

Anticoagulation Therapies & VTE Risk Assessment Clinical Pathways Synopsis

VTE Risk Assessment Algorithm

"Other" VTE Risk Factors

ACUTE CONDITIONS

- COVID/Multisystem inflammatory syndrome in children (MIS-C)
- Patient in ICU
- Acute infection either:
 - Known active viral infection
 - Current antibiotic treatment
- Burns
- Major lower extremity orthopedic surgery
- Major trauma
- Lower extremity central venous catheter
- Pregnancy
- Active cancer
- Spinal cord injury
- Acute inflammation
- Severe dehydration
- Protein-losing disorder

CHRONIC MEDICAL CONDITIONS

- Estrogen containing medications
- Obesity
 - Weight > 80 kg in age 12-16
 - Weight > 85 kg over age 16
- Inflammatory bowel disease
- Malignancy
- Nephrotic syndrome
- Known acquired or inherited thrombophilia
- Cyanotic heart disease or low flow states

HISTORICAL FACTORS

- Surgery within last 30 days
- Previous history of DVT/PE
- Family history of VTE in 1st degree relative < 40 yrs

CONTRAINDICATIONS TO ANTICOAGULATION

- Intracranial hemorrhage
- Infants at high risk for IVH/intracranial hemorrhage
- Ongoing and uncontrolled bleeding
- Uncorrected coagulopathy
- Incomplete spinal cord injury with suspected or known paraspinous hematoma
- Allergy to UFH or enoxaparin
- Heparin induced thrombocytopenia
- Thrombocytopenia
- Acute stroke or brain ischemia
- Inability to maintain platelet count above 30,000/mcL
- Epidural anesthesia
- Risk of invasive procedure within 24 hours
- Congenital bleeding disorder
- Uncontrolled severe hypertension
- Intracranial mass

• [Concern for Pulmonary Embolism](#)
• [Alteplase dosing](#)

The provider must document, if the patient does not receive the therapies indicated by this algorithm.

Definitions

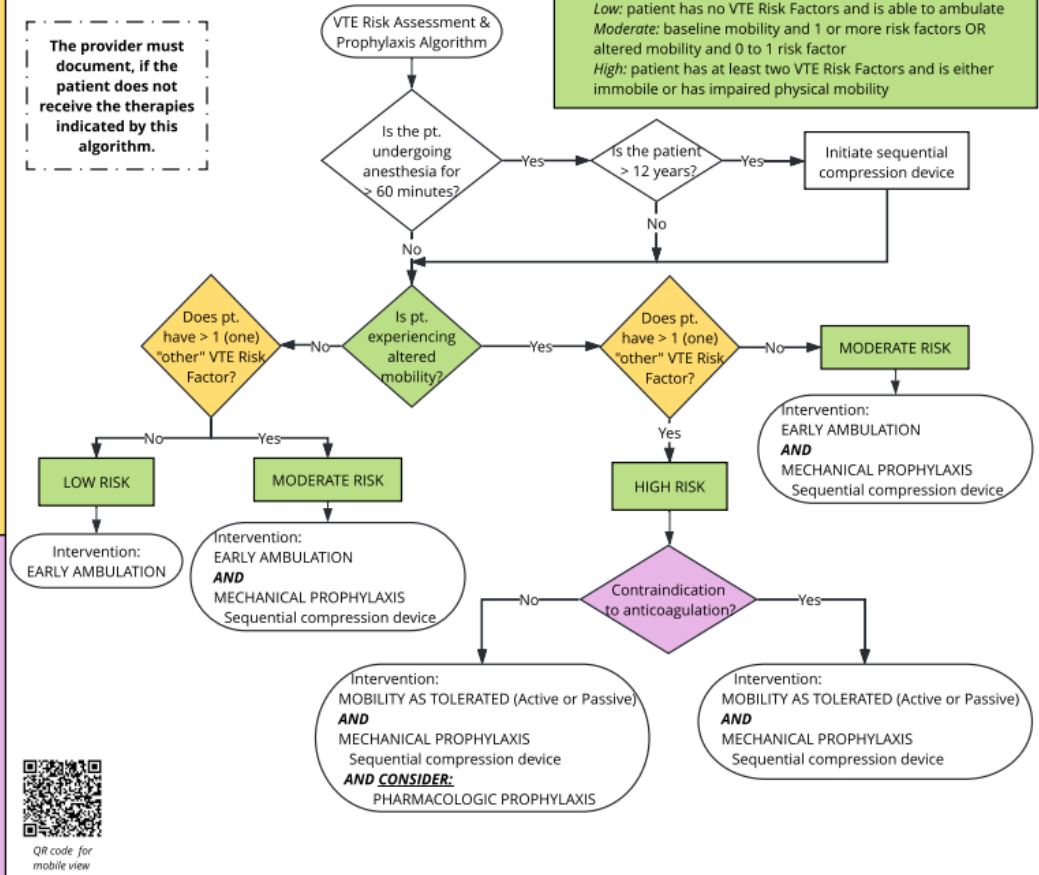
Altered Mobility: refers to either a permanent or temporary state in which the patient has a limitation in independent, purposeful physical movement of the body or of one or more extremities

Levels of Risk:

Low: patient has no VTE Risk Factors and is able to ambulate

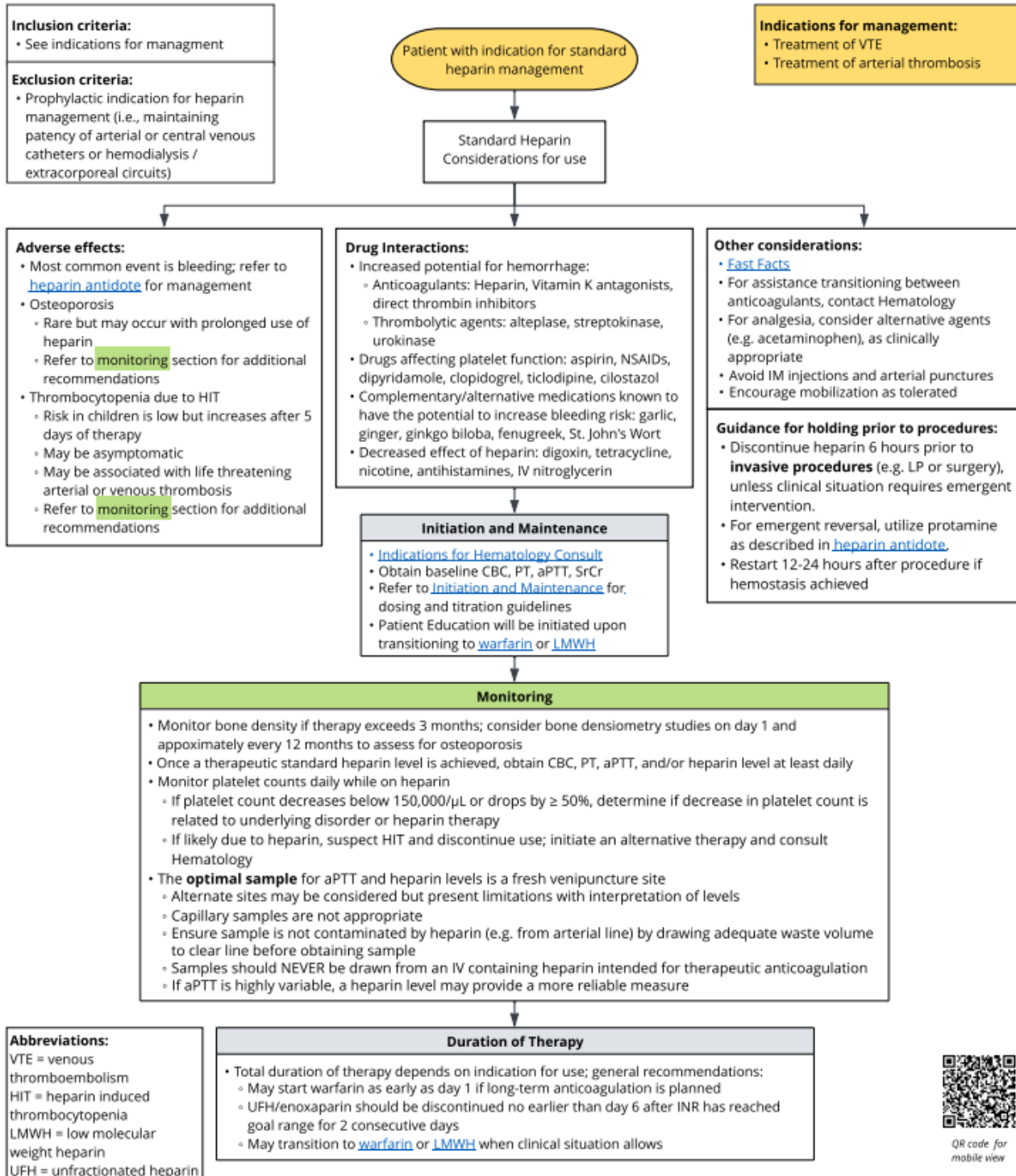
Moderate: baseline mobility and 1 or more risk factors OR altered mobility and 0 to 1 risk factor

High: patient has at least two VTE Risk Factors and is either immobile or has impaired physical mobility

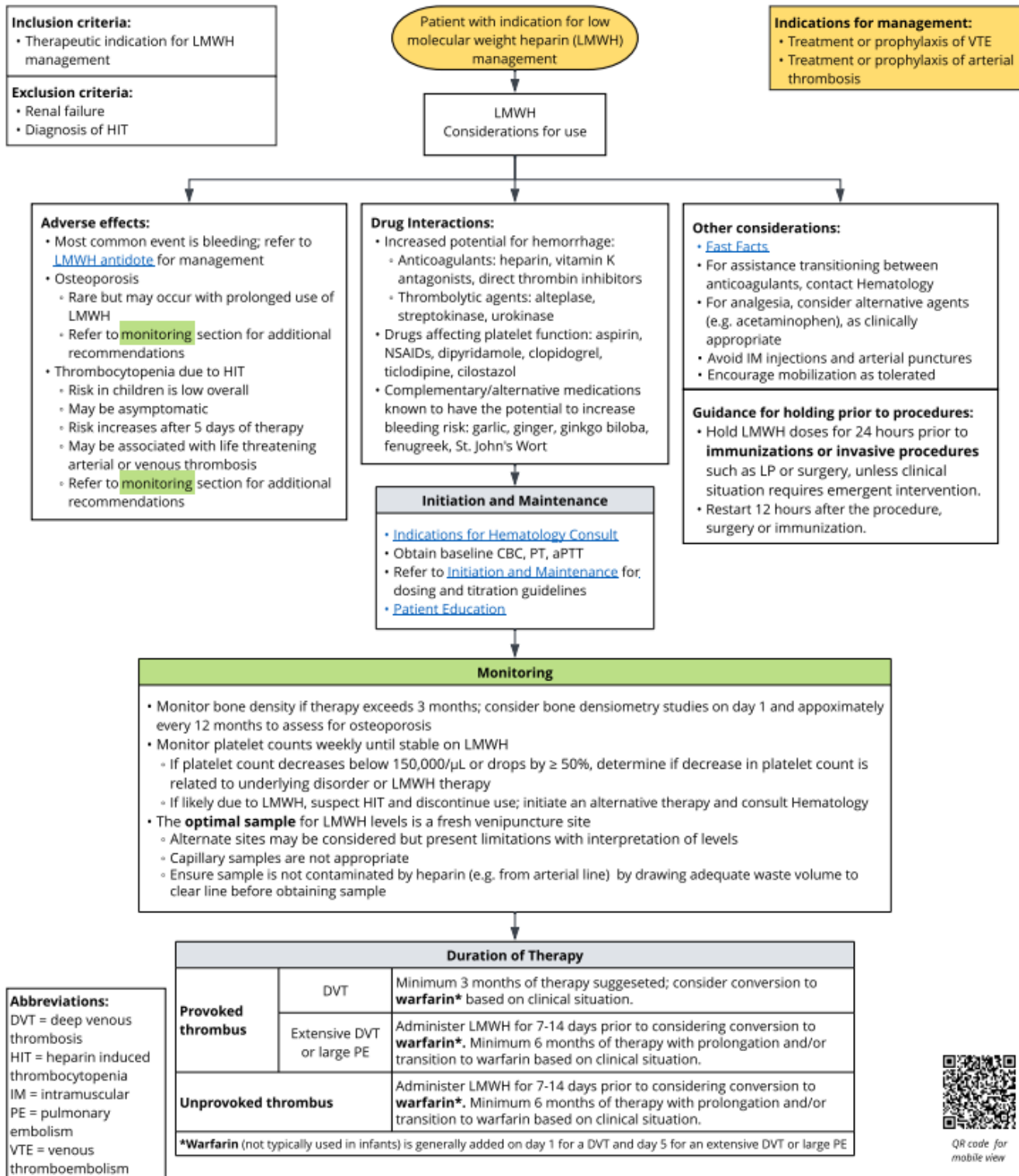


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Standard Heparin Algorithm

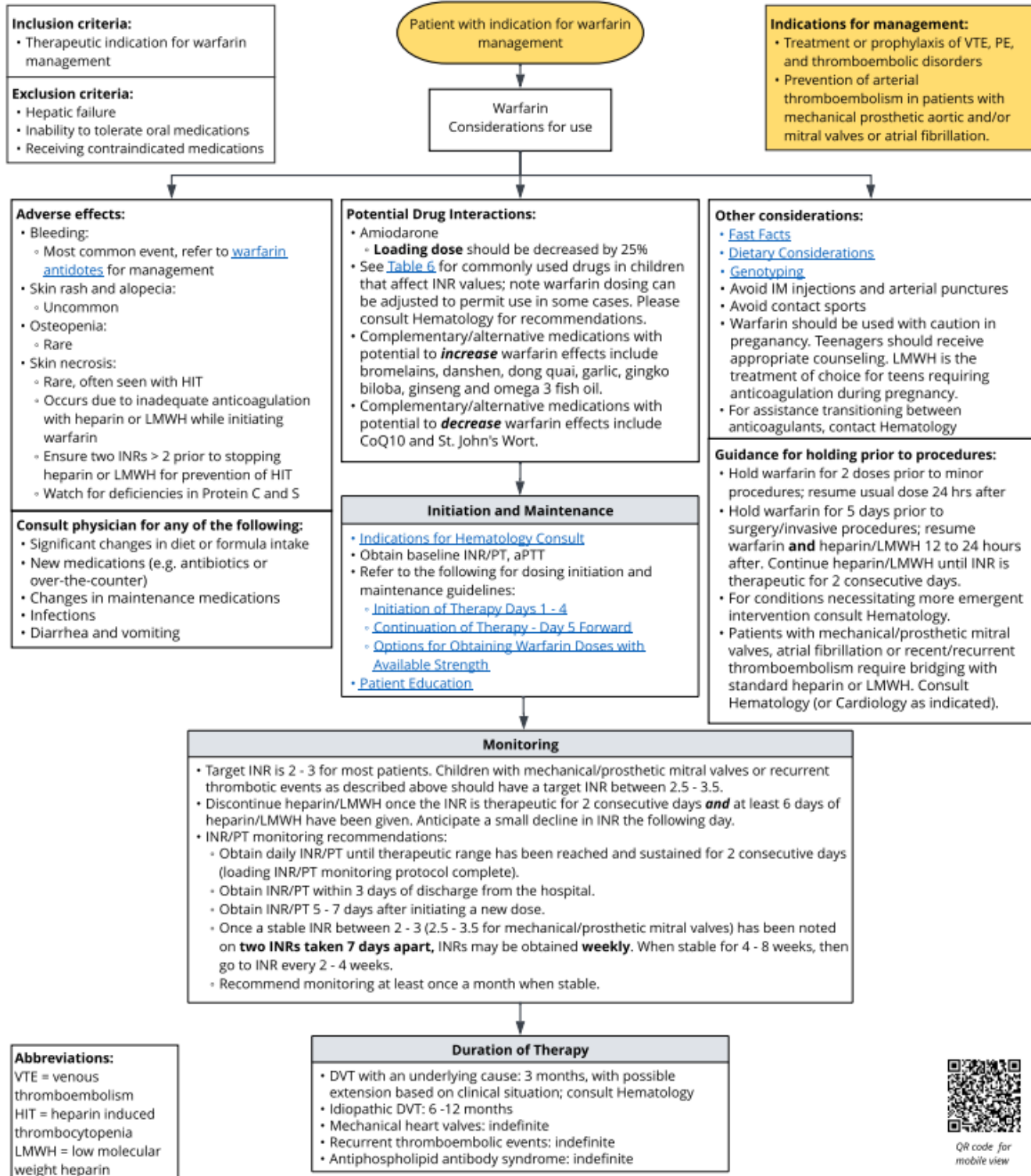


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Low Molecular Weight Heparin Algorithm


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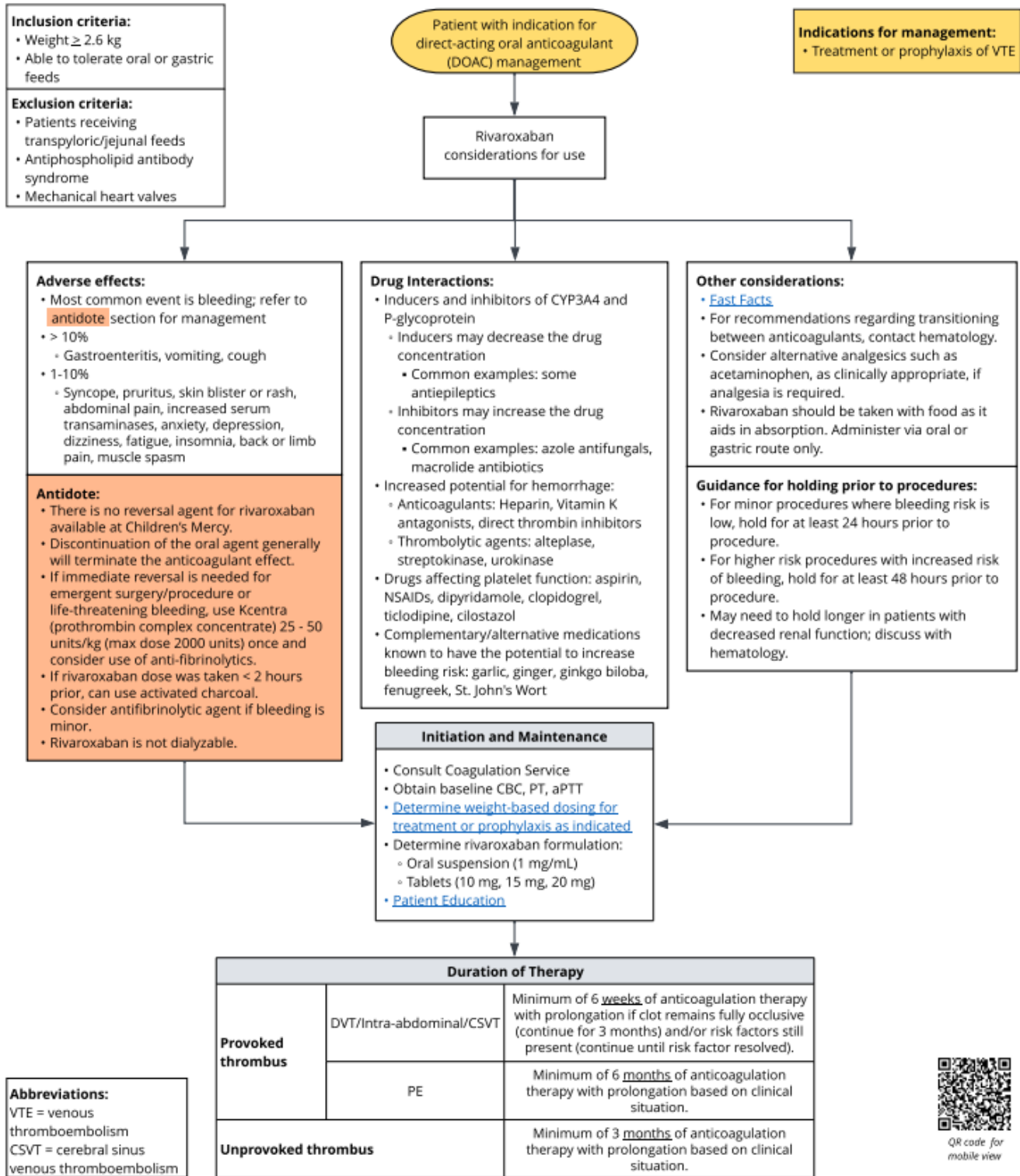
Warfarin Algorithm



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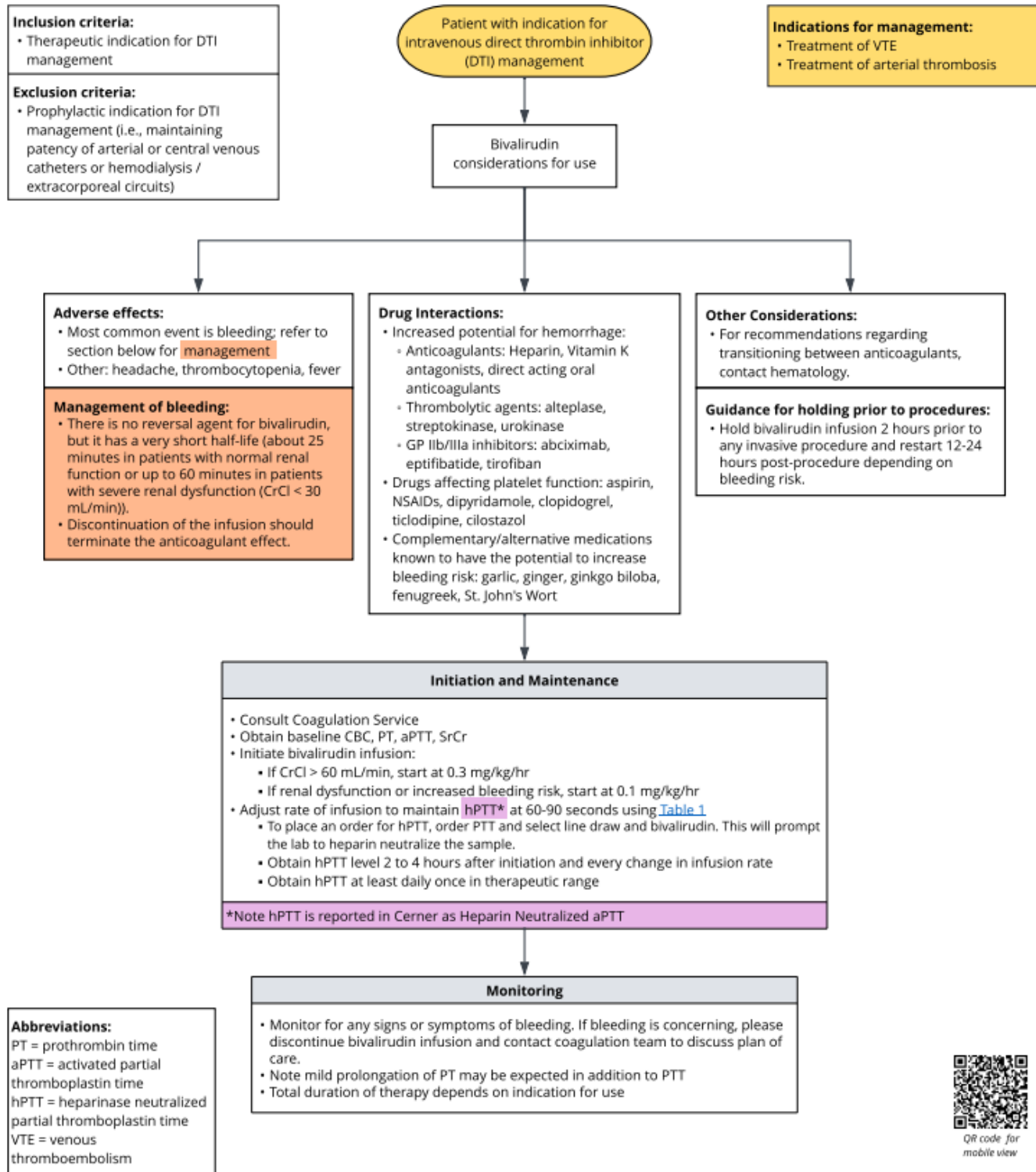


Rivaroxaban Algorithm



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Bivalirudin Algorithm



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Objective of Clinical Pathway

To provide care standards for patients requiring anticoagulation therapy for treatment or prophylaxis. The Anticoagulation Therapies & VTE Risk Assessment Clinical Pathways provide guidance regarding initiation of therapy and ongoing management to enhance patient safety and minimize variation of care.

Background

Hospitalized children may require anticoagulation therapy for a variety of indications. Although the incidence of venous thromboembolism (VTE) in children at a population level is very low, reported to be 0.07 to 0.14 per 10,000; in hospitalized children, the rate is increased 100 to 1000 times, to 58 per 10,000 admissions (Monagle et al., 2018). Anticoagulant therapy for venous or arterial thromboembolism requires balancing the risks of recurrent clot formation with bleeding (Goldenberg et al., 2022). Decision making must take into account a variety of complex issues including drug interactions, adverse effects, timing of administration, dose adjustments, and duration of therapy.

Due to the potential complexities of VTE management and paucity of pediatric data, the Anticoagulation Therapies & VTE Risk Assessment Clinical Pathway Committee developed these pathways to guide providers through recommendations for consultation, initiation, maintenance, and monitoring of anticoagulation therapy.

Target Users

- Physicians (Hospital Medicine, Fellows, Residents)
- Nurse Practitioners
- Nurses
- Pharmacy

Target Population***Inclusion Criteria***

- Patients requiring anticoagulation therapy or prophylaxis

Exclusion Criteria

- Patients on ECMO, cardiac bypass pump, hemodialysis or continuous renal replacement therapy
- Patients requiring anticoagulation to maintain patency of arterial or central venous catheters

Practice Recommendations

Practice recommendations are based on consensus among providers with knowledge of the existing evidence and expertise in the initiation, maintenance, and monitoring of anticoagulation therapy.

Additional Questions Posed by the Clinical Pathway Committee

No clinical questions were posed for this review.

Value Implications

The following improvements may increase value by reducing healthcare costs and non-monetary costs (e.g., missed school/work, loss of wages, stress) for patients and families and reducing costs and resource utilization for healthcare facilities.

- Decreased risk of inappropriate treatment or laboratory assessments
- Decreased frequency of complications associated with anticoagulant use
- Decreased unwarranted variation in care

Organizational Barriers and Facilitators***Potential Barriers***

- Variability of acceptable level of risk among physicians and nurses

Potential Facilitators

- Collaborative engagement across care continuum settings during clinical pathway development

Power Plans

- LMW Heparin (Enoxaparin) Initiation and Maintenance
- ICN LMW Heparin (Enoxaparin) Initiation and Maintenance

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- Heparin Management (Initiation and Maintenance)
- ICN Heparin Management (Initiation and Maintenance)

Policies

- Anticoagulation Management

Clinical Pathway Preparation

This pathway was prepared by the Evidence Based Practice (EBP) Department in collaboration with the Anticoagulation Therapies & VTE Risk Assessment Clinical Pathway Committee composed of content experts at Children's Mercy Kansas City. The development of this pathway supports the Quality Excellence and Safety Division's initiative to promote care standardization that is evidenced by measured outcomes. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

Anticoagulation Therapies & VTE Risk Assessment Clinical Pathway Committee Members and Representation

- Shannon Carpenter, MD, MS | Hematology/Oncology/BMT | Committee Chair
- Lauren Amos, MD | Hematology/Oncology/BMT | Committee Member
- Sara McElroy, MD | Hematology/Oncology/BMT Fellow | Committee Member
- Thomas Cochran, MD | Hematology/Oncology/BMT Fellow | Committee Member
- Michael Rose, PharmD | Pharmacy | Committee Member

EBP Committee Members

- Todd Glenski, MD, MSHA, FASA | Anesthesiology, Evidence Based Practice
- Jarrod Dusin, MS, RD, CPHQ | Evidence Based Practice
- Kori Hess, PharmD | Evidence Based Practice

Clinical Pathway Development Funding

The development of this clinical pathway was underwritten by the following departments/divisions: Hematology/Oncology/BMT, Pharmacy, and Evidence Based Practice.

Conflict of Interest

The contributors to the Anticoagulation Therapies & VTE Risk Assessment Clinical Pathways have no conflicts of interest to disclose related to the subject matter or materials discussed.

Approval Process

- This clinical pathway was reviewed and approved by the content experts from related departments/divisions, and the EBP Department.
- Pathways are reviewed and updated as necessary every 3 years within the EBP Department at CMKC. Content expert teams are involved with every review and update.

Review Requested

Department/Unit	Date Obtained
Hematology/Oncology/BMT	November 2023
Pharmacy	November 2023
Evidence Based Practice	November 2023

Version History

Date	Comments
2016	Low Molecular Weight Heparin (version one) Standard Heparin (version one) Warfarin (version one)
February 2023	Low Molecular Weight Heparin (version two) Standard Heparin (version two) Warfarin (version two)
September 2023	Rivaroxaban (version one)

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	Bivalirudin (version one)
November 2023	Low Molecular Weight Heparin (version three- updated algorithm template) Standard Heparin (version three- updated algorithm template) Warfarin (version three- updated algorithm template) Synopsis created (version one) COVID-19 VTE prophylaxis (version one)

Date for Next Review

- September 2026

Implementation & Follow-Up

- Once approved, the pathway was presented to appropriate care teams and implemented. Care measurements will be assessed and shared with appropriate care teams to determine if changes need to occur.
- Additional institution-wide announcements were made via email, hospital website, and relevant huddles.
- Metrics will be assessed and shared with appropriate care teams to determine if changes need to occur.

Disclaimer

When evidence is lacking or inconclusive, options in care are provided in the supporting documents and the power plan(s) that accompany the clinical pathway.

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