

83. Colonoscopy or surgery while on coumadin® (Bridging Therapy)

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Q: "I am a survivor of a blood clotting incident. In January 2005, following shoulder surgery, I developed three pulmonary emboli. And shortly after my PEs it was determined that I am positive for Factor V Leiden. Twenty-five years prior, I had phlebitis in my right leg. Next month, I will undergo colonoscopy because of back-to-back positive colonoscopies with pre-cancerous polyps. My question is that I am currently therapeutic with Coumadin®. I know that I must stop this therapy some days prior to this procedure. However, I am not sure how my coumadin® should be managed before and after colonoscopy. I am concerned that our medical care in this area of the country is not current with needed therapy. Can you explain the proper protocol for pre- and post-procedure care for individuals with issues such as mine?"

A: Discontinuation of warfarin 5 days before a colonoscopy is often appropriate. Depending on an individual patient's level of risk for a new blood clot once off coumadin® (warfarin), bridging therapy with low molecular weight heparin (LMWH) before and/or after the colonoscopy may be recommended. One would need to know more details about this patient to be able to give more specific recommendations. Some published guidelines on bridging therapy exist for health care providers, available on the web (see Medical Reference 1).

Colonoscopy and upper endoscopy (=EGD) are typically not high-risk bleeding procedures and could potentially be performed safely while a patient continues taking warfarin (coumadin®). However, during the procedure biopsies may have to be taken or polyps removed. Since the risk of bleeding with biopsies or polyp removal is substantial if a patient is still on warfarin (coumadin®), physicians often ask all patients undergoing colonoscopy and EGD to stop their warfarin (coumadin®) - just in case that biopsies or polyp removal will have to be done. Warfarin is typically stopped 5-7 days before the procedure, to allow warfarin's blood thinning effect to wear off (i.e. the INR to normalize. For "INR" explanation see [Q/A 17](#)). As the blood gets thicker (i.e. the INR goes down), the low molecular weight heparin blood thinners (LMWH, such as Lovenox®, Fragmin®, Innohep®) are sometimes given as injections underneath the skin, so that the blood continues to be thinned, as the INR drifts below the therapeutic level. This is referred to as "**Bridging Therapy**". Since the blood thinning effect of LMWH only lasts for about 24 hours after an injection, the last dose of LMWH is typically given 24 hours before the planned procedure, i.e. on the morning of the day prior to the day of the procedure.

If a patient is at relatively low risk for a new blood clot, LMWH bridging therapy may not be needed. Such low risk patients may be the ones who are on warfarin because of (a) irregular heart beat (atrial fibrillation) without a history of stroke, or (b) a previous DVT or PE more than several weeks ago and no strong clotting disorder. However, patients at higher risk for clots may need to receive LMWH before the procedure, for example patients with (a) presence of mechanical prosthetic heart valves (in the mitral valve position), (b) recent DVT or PE (in the last few weeks), (c) presence of a strong clotting disorder (APLA syndrome, ATIII deficiency, etc.). The LMWH is a matter of debate - in the absence of good clinical study data some physicians choose full-dose LMWH, others low-dose (prophylactic dose) LMWH. In the extremely high-risk patient one may decide on twice a day LMWH dosing, in others once a day dosing may be sufficient. While some "consensus guidelines" have been written as to who is considered high-risk and low-risk (reference 1), no uniformly accepted consensus exists as to who needs what type of bridging before a procedure. Additional clinical studies to clarify this uncertainty are ongoing.

Once a colonoscopy or EGD have been performed, warfarin is typically restarted. The first dose may be given in the evening of the day of the procedure. Often, the same dose as the one the patient used to take is given; a higher than usual "loading dose" (such as double the dose) is typically avoided. Since warfarin typically takes about 5 days to reach its full blood thinning effect (i.e. for the INR to be therapeutic again), LMWH bridging may also be given for these first 5 days after the procedure. Once again, no consensus exist as to (a) who needs and who does not need LMWH bridging after the procedure, and (b) what dose of LWMH to give if bridging is chosen. If a biopsy was done or a polyp removed the patient may be at risk for bleeding after the colonoscopy or EGD. This needs to be taken into consideration when deciding when to restart warfarin and whether to give LMWH bridging or not.

In summary: It is a very individual decision as to (a) whom to give bridging therapy and whom not, and (b) what LMWH dose to use if one decides on bridging therapy, and (c) when to restart warfarin after the procedure. A good risk-benefit assessment needs to be done as to what an individual patient's risk for a new clot and risk for bleeding is. Generalizable guidelines are difficult to create in this field.

My personal approach:

The 2 figures are sample forms which I use regarding bridging therapy in patients I assess as being at low risk (figure 1) or intermediate risk (figure 2) for new blood clots, and low risk for bleeding. They are not meant to be used by patients or clinicians. They are meant as examples as to how to communicate with a patient what his/her warfarin and LMWH dosing should be around the time of a procedure.

Figure 1

BRIDGING: Bridging Only Post		COUMADIN®: always taken in evening				Low molecular weight heparin (LMWH): once/day					
Coumadin® (warfarin)	PM Last dose	none	none	none	none	PM* ... mg	PM* ... mg	PM* ... mg	PM* ... mg	PM* ... mg	PM* ... mg
LMWH #	none	none	none	none	none	none	AM	AM	AM	AM	AM
Days	-5	-4	-3	-2	-1	0 (procedure)	1	2	3	4	5
Date (month/day)	/	/	/	/	/	/	/	/	/	/	/

*Restart Coumadin® (warfarin) at your previous dose.

Low molecular weight heparin:

1. Lovenox® dose is mg (1.5 mg/kg) once per day; or
2. Fragmin® dose is U (200 U/kg) once per day; or
3. Innohep® dose is U (175 U/kg) once per day.

Figure 2

BRIDGING: PRE & POST		COUMADIN®: always taken in evening				Low molecular weight heparin (LMWH): once/day					
Coumadin® (warfarin)	PM Last dose	none	none	none	none	PM* ...mg	PM* ... mg	PM* ... mg	PM* ... mg	PM* ... mg	PM* ... mg
LMWH #	none	none	none	AM	AM	none	AM	AM	AM	AM	AM
Days	-5	-4	-3	-2	-1	0 (procedure)	1	2	3	4	5
Date (month/day)	/	/	/	/	/	/	/	/	/	/	/

*Restart Coumadin® (warfarin) at your previous dose.

Low molecular weight heparin:

1. Lovenox® dose is mg (1.5 mg/kg) once per day; or
2. Fragmin® dose is U (200 U/kg) once per day; or
3. Innohep® dose is U (175 U/kg) once per day

Medical References:

1. Ansell J et al: The pharmacology and management of the vitamin K antagonists. The Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. *Chest* 2004;126:204S-233S). Available at: www.chestjournal.org/cgi/reprint/126/3_suppl/204S (table on page 215S).
2. Turpie AG et al: Enoxaparin is effective and safe as bridging anticoagulation in patients with a mechanical prosthetic heart valve who require temporary interruption of warfarin because of surgery or an invasive procedure. *Blood* 2004;104:202s(abstract 703).
3. Seshadri N et al: The clinical challenge of bridging anticoagulation with low-molecular-weight heparin in patients with mechanical prosthetic heart valves: an evidence-based comparative review focusing on anticoagulation options in pregnant and nonpregnant patients. *Am Heart J* 2005;150:27-34.
4. Douketis JD et al: Low-molecular-weight heparin as bridging anticoagulation during interruption of warfarin: assessment of a standardized periprocedural anticoagulation regimen. *Perspect Vasc Surg Endovasc Ther.* 2005 Jun;17(2):176.