

LRI Children's Hospital

Venous Thromboembolism (VTE) Prophylaxis in Children

Staff relevant to:	All staff caring for patients admitted to UHL Children's Hospital
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1. Introduction and Who Guideline applies to

This guideline is for all paediatric patients admitted to the children's hospital (excluding neonates). All children under the age of 16 yrs should have a VTE risk assessment completed on admission to hospital this should be reassessed every third day during the

admission or if risk factors change. 16yrs and over should have an adult VTE risk assessment completed.

Venous thrombosis is substantially lower in children compared with adults. Several factors may protect children from VTE, contributing to the relatively lower incidence. However Venous thromboembolism (VTE) is increasingly recognised in the paediatric population due to an increase in the use of central venous catheters; the most common risk factor for VTE in children. Other risk factors include immobility, sepsis and malignancy etc. In hospitalised children, 80% of VTE is provoked, occurring in patients with more than one risk factor.

Although venous thrombosis may occur all through childhood, there are 2 peak age groups at risk for VTE, these being neonates (use of central venous catheters) and >13 years adolescents/teenagers due to physiological changes in the coagulation system and an increase in risk factors such as; smoking, obesity, OCP. The incidence of VTE then increases significantly throughout adult life.

Related Guidelines

[Diabetic Ketoacidosis \(DKA\) Quick Reference UHL Childrens Intensive Care Guideline C67/2019](#)

[Diabetes \(Including Diabetic Ketoacidosis\) UHL Childrens Hospital Guideline C10/2019](#)

[Thromboprophylaxis Post Congenital Heart Surgery UHL Childrens Intensive Care Guideline C44/2016](#)

[Nephrotic Syndrome UHL Childrens Medical Guideline E4/2019](#)

[Paediatric Inflammatory Multisystem Syndrome – Temporally Associated with SARS-CoV-2 \(PIMS-TS\) UHL Childrens Guideline D4/2020](#)

2. Guideline Standards and Procedures

Thromboprophylaxis describes the use of various measures to reduce the risk of thrombosis:

- Early mobilization of post-surgery patients
- Optimal hydration – Oral or Intravenous
- Mechanical interventions such as compression stockings (>40kg)
- Pharmacological Thromboprophylaxis, usually with Low molecular weight heparin (LMWH)

When considering which patients should be offered Thromboprophylaxis, the perceived risk of thrombosis should be assessed (see risk factor chart page 4), as should the risk of intervention, particularly if heparin is being considered.

The VTE risk assessment chart is shown below and serves as a basis for the consideration of Thromboprophylaxis in all patients considered being at an increased risk of VTE. More complex patients and those <13yrs should be discussed on an individual basis with haematology.

Note

- Patients with Nephrotic syndrome and PIMS-TS should be considered for LMWH Thromboprophylaxis please refer to the specific guidelines linked above.
- Complex cardiac abnormalities/procedures should be managed individually lead by their consultant and liaison with haematology

Thromboprophylaxis does not entail giving heparin to all patients and it would be anticipated that only a minority will require pharmaceutical Thromboprophylaxis.

Mechanical Thromboprophylaxis

- For those paediatric patients with >1 risk factor (see page 4 for risk factors) should be considered for TED stockings as per flow chart (see page 3). These are only suitable for older children (and >40kg).
- Graduated compression stockings reduce lower limb venous stasis and increase blood velocity but do not increase the risk of bleeding
- If using TEDs it is essential that they are correctly fitted and contraindications considered e.g. poor skin quality, arterial compromise
- There are paediatric sizes but note the minimum circumference is 26.4cm which is the relaxed circumference of the smallest stocking available

Pharmacological Thromboprophylaxis

- Should be considered for children that have 3 risk factors or more for VTE (see page 4)
- LMWH is the anticoagulant of choice currently for VTE prophylaxis
- LMWH is administered subcutaneously
- Check base line full blood count and coagulation screen before starting LMWH
- Maintain platelet count >75 x10⁹/l and fibrinogen >1g/l for full dose heparin to be given
- Note Dalteparin is the LMWH currently used in UHL
- Dose as per BNF; Child 1 month – 11 years 100 units/kg OD, Child 12 – 17 years 2500 – 5000 units/kg OD
- Note Dalteparin is administered OD in prophylaxis and BD in treatment
- Aim for a prophylactic anti Xa level of 0.1-0.3units/ml, 3-4 hours after administration of dose
- Level should be checked weekly in in patients if patient is otherwise stable
- When the Heparin assay is taken it should be 4 hours post dose, the tube should be appropriately filled and walked to the lab – level 4 Sandringham building for analysis
- When requested please state which heparin i.e. Dalteparin the patient is on and the time the last dose was given
- Heparins are renally excreted and therefore children with altered creatinine clearance may need closer monitoring and these patients should be discussed with a haematologist
- If surgery/procedure is required for a patient receiving LMWH, it is recommended that 2 doses of are omitted prior to surgery, i.e. the morning dose is given on the day before surgery, with LMWH then being restarted post-surgery if responsible team are happy the patient is haemostatically secure.

It should be noted that there is little evidence base to support the use of LMWH prophylaxis in childhood and no validated guidance for who should receive LMWH. Therefore any child <13yrs with 3 or more risk factors and LMWH is being considered should be discussed with Haematology.

Risk assessment for Venous Thromboembolism (VTE) in Paediatric patients <16yrs

Assess all patients aged <16 years on admission to hospital (those 16yrs+ to have an adult risk assessment)

Expect significantly reduced mobility >48 hours

Assess for all thrombosis risk factors* and tick all that apply ([see table page 5](#))

No other risk factor
LOW RISK

1-2 risk factor
MODERATE RISK

3+ risk factors
HIGHER RISK

Ensure adequate hydration, mobilise early, reduce risk factors where present, remove CVC where possible

AND
Consider mechanical prophylaxis in older children (>40kg) and only if tolerated
Graduated compression stockings/TEDS measured for correct sizing and application until mobile (minimum size 26.4cm calf circumference)
And/or

EXCLUDES

- Patients age 16 years & over (16+ assessed on adult proforma)
- Current thrombosis
- Neonates

Assess bleeding risk*, tick all that apply ([see assessment form page 5](#))

BLEEDING RISK
LMWH
CONTRAINDICATED
Consider mechanical prophylaxis

NO BLEEDING RISK
CONSIDER Low Molecular Weight Heparin Dalteparin;
Child 1 month – 11 years 100 units/kg OD
Child 12 – 17 years 2500 units/kg OD

Reassess at 48 and 72 hours

Children's Hospital VTE risk assessment form

Date of admission	PLEASE AFFIX PATIENT LABEL HERE
Risk assessed by	
Signature	
Designation	
Date	

Review the patient related factors shown on the assessment sheet for thrombosis risk, ticking each and any box that applies. Clinicians may consider further risks apply in addition to those listed.

Bleeding risk

Patient related	Tick	Admission related	Tick
Acquired bleeding disorders (such as acute liver failure)		Neurosurgery, spinal surgery or eye surgery, Cardiac	
Untreated inherited bleeding disorders (such as haemophilia and Von Willebrand Disease)		Lumbar puncture/epidural/spinal anaesthesia expected within the next 12 hours	
Concurrent use of anticoagulants known to increase the risk of bleeding (such as warfarin with INR>2)		Lumbar puncture/epidural/spinal anaesthesia within the previous 24 hours	
Thrombocytopenia (platelets <75)		Active bleeding	
Uncontrolled systolic hypertension (>230/120 mmHg)			

Thrombosis Risk

Patient related	Tick	Admission related	Tick
Central venous catheter		Significantly reduced mobility for 3 days or more	
Active cancer or cancer treatment		Severe trauma with IS (Injury Severity Score)>9	
Dehydration		Spinal cord injury with paralysis	
Known thrombophilia		Total anaesthetic + surgical time > 60 minutes	
Obesity (BMI>30 kg/m ²)		Acute severe sepsis	
One or more significant medical conditions (e.g. congenital or low output heart disease, sickle cell disease, metabolic or inflammatory conditions)			
Parental/family history of VTE age <40 years		Critical care admission, intubated and ventilated	
Use of oestrogen containing contraceptive therapy		Severe burns	
Pregnancy or <6 weeks post-partum (NICE 2018)			

If an increased risk of bleeding is documented on the risk assessment – thromboprophylaxis with LMWH is relatively contraindicated.

Prescribe the appropriate intervention if required and complete all the prescription chart documentation

Outcome (tick all that apply)	Tick
No Thromboprophylaxis	
Mechanical Thromboprophylaxis	
Low Molecular Weight Heparin (LMWH)	
Risk Assessment Score	
Completed by:	Date:

3. Education and Training

None

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Assessment complete on admission	NerveCentre assessment completion data	Consultant lead	monthly	Children's Quality & Safety Board
Appropriate prophylaxis prescribed	Audit of medical records	Consultant lead	monthly	Children's Quality & Safety Board

5. Supporting References

Anticoagulation protocols for Birmingham Children's Hospital March 2020

<https://www.apagbi.org.uk/sites/default/files/inline-files/APA%20Thromboprophylaxis%20guidelines%20final.pdf>

<https://b-s-h.org.uk/guidelines/guidelines/investigation-management-and-prevention-of-venous-thrombosis-in-children/>

<https://ashpublications.org/bloodadvances/article/2/22/3292/16093/American-Society-of-Hematology-2018-Guidelines-for>

[https://www.bjaed.org/article/S2058-5349\(19\)30084-8/pdf](https://www.bjaed.org/article/S2058-5349(19)30084-8/pdf)

6. Key Words

Heparin, Mechanical Thromboprophylaxis, Pharmacological Thromboprophylaxis, TEDS

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs. As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

Contact and review details	
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