
Edmonton Zone Consensus Guidelines for Management of Abnormal Coagulation (INR) in Bedside, Imaging-guided procedures

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Overview

This guideline is designed to assist in the management of patients with abnormal INR who may or not require an invasive procedure. The focus will be on the prophylactic use of Frozen Plasma (FP) in adult, non-bleeding patients with INR >1.8 who might require a bedside, imaging-guided procedure (**mainly paracentesis, thoracentesis, central line insertions**). Although this guideline focuses on non-warfarin coagulopathy, it provides some guidance in warfarin- and DOAC-related coagulopathies. A general guideline for management of patients who present with major bleeding or require an urgent invasive procedure/surgery will be discussed briefly as well.

A general algorithm is provided in this document that provides a systematic approach to assist in decision making to correct abnormal INR.

This guideline will not discuss the peri-procedural management of anticoagulants and/or antiplatelet therapy. Please follow appropriate alternative treatment recommendations and guidelines in these cases.

Procedure-specific

Medical Situation	Threshold of INR for FFP transfusion
Active, Major Bleeding Patients (non-MHP)	
Non-Warfarin coagulopathy	INR > 1.8
Non-Bleeding Patients, requiring a procedure	
Low risk procedures*	INR > 3
Moderate to high risk procedures	INR > 1.8

*Note that some studies have demonstrated safe bedside, imaging-guided procedure (specifically paracentesis, thoracentesis, and central line insertion) with INR higher than 3. Some reported INR as high as 17. Some current guidelines at other institutions recommend safe procedure at any INR including those higher than 3.

Definitions

- Major bleed*:
 - o Overt bleeding with any one of the following in absence of other causes:
 1. Decrease in Hb of $\geq 20\text{g/l}$
 2. Transfusion of ≥ 2 units of pRBC with inappropriate response (increase in 10 points per 1 unit of PRBC).
 3. Objectively confirmed bleeding at intracranial, intraocular, retroperitoneal, intraspinal, pericardial, or intra-articular.
 - o *Plasma provided as part of Massive Hemorrhage Protocol is not included in the scope of this guideline.

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Table 1: Examples of Organ-Specific Procedures for Risk of Bleed*:

Organ System	Surgery / Procedure	
	Low-risk of bleeding	Moderate to high-risk
Pulmonary	Flexible bronchoscopy: <ul style="list-style-type: none"> • Airway inspection • Bronchoalveolar lavage /wash 	
Gastrointestinal	<ul style="list-style-type: none"> • EGD, sigmoidoscopy, colonoscopy enteroscopy, with or without biopsy • ERCP without sphincterotomy • EUS without FNA • Capsule endoscopy • Enteral stent deployment (without dilation) • Cold snare or forceps polypectomy 	<ul style="list-style-type: none"> • Polypectomy > 1cm • ERCP with sphincterotomy • EUS with FNA • PEG placement • Cystogastrostomy • Pneumatic or bougie dilation • Treatment of varices • Tumor ablation by any technique
Genitourinary	<ul style="list-style-type: none"> • Cystoscopy • Urethroscopy • Urodynamic testing 	<ul style="list-style-type: none"> • Cystoscopy with biopsy • Urethroscopy with biopsy • Vasectomy • Transrectal prostate biopsy • Transurethral resection of the prostate • Laser ablation of the prostate
Cutaneous	<ul style="list-style-type: none"> • Punch biopsy • Excisional biopsy • Cryosurgery • Curettage 	<ul style="list-style-type: none"> • Periorbital surgery • Periauricular surgery • Excision • Mohs surgery
Interventional Radiology	Percutaneous biopsy, aspiration, drainage, injection: <ul style="list-style-type: none"> • Paracentesis • Thoracentesis • Soft tissue (aspiration only) • Superficial lymph node • Salivary gland (FNA only) • Thyroid/Parathyroid (FNA) • Breast (including wire localization) • Joint/Tendon sheath/Bursa Transvenous procedures: <ul style="list-style-type: none"> • Central line insertion • PICC line insertion or reposition • Venous catheter port check • IVC filter insertion or retrieval • Adrenal venous sampling • Gastrostomy/jejunostomy tube replacement (> 30 days after placement) 	Percutaneous biopsy, aspiration, drainage, injection: <ul style="list-style-type: none"> • Renal biopsy / Nephrostomy • Liver biopsy / Cholangiogram • Cholecystostomy • Lung nodule/mass • Deep lymph node • Transrectal/Transvaginal • Fiducial seed • Bone • Soft-tissue (biopsy) • Radiofrequency ablation Transvenous • Tunneled line • Port placement • TIPS • Angiography/Angioplasty/ Stenting • Embolization Percutaneous Gastrointestinal <ul style="list-style-type: none"> • Lumbar/spinal puncture

*Compilation adapted from a number of other institutional guidelines (Beth Israel Deaconess Medical Center [2014], Sunnybrook Hospital [2015], Cleveland clinic [2009] and Blood Center of Wisconsin [2011])

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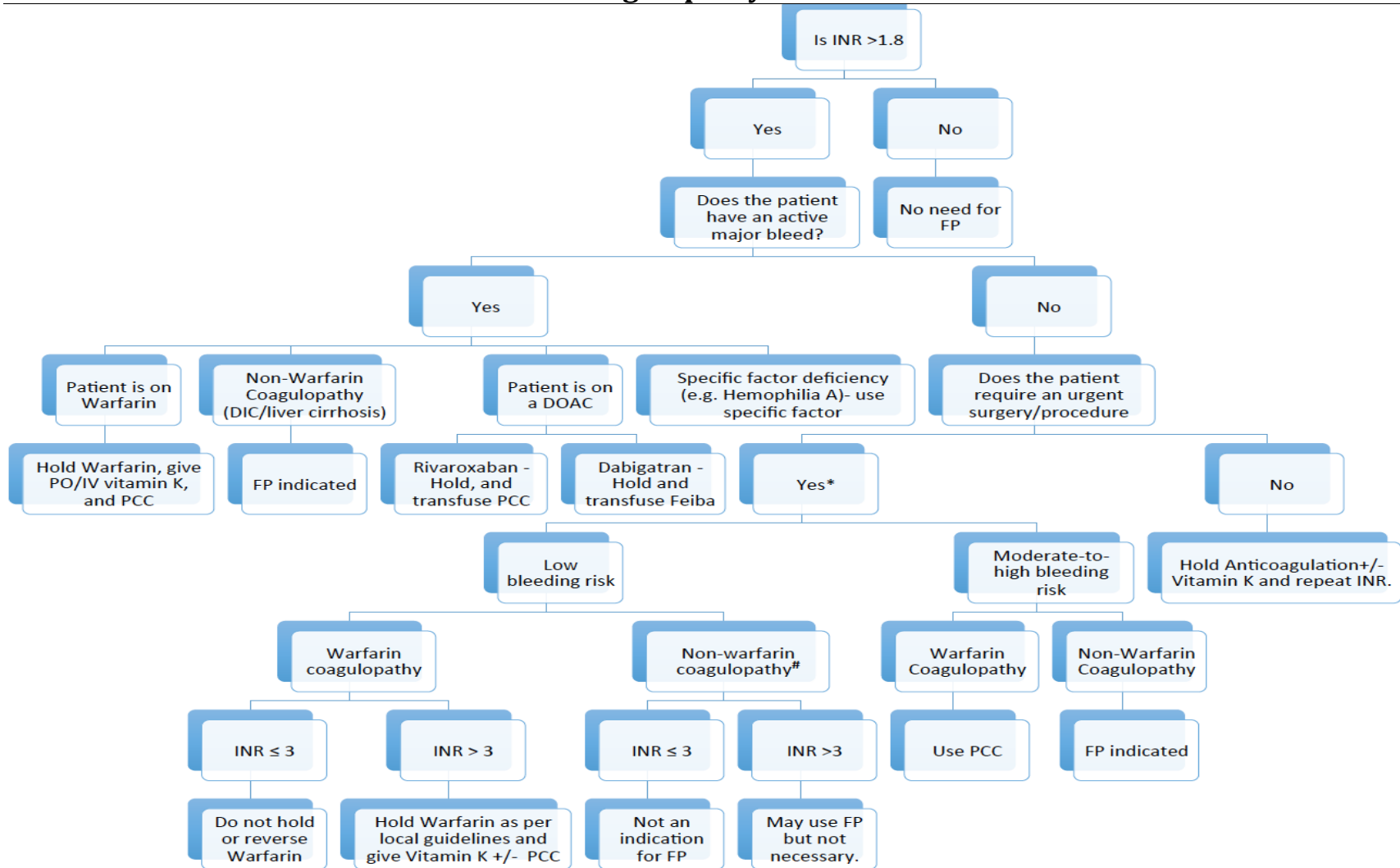
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Algorithm: Clinical Decision Tree for Reversal of Coagulopathy



* Refer to table for extensive list of bleeding risk for different procedures.

Note that studies have shown that these low bleeding risk procedure (paracentesis, central line insertions) can be done safely at higher INR (upto 17). Some guidelines for other institutions recommend doing these procedure at any INR.

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Table 2: Evidence Base of bleeding risk by INR

Imaging-guided procedure	In Favor of INR >1.8					Against INR >1.8		
	Safe INR	Studies	Type of Studies	Safe INR (warfarin vs liver)	Local Consensus Guidelines[1]	Safe INR	Studies	Type of Studies
Arthrocentesis	2-3	[2]	retro	2-3 (any INR)	[3]			
Paracentesis	Median 2, 2.2, 3.5 range 1.5-3 (upto8.7)	[4-9]	Retro, Prosp, PROBE (abdo/perc drain)	2-3 (any INR)	[3, 10] Wisconsin, BIDMC, Cleveland, AASLD, Sunnybrook 2015)		[11-14]	Meta Analysis, reviews/ guidelines
Thoracentesis	Range 1.5-3	[6, 9, 15-17]	PROBE, prsop, observ,	2-3 (any INR)	[18]	<1.5		Society of Interventional Radiology
CVC insertion	Median 1.9, 2.4, 2.7 Range 1-17, 1.5-3.8	[6, 9, 11, 19-26]	Prosp, PROBE, MetaAnalysis, Case control	2-3 (any INR)	Wisconsin, BIDMC, Cleveland, Penn, AASLD, Sunnybrook 2015)			

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Stakeholder Consultation

This guideline has been circulated to all medical and nursing staff in the Edmonton Zone via laboratory bulletin. In addition, directed stakeholder consultation has been sent to the Edmonton Zone Transfusion Medicine Committee (via Dr. S. Nahirniak), Critical Care (via Dr. M. Meier), Radiology (via Dr. R. Owen), Hepatology (Dr. V. Bain) and General Internal Medicine (via Dr. N. Kassam). Feedback should be sent to Dr. Susan Nahirniak – susan.nahirniak@albertahealthservices.ca.

References

1. Iorio, A., et al., *The good use of plasma. A critical analysis of five international guidelines*. Blood Transfus, 2008. **6**(1): p. 18-24.
2. Ahmed, I. and E. Gertner, *Safety of arthrocentesis and joint injection in patients receiving anticoagulation at therapeutic levels*. Am J Med, 2012. **125**(3): p. 265-9.
3. Keeling, D., et al., *Guidelines on oral anticoagulation with warfarin - fourth edition*. Br J Haematol, 2011. **154**(3): p. 311-24.
4. Grabau, C.M., et al., *Performance standards for therapeutic abdominal paracentesis*. Hepatology, 2004. **40**(2): p. 484-8.
5. McVay, P.A. and P.T. Toy, *Lack of increased bleeding after paracentesis and thoracentesis in patients with mild coagulation abnormalities*. Transfusion, 1991. **31**(2): p. 164-71.
6. Muller, M.C., et al., *Transfusion of fresh-frozen plasma in critically ill patients with a coagulopathy before invasive procedures: a randomized clinical trial (CME)*. Transfusion, 2015. **55**(1): p. 26-35; quiz 25.
7. Pache, I. and M. Bilodeau, *Severe haemorrhage following abdominal paracentesis for ascites in patients with liver disease*. Aliment Pharmacol Ther, 2005. **21**(5): p. 525-9.
8. Runyon, B.A., *Paracentesis of ascitic fluid. A safe procedure*. Arch Intern Med, 1986. **146**(11): p. 2259-61.
9. Yang, L., et al., *Is fresh-frozen plasma clinically effective? An update of a systematic review of randomized controlled trials*. Transfusion, 2012. **52**(8): p. 1673-86; quiz 1673.
10. Konkle, B.A., *Percutaneous interventions in the coagulopathic patient*. Semin Intervent Radiol, 2005. **22**(2): p. 88-94.
11. Segal, J.B. and W.H. Dzik, *Paucity of studies to support that abnormal coagulation test results predict bleeding in the setting of invasive procedures: an evidence-based review*. Transfusion, 2005. **45**(9): p. 1413-25.
12. Strobel, D., et al., *Incidence of bleeding in 8172 percutaneous ultrasound-guided intraabdominal diagnostic and therapeutic interventions - results of the prospective multicenter DEGUM interventional ultrasound study (PIUS study)*. Ultraschall Med, 2015. **36**(2): p. 122-31.
13. Runyon, B.A., *Management of adult patients with ascites caused by cirrhosis*. Hepatology, 1998. **27**(1): p. 264-72.
14. Eisen, G.M., et al., *Guideline on the management of anticoagulation and antiplatelet therapy for endoscopic procedures*. Gastrointest Endosc, 2002. **55**(7): p. 775-9.

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15. Muller, M.C., et al., *Transfusion of fresh frozen plasma in non-bleeding ICU patients--TOPIC trial: study protocol for a randomized controlled trial*. *Trials*, 2011. **12**: p. 266.
16. Puchalski, J.T., et al., *The safety of thoracentesis in patients with uncorrected bleeding risk*. *Ann Am Thorac Soc*, 2013. **10**(4): p. 336-41.
17. Hibbert, R.M., et al., *Safety of ultrasound-guided thoracentesis in patients with abnormal preprocedural coagulation parameters*. *Chest*, 2013. **144**(2): p. 456-63.
18. Puchalski, J., *Thoracentesis and the risks for bleeding: a new era*. *Curr Opin Pulm Med*, 2014. **20**(4): p. 377-84.
19. Fisher, N.C. and D.J. Mutimer, *Central venous cannulation in patients with liver disease and coagulopathy--a prospective audit*. *Intensive Care Med*, 1999. **25**(5): p. 481-5.
20. Lauzier, F., et al., *Fresh frozen plasma transfusion in critically ill patients*. *Crit Care Med*, 2007. **35**(7): p. 1655-9.
21. Carino, G.P., A.V. Tsapenko, and J.D. Sweeney, *Central line placement in patients with and without prophylactic plasma*. *J Crit Care*, 2012. **27**(5): p. 529.e9-13.
22. Goldfarb, G. and D. Lebec, *Percutaneous cannulation of the internal jugular vein in patients with coagulopathies: an experience based on 1,000 attempts*. *Anesthesiology*, 1982. **56**(4): p. 321-3.
23. Doerfler, M.E., B. Kaufman, and A.S. Goldenberg, *Central venous catheter placement in patients with disorders of hemostasis*. *Chest*, 1996. **110**(1): p. 185-8.
24. Foster, P.F., et al., *Central venous catheterization in patients with coagulopathy*. *Arch Surg*, 1992. **127**(3): p. 273-5.
25. Hall, D.P., et al., *Factors associated with prophylactic plasma transfusion before vascular catheterization in non-bleeding critically ill adults with prolonged prothrombin time: a case-control study*. *Br J Anaesth*, 2012. **109**(6): p. 919-27.
26. Haas, B., J.L. Chittams, and S.O. Trerotola, *Large-bore tunneled central venous catheter insertion in patients with coagulopathy*. *J Vasc Interv Radiol*, 2010. **21**(2): p. 212-7.

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