
Plavix (Clopidogrel) 75mg QD
Brilinta (Ticagrelor) 90mg BID
Zontivity (Vorapaxar) 2.08mg QD
Prasugrel (Effient) 10mg PO QD