

Treatment of venous thromboembolism in pediatric patients. Witmer C, Raffini L. *Blood*. 2020 Jan 30;135(5):335-343. doi: 10.1182/blood.2019001847

**Background:** Venous thromboembolism (VTE) is rare in healthy children, but is an increasing problem in children with underlying medical conditions. Factors driving this include more invasive technologies in children with underlying medical conditions and heightened awareness. VTE may lead to pulmonary embolism (PE), paradoxical emboli and stroke, organ dysfunction, infection, post thrombotic syndrome (PTS), loss of venous access, pain and occasionally death.

**Objective :** Treatment options for VTE include observation, anticoagulation, or thrombectomy (pharmacologic, pharmaco mechanical, or surgical). When weighing options, risk of complications from the thrombus need to be balanced against risk of treatment, taking into consideration the patient's age, underlying hemostatic system and comorbidities. This article summarizes treatment recommendations available from various guidelines including the 2018 ASH Guidelines for treatment of pediatric VTE.

# ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet



## Treatment of Venous Thromboembolism in Pediatric Patients

### Clinical observations :

**1) Anticoagulation:** Dalteparin, a LMWH, approved by FDA for use in patients >1 month of age. LMWH is generally preferred over unfractionated heparin (UFH). UFH is usually reserved for patients at highest risk of bleeding or in renal failure because of its short half-life, reversibility (with protamine), and non renal clearance. Oral anticoagulants: Warfarin remains the mainstay for oral anticoagulation in pediatric patients. Adult guidelines for treatment of VTE now recommend DOACs over warfarin. The 2018 ASH guidelines for pediatric VTE recommend that DOACs not be used in children until completion of clinical trials.

**2) Thrombolysis :** Therapy is generally reserved for limb-, life-, or organ-threatening events. VTE that fits these criteria is rare, but include bilateral renal vein thrombosis, superior vena cava syndrome, cerebral sinovenous thrombosis with neurologic decline, extremity deep vein thrombosis with pending limb ischemia, intracardiac thrombi causing cardiovascular instability, and massive pulmonary embolism

**3) Duration of therapy :** Pediatric guidelines recommend treating provoked VTE for a maximal duration of 3 months. Treating CVAD-VTE for a shorter duration (generally 6 weeks) has become common in many centers, despite little evidence. Patients that warrant consideration of longer duration therapy include those with antiphospholipid antibody syndrome, life-threatening index VTE, strong/combined inherited thrombophilia, or recurrent unprovoked VTE.

## EXPERT COMMENT



There is heterogeneity in clinical presentation of patients with VTE and the progress in making clinical guidelines based on pediatric trials has been slow. Much of the data has been extrapolated from adult trials. Given the benefits of DOACs compared with warfarin or enoxaparin they are being increasingly used on off label basis. Availability of safe and effective oral agents with pediatric data to support use would be of clear benefit for which international registries are warranted. Hopefully, in coming years we see more pediatric data and have clinical guidelines based on it for pediatric patients”

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### Reference

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