Blackpool Teaching Hospitals
NHS Foundation Trust

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Title: **DALTEPARIN for Treatment of Venous Thromboembolism**		**Version Number:** 3
		Status: Ratified
Target Audience: Trust Wide		**Divisional and Department:** Pharmacy
Author / Originator and Job Title: Jennifer Walters – Lead Pharmacist, Surgery		**Risk Assessment:** Not Applicable
Replaces: Version 2	**Description of amendments:** Reviewed and updated as V2 expired	
Validated (Technical Approval) by: VTE Committee	**Validation Date:** 29/06/2018	**Which Principles of the NHS Constitution Apply?** 1-4
Ratified (Management Approval) by: Medicines Management and Safety Review Committee	**Ratified Date:** 16/08/2018	**Issue Date:** 16/08/2018
Review dates and version numbers may alter if any significant changes are made		**Review Date:** 01/08/2021

Blackpool Teaching Hospitals NHS Foundation Trust aims to design and implement services, policies and measures that meet the diverse needs of our service, population and workforce, ensuring that they are not placed at a disadvantage over others. The Equality Impact Assessment Tool is designed to help you consider the needs and assess the impact of your policy in the final Appendix.

CONTENTS

1 PURPOSE

To provide a Dalteparin dosing guide for the treatment of venous thromboembolism.

To reduce the treatment dose errors with Dalteparin.

2 TARGET AUDIENCE

Trust wide

2.1 Exceptions - Children and Neonates

The use of Low molecular weight heparin (LMWHs) in paediatrics and neonates is outside the scope of this procedure.

LMWH products are currently not licensed for use in children and dosing may require specialist advice. Liaise with tertiary paediatric centres for advice about anticoagulation.

2.2 Exceptions – Pregnancy

For dosing advice in pregnant patients refer to the Obstetric / Gynaecology policies and procedures. Pregnant patients must be managed by a Specialist Obstetrics / Gynaecology consultant.

3 PROCEDURE

3.1 Background

Low molecular weight heparins (LMWHs) are used in the prevention and treatment of venous thromboembolism (VTE) and treatment of acute coronary syndromes. These medicines are given parenterally. LMWHs offer many advantages over regular unfractionated heparin. They are seen as effective, with a low risk of heparin-induced thrombocytopaenia. Routine monitoring of anti-Factor Xa (anti-Xa) activity is not usually required during treatment with LMWHs, although it may be necessary in patients at increased risk of bleeding, such as those with renal impairment and those who are under or overweight.

Patients can potentially be discharged home with dalteparin because of its long duration of action and subcutaneous administration, thereby shortening their stay in hospital.

When used for the treatment of a thromboembolic event the dose is dependent on the weight of the patient. Treatment dose regimens are also dependent on the clinical indication for therapy – under-dosing can lead to an increased risk of a further thromboembolic event, while overdosing can increase the risk of bleeding, leading to serious consequences for the patient.

Dalteparin is the LMWH of choice for the treatment of VTE at Blackpool Teaching Hospitals, therefore this procedure details the dosing regimens for Dalteparin only.

3.2 Drug Information

British National Formulary (BNF) (intranet)

Dalteparin - Summary of Product Characteristics (SPC)
https://www.medicines.org.uk/emc/product/4243/smpc

Dalteparin - Patient Information Leaflet https://www.medicines.org.uk/emc/product/4243/pil

3.3 Directorate Manager's/Head of Services Responsibility

3.3.1 It is the responsibility of the Directorate Managers/Head of Services to ensure the availability of appropriate weighing equipment. Hoists or under-bed weighing scales must be available for patients who are bedbound or too ill. Weighing scales which are broken or unreliable must be removed and replaced. Risk department provide a weighing service for community for restricted mobility patients.

3.3.2 Healthcare staff with responsibilities of weighing patients must have training on the correct weighing procedure, especially in patients with poor mobility. Also they must have guidance on how to use the weighing equipment.

3.3.3 Staff must have access to the information on weight-based dosing to check prescriptions.

3.4 Prescriber's Responsibility

3.4.1 The prescriber must check for history of bleeding risk, acute peptic symptoms or other contraindications.

The prescriber must individually assess the patient as to whether the benefits outweigh the risks for pharmacological or clinical contraindications to the use of LMWHs. Patient harm has resulted from using LMWHs when contraindicated.

3.4.2 Circumstances when the use of LMWHs are contraindicated include (but are not limited to):

- active bleeding;
- acquired bleeding disorder (such as acute liver failure);
- concurrent use of anticoagulants known to increase risk of bleeding;
- concurrent use of antiplatelets
- and other interacting medicines;
- or, lumbar puncture / epidural / spinal anaesthesia within the previous four hours, or expected within the next 12 hours.

3.4.3 The prescriber must check if the patient is on drugs that may prolong bleeding time or affect platelet function. The use of concurrent anti-platelets or other interacting medicines with a LMWH (dalteparin) must outweigh the risk of

bleeding. If the clinical decision is to co-prescribe it must be clearly documented in the patients' medical notes, with the clinical justification.

3.4.4 The prescriber must understand the dosing requirements for vulnerable patients (renally impaired, pregnant, children).

3.4.5 The prescriber must prescribe a dalteparin dose based on an up to date and accurate (see 3.8) patient weight and renal function.

3.4.6 The prescriber must give patients adequate information about their condition and their treatment and ensure it is understood, by allowing them time to ask questions.

3.4.7 The prescriber who initiates dalteparin must arrange for the patient to have baseline blood tests Full Blood Count (FBC), Liver Function Tests (LFTs); Renal Function, Urea and Electrolytes (U&E's) and ensure the results are reviewed. These tests should be repeated if there is a change in patients' clinical condition. Platelet count should be repeated 24 hours after initiation of dalteparin.

3.4.8 The prescriber must document in patients notes and communicate to General Practitioner (GP);

- clinical indication
- weight
- FBC, U&Es and LFTs
- renal function (creatinine clearance not eGFR)
- dose
- duration of treatment / therapeutic goal for therapy
- baseline FBC results
- dates for follow up blood tests.

3.5 Heparin Induced Thrombocytopenia (HIT)

3.5.1 Guidelines on the diagnosis of HIT can be found on the BCSH website:

https://b-s-h.org.uk/guidelines/guidelines/diagnosis-and-management-of-heparin-induced-thrombocytopenia-second-edition/
and in the Trust document Management of Heparin Induced Thrombocytopenia
http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/CORP-PROC-639.docx

Heparin induced thrombocytopenia (low platelets) is an uncommon but potentially life-threatening complication. If the platelet count falls by 30% or more and/or the patient develops new thrombosis or skin allergy or any of the other rarer manifestations of heparin-induced thrombocytopenia (HIT) between days 4 and 14 of heparin administration, HIT should be considered and a clinical assessment made. (See Trust document CORP/PROC/639 and contact Haematology).

Patients who are to receive any heparin should have a baseline platelet count and then a repeat 24hours after initiation of heparin.

3.6 Hyperkalaemia

LMWH treatment may cause hyperkalaemia. Patients with chronic renal failure, diabetes or those taking potassium sparing medication e.g. spironolactone, Angiotensin-Converting Enzyme (ACE) inhibitors are more susceptible.

3.7 Intramuscular Injections

Avoid intramuscular injections whilst on treatment doses of LMWH as there is a risk of haematoma.

3.8 Dalteparin - Dose is dependent on the patient's weight

3.8.1 It is important that an up to date and accurate weight is obtained. (See Appendix 1 Standards of weighing equipment and Staff Training). Healthcare professionals must not visually estimate a patient's weight. All healthcare staff involved in weighing patients must be trained on the weighing equipment and the correct weighing procedure.

3.8.2 The patient's weight must be accurately recorded in kilograms (kg) on the front of the in-patient medication chart, on out-patient prescriptions, on e-discharge prescriptions and the clinical record

3.8.3 Patients must be weighed at the start of therapy and, where applicable (e.g. if weight loss or gain during prolonged treatment), re-weighed during treatment.

3.8.4 When patients are unable to stand or are confined to their beds use equipment such as hoists with weighing scales ask Senior Nursing staff or the Risk department for advice.

3.9 Dalteparin - Dose is dependent on the patient's renal function

3.9.1 Dalteparin is renally excreted so must be used with caution in patients with reduced renal function.

3.9.2 The renal function test should not delay initiation of the first dose but every effort must be made to base subsequent doses on the result.

3.9.3 The Serum Creatinine level must not be used to estimate renal function. A Creatinine Clearance (Cr Cl) must be calculated. If the calculated CrCl is less than 30ml/min, then the prescriber must contact the on-call Consultant Haematologist for advice.

3.10 Dalteparin – Adults VTE treatment dose (Non-Pregnant)

VTE Treatment Poster is available on SharePoint.

VTE Treatment Dalteparin Dose	
Body Weight (kg)	**Units**
Under 46	**7,500**
46 – 56	**10,000**
57 – 68	**12,500**
69 – 82	**15,000**
83 and over	**18,000**
The single daily subcutaneous dosage should NOT exceed 18,000 units	

3.11 Communication at Discharge or Transfer

Patients who are discharged from hospital on dalteparin are still under routine care of the hospital specialist unless the GP has agreed to take over management (see shared care guideline http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/CORP-GUID-456.docx).

On the e-discharge or out-patient prescription, the prescriber must document:

Clinical indication ..... *e.g. Deep Vein Thrombosis (DVT)*

Weight..... *e.g. 49kg*

Renal function result ..... *e.g. Cr Cl 90 ml/min*

Dose ..... *e.g. 10000 units*

Duration of treatment / therapeutic goal for therapy ..... *e.g. 3 months*

Baseline Blood Test Results and dates taken

Dates for follow up blood tests

Prior to discharge the patient **must** be supported to self-administer their medication and provided with all required information and advice. They must be given appropriate training and education, and have been assessed as competent to undertake the procedure safely.

On discharge consider whether the patient requires further support following full advice and training on administration of their medication prior to leaving the ward setting. If they are unable to self-administer, complete a District Nurse referral online, this must contain the above information including the time and date of the last administered dose. It must be communicated as per Trust procedure CORP/PROC/074 Discharge of Adult Patients.

3.12 Pharmacy Responsibility

The pharmacy staff will check that a safe dose of dalteparin is dispensed based on information provided by prescriber in point 3.10.

The dispensed prescription must include a Patient information leaflet.

The pharmacy will monitor compliance by recording intervention data on clinical incidents and near miss incidents. Data will be reported to Medicines Management Committee.

3.13 Hospital Nursing Staff Responsibility

It is the responsibility of nursing staff to ensure a safe dose of dalteparin is administered whether they are administering or if the patients is self-administering dalteparin as per the Self Administration of Medications Policy (CORP/POL/549) whilst in hospital.

The nurse must check that the patient has been weighed in hospital and that it is recorded on the prescription.

The nurse must check that the dalteparin prescribed is correct by checking it with the Dalteparin Dosing guide (point 3.10).

Before administration of the second and subsequent doses the nurse must ensure that the prescriber has checked the renal function and has documented the calculated creatinine clearance (Cr Cl) on the prescription chart / patient notes.

The nurse must be aware that it is not safe to administer dalteparin if the calculated Cr Cl is less than 30ml/min, unless there is a plan in place directed by the specialist team.

At discharge, if a district nurse is required to administer dalteparin, then the hospital nurse must communicate as per Trust procedure CORP/PROC/074 Discharge of Adult Patients.

The date and time of the last dose.

All information as per 3.10.

A copy of the e-discharge (give to the patient to give to the district nurse) as it will act as the authorisation from the hospital doctor to administer.

At discharge, if the patient is to self-administer then they must be given appropriate training and education, and have been assessed as competent to undertake the procedure safely.

Written consent must be obtained and retained in patient's record.

Patients must be supplied with a medicinal sharps bin with yellow lid which are available through Powergate.

(Wards should place their orders direct – don't order too many as they need to be stored on the ward).

The patient must be provided with a patient information leaflet.

- What dalteparin (Fragmin®) is used for.
- What is the dose, frequency and duration of therapy.
- Where to inject.
- How to give the injection.
- How to get rid of used syringes safely. Issue a Medicinal Sharps bin.
- Possible side effects.
- How to store dalteparin.

4 ATTACHMENTS	
Appendix Number	**Title**
1	Accurate Patient Weight
2	Calculation of Renal Function
3	Equality Impact Assessment Tool

5 PROCEDURAL DOCUMENT STORAGE (HARD AND ELECTRONIC COPIES)
Electronic Database for Procedural Documents
Held by Procedural Document and Leaflet Coordinator

6 LOCATIONS THIS DOCUMENT ISSUED TO		
Copy No	**Location**	**Date Issued**
1	Intranet	16/08/2018
2	Wards, Departments and Service	16/08/2018

7 OTHER RELEVANT / ASSOCIATED DOCUMENTS	
Unique Identifier	**Title and web links from the document library**
	VTE Treatment Poster http://fcsp.xfyldecoast.nhs.uk/M-/Medicines_Management/Documents/VTE%20Treatment.doc
CORP/PROC/074	The Discharge of Adult Patients http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/CORP-PROC-074.doc

7 OTHER RELEVANT / ASSOCIATED DOCUMENTS	
Unique Identifier	**Title and web links from the document library**
CORP/GUID/147	Warfarin http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/CORP-GUID-147.docx
CORP/GUID/456	Shared Care Guideline - Drug: Dalteparin, Low Molecular Weight Heparin (LMWH) for the extended prescription and supply http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/CORP-GUID-456.docx
CORP/POL/549	Self-Administration of Medicines in Adult Patients (16 years and over) http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/CORP-POL-549.docx
CORP/PROC/639	Management of Heparin Induced Thrombocytopenia http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/CORP-PROC-639.docx
OBS/GYNAE/GUID/102	Venous Thromboembolism – Treatment/Management In Pregnancy, Labour And The Puerperium http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/OBS-GYNAE-GUID-102.docx
OBS/GYNAE/GUID/103	Venous Thromboembolism – antenatal, intrapartum and postnatal risk assessments and prophylaxis http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/OBS-GYNAE-GUID-103.docx

8 SUPPORTING REFERENCES / EVIDENCE BASED DOCUMENTS
References In Full
British Journal of Haematology (bjh). (2012). Guidelines on the diagnosis and management of heparin induced thrombocytopenia: second edition. Available: https://b-s-h.org.uk/guidelines/guidelines/diagnosis-and-management-of-heparin-induced-thrombocytopenia-second-edition/ last accessed 1/6/18
Dalteparin - Summary of Product Characteristics (SPC) last accessed 1/6/18 https://www.medicines.org.uk/emc/product/4243/smpc
NHS England, Patient safety alert – Harm from using Low Molecular Weight Heparins when contraindicated, January 2015 https://www.england.nhs.uk/wp-content/uploads/2015/01/psa-lmwhs.pdf
NPSA Rapid Response Report, Reducing treatment dose errors with low molecular weight heparns, July 2010 https://www.sps.nhs.uk/wp-content/uploads/2018/02/2010-NRLS-1270-LMWH-RRR-2010.07.30-v1-1.pdf
Renal Drug Handbook 3RD Edn. Ashley, Currie. Radcliffe Publishing Oxford

9 CONSULTATION / ACKNOWLEDGEMENTS WITH STAFF, PEERS, PATIENTS AND THE PUBLIC		
Name	**Designation**	**Date Response Received**
	VTE Committee	29/06/2018

10 DEFINITIONS / GLOSSARY OF TERMS	
ACE	Angiotensin-Converting Enzyme
anti-Xa	anti-Factor Xa
BNF	British National Formulary
Cr Cl	Creatinine Clearance
DVT	Deep Vein Thrombosis
FBC	Full Blood Count
GPs	General Practitioners
HIT	Heparin Induced Thrombocytopenia
INR	International Normalized Ratio
LFTs	Liver Function Tests
LMWH	Low molecular weight heparin
NRLS	National Reporting and Learning System
SPC	Summary of Product Characteristics
U&E's	Urea and Electrolytes
VTE	venous thromboembolism

11 AUTHOR / DIVISIONAL / DIRECTORATE MANAGER APPROVAL			
Issued By	Jennifer Walters	**Checked By**	
Job Title	Lead Pharmacist - Surgery	**Job Title**	VTE Committee
Date	June 2018	**Date**	29/06/2018

APPENDIX 1: PATIENT WEIGHT

Standard of Weighing Equipment

For accurate dosing patients must be weighed on a Trust approved and calibrated weighing scale.

In March 2010 the Department of Health issued an updated Estates Alert, *Medical patient weighing scales*. This Alert requires the Trust to ensure healthcare professionals have access to accurate scales used for weighing patients in relation to medication, treatment or diagnosis.

Inaccurate weighing of patients has resulted in patient harm.

The weighing equipment should be of the Class III type, and should be regularly maintained and correctly calibrated.

For Medical purposes all weighing scales must have a metric display which is not switchable between units.

Medical weighing equipment used in healthcare premises must be accurate, appropriate and used correctly to prevent potential errors in diagnosis, treatment or medication of patients.

Staff Training

It is very important that healthcare staff do not under-estimate the significance of an accurate weight as an essential aspect of safe patient care.

All healthcare staff involved in weighing patients must be trained on the weighing equipment and the correct weighing procedure.

Healthcare professionals must not visually estimate a patient's weight. It has been demonstrated to be the least accurate method.

- The scale used must have been tested and approved by Atlas Medical devices
- The scale must be set to zero before use.
- The scale must display metric units only and not be switchable between units
- The patient's weight must be accurately recorded in kilograms (kg) on the front of the inpatient medication chart, on out-patient prescriptions and on the e-discharge prescription. and the clinical record
- Patients should be weighed at the start of therapy and, where applicable, re-weighed during treatment.
- When patients are unable to stand or are confined to their beds use equipment such as hoists with weighing scales (ask senior Nursing staff for location of equipment)

In exceptional circumstances, when a patient cannot be weighed:-

- obtain body weight information from patients (or carers).
- use weight estimation tools, e.g. formulae utilising knee height and mid-arm circumference.

Obese Patients defined as BMI > 30kg/m2 **Underweight patients** defined as BMI < 18.5kg/m2

APPENDIX 2: RENAL FUNCTION

1. Collect patient data

Height
Age
Serum Creatinine ……. micromol/L
Actual Body Weight = weight on scales……..kg

2. Calculate the Ideal Body Weight (IBW) of the patient

IBW Men (kg) = [(height (cm) **– 154) x 0.9] + 50**

IBW Women (kg) = [(height (cm) **– 154) x 0.9] + 45.5**

3. Calculate Renal Function using Cockroft Gault Formula as an estimate of Creatinine Clearance (Cr Cl)

Weight* (kg) use IBW (except if Obese/Underweight)

Underweight- If a patient's body weight is less than the IBW then use Actual Body Weight

Obese – If a patient's body weight is > 30% above the IBW then use an Adjusted Body Weight (Adj BW) in the Cr Cl calculation.

Adj BW = IBW + 0.4(Actual Body Weight – IBW)

4. The Cockcroft-Gault Formula

The Cockroft- Gault formula can be used to estimate the creatinine clearance (CrCl) in adults. The formula must not be used when the serum creatinine is not stable ; pregnancy ; ascites ; oedema or in children.

BNF : Cr Cl calculator:

Constant Male = 1.23 Female = 1.04

$$\text{CrCl (ml/min)} = \frac{(140 - \text{Age}) \times \text{Weight * (kg)} \times \text{constant}}{\text{Serum Creatinine (micromol/L)}}$$

APPENDIX 3: EQUALITY IMPACT ASSESSMENT FORM

Department		Service or Policy		Date Completed:	

GROUPS TO BE CONSIDERED

Deprived communities, homeless, substance misusers, people who have a disability, learning disability, older people, children and families, young people, Lesbian Gay Bi-sexual or Transgender, minority ethnic communities, Gypsy/Roma/Travellers, women/men, parents, carers, staff, wider community, offenders.

EQUALITY PROTECTED CHARACTERISTICS TO BE CONSIDERED

Age, gender, disability, race, sexual orientation, gender identity (or reassignment), religion and belief, carers, Human Rights and social economic / deprivation.

QUESTION	RESPONSE		IMPACT	
	Issue	Action	Positive	Negative
What is the service, leaflet or policy development? What are its aims, who are the target audience?	All staff Monitoring of weight and renal function as part of dalteparin therapy			
Does the service, leaflet or policy/ development impact on community safety • Crime • Community cohesion	N			
Is there any evidence that groups who should benefit do not? i.e. equal opportunity monitoring of service users and/or staff. If none/insufficient local or national data available consider what information you need.	N			
Does the service, leaflet or development/ policy have a negative impact on any geographical or sub group of the population?	N			
How does the service, leaflet or policy/ development promote equality and diversity?	NA			
Does the service, leaflet or policy/ development explicitly include a commitment to equality and diversity and meeting needs? How does it demonstrate its impact?	N			
Does the Organisation or service workforce reflect the local population? Do we employ people from disadvantaged groups	Y			
Will the service, leaflet or policy/ development i. Improve economic social conditions in deprived areas ii. Use brown field sites iii. Improve public spaces including creation of green spaces?	N			
Does the service, leaflet or policy/ development promote equity of lifelong learning?	N			
Does the service, leaflet or policy/ development encourage healthy lifestyles and reduce risks to health?	Y			
Does the service, leaflet or policy/ development impact on transport? What are the implications of this?	N			
Does the service, leaflet or policy/development impact on housing, housing needs, homelessness, or a person's ability to remain at home?	N			
Are there any groups for whom this policy/ service/leaflet would have an impact? Is it an adverse/negative impact? Does it or could it (or is the perception that it could exclude disadvantaged or marginalised groups?	N			
Does the policy/development promote access to services and facilities for any group in particular?	N			

APPENDIX 3: EQUALITY IMPACT ASSESSMENT FORM

Does the service, leaflet or policy/development impact on the environment • During development • At implementation?	N			

ACTION:			
Please identify if you are now required to carry out a Full Equality Analysis		**No**	**(Please delete as appropriate)**
Name of Author: **Signature of Author:**	**Jennifer Walters**	**Date Signed:**	**5/6/18**
Name of Lead Person: **Signature of Lead Person:**	Jennifer Walters	**Date Signed:**	5/6/18
Name of Manager: **Signature of Manager**	Vanya Fidling	**Date Signed:**	5/6/18