Anticoagulation: Warfarin

Children's Mercy KANSAS CITY | Evidence Based Practice

Inclusion criteria:
- Therapeutic indication for warfarin management

Exclusion criteria:
- Hepatic failure
- Inability to tolerate oral medications
- Receiving contraindicated medications

Patient with indication for warfarin management

Warfarin Considerations for use

Indications for management:
- Treatment or prophylaxis of VTE, PE, and thromboembolic disorders
- Prevention of arterial thromboembolism in patients with mechanical prosthetic aortic and/or mitral valves or atrial fibrillation.

Adverse effects:
- Bleeding:
  - Most common event, refer to warfarin antidotes for management
- Skin rash and alopecia:
  - Uncommon
- Osteopenia:
  - Rare
- Skin necrosis:
  - Rare, often seen with HIT
  - Occurs due to inadequate anticoagulation with heparin or LMWH while initiating warfarin
  - Ensure two INRs > 2 prior to stopping heparin or LMWH for prevention of HIT
  - Watch for deficiencies in Protein C and S

Consult physician for any of the following:
- Significant changes in diet or formula intake
- New medications (e.g. antibiotics or over-the-counter)
- Changes in maintenance medications
- Infections
- Diarrhea and vomiting

Potential Drug Interactions:
- Amiodarone
  - **Loading dose** should be decreased by 25%
- See Table 6 for commonly used drugs in children that affect INR values; note warfarin dosing can be adjusted to permit use in some cases. Please consult Hematology for recommendations.
- Complementary/alternative medications with potential to ***increase*** warfarin effects include bromelains, danshen, dong quai, garlic, gingko biloba, ginseng and omega 3 fish oil.
- Complementary/alternative medications with potential to ***decrease*** warfarin effects include CoQ10 and St. John's Wort.

Initiation and Maintenance
- Indications for Hematology Consult
- Obtain baseline INR/PT, aPTT
- Refer to the following for dosing initiation and maintenance guidelines:
  - Initiation of Therapy Days 1 - 4
  - Continuation of Therapy - Day 5 Forward
  - Options for Obtaining Warfarin Doses with Available Strength
- Patient Education

Other considerations:
- Fast Facts
- Dietary Considerations
- Genotyping
- Avoid IM injections and arterial punctures
- Avoid contact sports
- Warfarin should be used with caution in preganancy. Teenagers should receive appropriate counseling. LMWH is the treatment of choice for teens requiring anticoagulation during pregnancy.
- For assistance transitioning between anticoagulants, contact Hematology

Guidance for holding prior to procedures:
- Hold warfarin for 2 doses prior to minor procedures; resume usual dose 24 hrs after
- Hold warfarin for 5 days prior to surgery/invasive procedures; resume warfarin **and** heparin/LMWH 12 to 24 hours after. Continue heparin/LMWH until INR is therapeutic for 2 consecutive days.
- For conditions necessitating more emergent intervention consult Hematology.
- Patients with mechanical/prosthetic mitral valves, atrial fibrillation or recent/recurrent thromboembolism require bridging with standard heparin or LMWH. Consult Hematology (or Cardiology as indicated).

Monitoring
- Target INR is 2 - 3 for most patients. Children with mechanical/prosthetic mitral valves or recurrent thrombotic events as described above should have a target INR between 2.5 - 3.5.
- Discontinue heparin/LMWH once the INR is therapeutic for 2 consecutive days ***and*** at least 6 days of heparin/LMWH have been given. Anticipate a small decline in INR the following day.
- INR/PT monitoring recommendations:
  - Obtain daily INR/PT until therapeutic range has been reached and sustained for 2 consecutive days (loading INR/PT monitoring protocol complete).
  - Obtain INR/PT within 3 days of discharge from the hospital.
  - Obtain INR/PT 5 - 7 days after initiating a new dose.
  - Once a stable INR between 2 - 3 (2.5 - 3.5 for mechanical/prosthetic mitral valves) has been noted on **two INRs taken 7 days apart,** INRs may be obtained **weekly**. When stable for 4 - 8 weeks, then go to INR every 2 - 4 weeks.
  - Recommend monitoring at least once a month when stable.

Duration of Therapy
- DVT with an underlying cause: 3 months, with possible extension based on clinical situation; consult Hematology
- Idiopathic DVT: 6 -12 months
- Mechanical heart valves: indefinite
- Recurrent thromboembolic events: indefinite
- Antiphospholipid antibody syndrome: indefinite

Abbreviations:
VTE = venous thromboembolism
HIT = heparin induced thrombocytopenia
LMWH = low molecular weight heparin

QR code for mobile view

Contact: EvidenceBasedPractice @cmh.edu

Link to Synopsis

Last Updated: 11/20/23

This clinical pathway is meant as a guide for physicians and healthcare providers. It does not establish a standard of care, and is not a substitute for medical judgment which should be applied based upon the individual circumstances and clinical condition of the patient. Printing of Clinical Pathways is not recommended as these documents are updated regularly. Copyright © The Children's Mercy Hospital 2023. All rights reserved.

References:

Ansell, J., Hirsh, J., Hylek, E., Jacobson, A., Crowther, M., & Palareti, G. (2008). Pharmacology and management of the vitamin K antagonists: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). *Chest*, *133*(6 Suppl), 160s-198s. https://doi.org/10.1378/chest.08-0670

Bolton-Maggs, P., & Brook, L. (2002). The use of vitamin K for reversal of over-warfarinization in children. *Br J Haematol*, *118*(3), 924. https://doi.org/10.1046/j.1365-2141.2002.03631_5.x

David, M., et al. (2004, May). Warfarin Therapy in Children. Thrombosis Interest Group of Canada. Retrieved Oct 21, 2008 from http://www.tigc.org/eguidelines/warfarinchildren04.htm.

Horton, J. D., & Bushwick, B. M. (1999). Warfarin therapy: evolving strategies in anticoagulation. *Am Fam Physician*, *59*(3), 635-646.

Lexicomp Online, Pediatric and Neonatal Lexi-Drugs. *Kcentra*. Retrieved Oct 2008, from https:online.lexi.com.

Lexicomp Online, Pediatric and Neonatal Lexi-Drugs. *Warfarin*. Retrieved Oct 2008, from https:online.lexi.com.

Monagle, P., Chan, A. K. C., Goldenberg, N. A., Ichord, R. N., Journeycake, J. M., Nowak-Göttl, U., & Vesely, S. K. (2012). Antithrombotic therapy in neonates and children: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest*, *141*(2 Suppl), e737S-e801S. https://doi.org/10.1378/chest.11-2308

Monagle, P., Cuello, C. A., Augustine, C., Bonduel, M., Brandão, L. R., Capman, T., Chan, A. K. C., Hanson, S., Male, C., Meerpohl, J., Newall, F., O'Brien, S. H., Raffini, L., van Ommen, H., Wiernikowski, J., Williams, S., Bhatt, M., Riva, J. J., Roldan, Y., . . . Vesely, S. K. (2018). American Society of Hematology 2018 Guidelines for management of venous thromboembolism: treatment of pediatric venous thromboembolism. *Blood Adv*, *2*(22), 3292-3316. https://doi.org/10.1182/bloodadvances.2018024786

Roach, E. S., Golomb, M. R., Adams, R., Biller, J., Daniels, S., Deveber, G., Ferriero, D., Jones, B. V., Kirkham, F. J., Scott, R. M., & Smith, E. R. (2008). Management of stroke in infants and children: a scientific statement from a Special Writing Group of the American Heart Association Stroke Council and the Council on Cardiovascular Disease in the Young. *Stroke*, *39*(9), 2644-2691. https://doi.org/10.1161/strokeaha.108.189696