Blackpool Teaching Hospitals
NHS Foundation Trust

Warfarin

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19/12/19	3	Dr Seye Kolade	ADAS request

Consultation / Acknowledgements with Stakeholders

Name	Designation	Date Response Received
	Quality and Governance meeting	3/12/19
Jennifer King	Advanced Pharmacist for Haem/Onc and palliative care	18/11/19
Bev Straker-Bennett	Senior Anticoagulation Practitioner	31/7/19

CONTENTS

1 Introduction / Purpose

To ensure the safe initiation, maintenance, monitoring and prescribing of Warfarin as per the National Patient Safety Agency (NPSA) alert number 18 March 2007 (NHS National Patient Safety Agency, 2007).

http://bfwnet/departments/anticoag/NRLS-0440-Anticoagulants-PSA-2007-03-28-v1.pdf .

This guideline will also cover the management of patients who are excessively anti-coagulated and the anticoagulation required before and after elective invasive procedures. This policy does not cover the management of children.

2 General Principles / Target Audience

This guideline applies to all staff employed by Blackpool Teaching Hospitals NHS Foundation Trust that are involved in the prescribing (loading and maintenance doses), administration, monitoring, dispensing, patient education and discharge of patients.

Patients who are unable to tolerate warfarin should be considered for alternative treatments.

3 Definitions and Abbreviations

ACS	Acute Coronary Syndrome
ADAS	Anticoagulant Dosing Advisory Service
AF	Atrial Fibrillation
APTT	Activated Partial Thromboplastin Time
ATE	Arterial thromboembolism
BCSH	British Committee for Standards in Haematology
BNF	British National Formulary
CVD	Cardiovascular disease
DVT	Deep Vein Thrombosis
FBC	Full Blood Count
FFP	fresh frozen plasma
GI	Gastro Intestinal
HIT	heparin induced thrombocytopenia
INR	International Normalised Ratio
IV	Intravenous
LFT's	Liver Function Tests
LMWH	Low Molecular Weight Heparin
MHV	Mechanical Heart Valve
MI	Myocardial infarction
NSAIDS	Non-steroidal anti-inflammatory drugs
PCC	prothrombin complex concentrate
PCI	Percutaneous Coronary Intervention
PE	Pulmonary Embolism
TIA	Transient Ischaemic Attack
TRALI	transfusion-related acute lung injury
VTE	Venous Thromboembolism

4 Guideline

4.1 Risk Assessment

It is the prescribers' responsibility to perform a risk assessment on each individual patient before initiating warfarin and documenting this in the notes. Warfarin therapy is not advisable if the risk of harm is likely to outweigh the benefits of treatment. Oral anticoagulants prescribed in pregnancy should be in consultation with an obstetrician. Based on the bleeding score HAS-BLED for Atrial Fibrillation (AF) the following risk factors should be taken into consideration.

- Is the patient over 65 years?
- Does the patient have a history of uncontrolled hypertension?
- Does the patient have renal disease?
- Is there any evidence of liver disease? Are the Liver Function Tests (LFT's) abnormal?
- Does the patient have a history of stroke?
- Does the patient have any history of a major bleed?
- Is there any evidence of alcohol excess?
- Is there any history of previous falls?
- Does the patient take any Non-steroidal anti-inflammatory drugs (NSAIDS), long term antibiotics or antiplatelets?
- Is the patient being investigated or receiving treatment for cancer?
- Patient compliance / Psychological issues.

4.2 Clinical Indications, treatment duration and target International Normalised Ratio (INR) for oral anticoagulation

Reason for treatment	Target INR	Duration of Therapy
Treatment of Venous Thromboembolism		
Calf Vein Thrombosis	2.5	6 weeks
Proximal Deep Vein Thrombosis (DVT) or Pulmonary Embolism (PE) (associated with temporary risk factors)	2.5	3 months
Idiopathic proximal DVT / PE	2.5	3-6 months
Recurrence of spontaneous venous thromboembolism when not on warfarin	2.5	Indefinite

Reason for treatment	Target INR	Duration of Therapy
Recurrence of venous thromboembolism when on warfarin	3.5	Indefinite
Mechanical Heart Valves		
Aortic Bileaflet	2.5	Indefinite
Aortic Tilting Disc	2.5	Indefinite
Mitral Bileaflet	3.0	Indefinite
Mitral Tilting Disc	3.0	Indefinite
Caged Ball Aortic	2.5	Indefinite
Caged Ball Mitral	3.0	Indefinite
Aortic valve (type not specified)	2.5	Indefinite
Mitral Valve (type not specified)	3.0	Indefinite
On X-aortic	2.0	Indefinite
Other reason not listed above	Please indicate range	Please indicate duration
Other Reasons		
Cardiomyopathy/ mural thrombus or akinetic segment	2.5	Indefinite
Atrial Fibrillation or other high risk arrhythmias	2.5	Indefinite
Other reason not listed above	Please indicate range	Please indicate duration

Information provided by Anticoagulant Dosing Advisory Service (ADAS) and British Committee for Standards in Haematology (BCSH).

**The final decision about the duration of anticoagulation can be complex and must be done in consultation with the patient - e.g. there will be certain patients with idiopathic Venous Thromboembolism (VTE) who it would be reasonable to consider indefinite anticoagulation.

Cancer associated thromboembolism is generally treated with a Low Molecular Weight Heparin (LMWH) as there is evidence that this is more effective at preventing recurrence than warfarin (CLOT trial).

4.3 Prescribing Anticoagulants in secondary care

Oral anticoagulants must be prescribed in accordance with the Trust's Medicines Prescribing Policy:

http://fcsp.xfyldecoast.nhs.uk/trustdocuments/Documents/CORP-PROC-301.docx

- Perform risk Vs benefit analysis of patient.
- Inform patient of decision to start warfarin.
- Document reason for initiating warfarin therapy and the intended duration of therapy in the patient's notes.
- Counsel the patient using the 'Warfarin Counselling Record checklist' (Appendix 1). Counselling can be conducted by a Nurse, Pharmacist or Doctor.
- Prescribe warfarin on the regular section of the in-patient prescription chart at 18:00 hours. The dose should not be specified but the words "See INR" should be used.
- Initiate anticoagulant loading doses (see section 4.6)
- Arrange monitoring and electronic referral to ADAS.
- Complete 'anticoagulation status' on the E discharge application
- Complete the 'Anticoagulant Treatment Section' on the reverse of the prescription chart. Details to be completed;
- Name of anticoagulant Target INR e.g. 2.5.
- Indication as to whether newly commenced or continuation therapy dose.
- If continuation therapy, the usual maintenance dose. Contact ADAS for any queries or advice.
- Indication for use / diagnosis.
- Intended duration of treatment.
- The INR on a specified date.
- The daily dose in milligrams.

Before prescribing warfarin for an in-patient always:

- Review bleeding history.
- Review and document baseline INR, creatinine, LFTs, Activated Partial Thromboplastin Time (APTT) and Full Blood Count (FBC) within one week prior to commencement of treatment.
- review previous results and the trend in INR.
- Review drug chart for new interacting treatment starting or stopping

4.4 Co-prescribing interacting medicines

Many drugs can interact with warfarin. A full list can be found in the British National Formulary (BNF) online via the trust internet.
https://www.medicinescomplete.com/#/content/bnf/_107604022
https://bnfc.nice.org.uk/interaction/warfarin.html

When prescribing, a non-interacting drug should be chosen wherever possible.

For short courses of a new drug, warfarin dose adjustment is not essential.

When starting a new interacting medicine for more than 7 days an INR test should be performed after 3–7 days so the warfarin dose can be adjusted if necessary.

The prescriber who initiated or discontinues an interacting medicine is responsible for informing the patient of the change in therapy, informing the anticoagulant clinic and ensuring that an INR check is performed.

Special considerations:

- Concomitant use of certain antibiotics e.g. Quinolones.
- Concomitant use of amiodarone.
- The dose of oral anticoagulant may need to be reduced by up to one third if amiodarone is added to anticoagulant therapy. Weekly INR monitoring for up to 4 weeks after initiating or discontinuing amiodarone is advised.
- Avoid Cranberry Juice.

4.5 Guidance on co-prescribing antiplatelet drugs

For full guidance follow the link below to the BSCH guidelines

https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2141.2011.08753.x

Caution: The combination of warfarin, clopidogrel and a non-steroidal anti-inflammatory drug (NSAID) may result in a significant Gastro Intestinal (GI) bleed

4.5.1 Management of Patients on Antiplatelet Therapy who develop an Indication for Warfarin

- Single agent Aspirin should be continued until 12 months post-Acute Coronary Syndrome (ACS), unless increased bleeding risk.

Antiplatelet therapy should be stopped in the following cases when warfarin is initiated;

- Primary prophylaxis for cardiovascular disease.
- Peripheral artery disease or previous ischaemic stroke

- Secondary prophylaxis for stable ischaemic heart disease (>12 months following Myocardial infarction (MI)).

Antiplatelet therapy should be reviewed and discussed with a cardiologist in the following cases

- Dual treatment with aspirin and clopidogrel following a stent placement or ACS should be carefully assessed before warfarin added.
- When combined warfarin and single antiplatelet agent are indicated, consideration should be given to use of aspirin given the higher bleeding risk associated with clopidogrel

4.5.2 Management of Patients on Warfarin Who Develop an Indication for Antiplatelet Agents

The need for warfarin should be reviewed. If there is a clear indication for warfarin to be continued, then an attempt should be made to reduce the length of time on dual or single antiplatelet therapy. The exact duration of dual or single agent antiplatelet therapy should be guided by the perceived bleeding risk.

- Patients requiring a coronary artery stent, should be considered for bare metal stent (rather than drug eluting stent) which would only necessitate triple therapy for 4 weeks, followed by aspirin and warfarin for 12 months.
- Patients who do not undergo Percutaneous Coronary Intervention (PCI) should be considered for 4 weeks triple therapy, after which clopidogrel should be stopped, and aspirin continued for a further 11 months.

4.6 Warfarin Rapid initiation dosing regimen for patients with VTE / PE

This regimen is recommended where oral anticoagulation is desired within 3 to 4 days. Target INR 2-3. Baseline INR must be less than 1.4 to use this algorithm.

Day 1 - 4

Measure baseline creatinine, LFT's, INR and FBC. Perform risk assessment.
Prescribe Warfarin 5mg for 4 days (3mg if risk factors)*
Prescribe therapeutic LMWH until INR > 2 for 48 hours

* Risk factors: age>70 years, weight<60kg, liver impairment, severe cardiac failure, low albumin, interacting drug therapy

↓

Day 5

INR to be checked day 5 and warfarin dosed accordingly.
(See below)

Only follow the dosing algorithm below if the patient has taken 5mg for 4 days.

DAY 5 INR	WARFARIN DOSAGE
=/< 1.4	8mg for 3 DAYS
1.5 - 1.7	6mg for 3 DAYS
1.8 - 2.2	4mg for 3 DAYS
2.3 - 2.7	3mg for 3 DAYS
2.8 - 3.2	2mg for 3 DAYS
3.3 - 3.7	1mg for 3 DAYS
>3.7	MISS 1 DAY AND RETEST

After day 5, repeat INR on day 8, then repeat frequently until two consecutive INR's within therapeutic range, with variation of < 0.3 INR.

There are no dosing guidelines for patients with a baseline INR of >1.4.

Consideration should be given to the safety of initiating therapy in patients who have a raised baseline INR and deranged LFT's. Further assessment is required; refer back to a consultant / senior member of the team.

4.7 Low dose, slow initiation of warfarin for AF (in patients NOT for cardioversion)

The treatment of AF for patients not requiring rapid anticoagulation can be safely managed using a slow loading regimen. This can be initiated through the ADAS system on the online referral system.

Day 1-4	Measure baseline creatinine, LFT's, INR and FBC. Prescribe Warfarin 3mg for 4 days. Check INR day 5

4.8 Monitoring oral anticoagulants

Monitoring of warfarin should be based on an inpatient's clinical state. A daily INR check may not always be clinically indicated. The dose of warfarin does not need to be adjusted for minor changes in INR.

Once a stable warfarin dose is obtained, the warfarin dose should not be increased or decreased by > 20 % in the absence of abnormal LFT's, interacting drugs, or hypersensitivity to warfarin.

To prevent the 'ping pong' effect of frequent dose alteration, it is recommended that trends are followed. Alteration of warfarin dose is generally reflected by a change in INR result in 2 - 3 days i.e. don't react to the INR result the day following a dose change, unless markedly different.

In the outpatient setting maintenance dose adjustment is the responsibility of community clinics. For a full list of clinics available follow the link below.
http://bfwnet/departments/anticoag/guidance.htm

See sections 4.15.1 and 4.15.2 for more information on managing raises in INR.

4.9 Patient Education

4.9.1 Inpatient Counselling

All new patients prescribed warfarin must have a counselling checklist (Appendix 1) completed to ensure that all the appropriate information has been provided. This includes;

- The name of the drug and current dose.
- The reason they are taking the drug.
- Therapeutic goal.
- The anticipated length of treatment.
- What to do in the event of a missed dose.
- Symptoms of under / over anticoagulation and action to take if these occur i.e. major bleeds, unexplained bruising.
- Drug / drug and drug / food interactions (including alcohol).
- Clinic arrangements and how to obtain further medicine supplies.
- What to do if dental treatment / surgery is required.
- What to do if a surgical procedure is required / indicated.
- Who to contact regarding any worries or concerns relating to their anticoagulation management.
- Attendance at the clinic for monitoring is essential and compulsory.
- The patient must be given the opportunity to ask questions.

Counselling can be conducted by the discharging doctor, staff nurse or pharmacist on the ward. The patient or carer must sign and date the counselling form which must then be filed in the patient's notes.

4.9.2 Anticoagulant Education Packs and Anticoagulant Record Books

Anticoagulant Education Packs and Anticoagulant Record books can be obtained from Pathology. Wards should keep a small supply. The pack includes a record book, alert card and information book.

- The record book must be completed with the following information.
    - Page 1 – Patients, name address and hospital number. A hospital addressograph label is sufficient.
    - Page 2 –The staff at the anticoagulation clinic will complete this page.
    - Page 3 - GP name only.
    - Page 4 - Referring consultant's name, reason for anticoagulation, target INR and duration of treatment.
    - Anticoagulant treatment record – Warfarin should be dosed at the time of discharge until the first appointment.
- The patient should be informed to take the warfarin record booklet to every anticoagulant appointment. This will remind them of their daily dosage and appointment date.
- Inform the patient to take the warfarin education folder, the Anticoagulant Therapy Record Book and alert card with them to Anticoagulant Clinic (ADAS) on their first visit. ADAS will re-enforce the warfarin counselling and complete the alert card.
- The prescriber must ensure that the patient has read and understood this information.

4.10 Discharging patients on oral anticoagulants

- The prescriber must fully complete the Anticoagulant Therapy Record Book.
- It is mandatory for the prescriber to complete the online referral form via the Nexus Suite Portal app ADAS.
- All patients should be given an appointment date / time at the anticoagulant clinic as soon as possible after discharge.
- Complete 'anticoagulation status' on the E discharge application
- **E-Discharge prescriptions** -should state why the anticoagulant has been started, duration of therapy and what follow up arrangements have been made.
- **If the patient is being discharged with LMWH injections see sections 4.16.3.2 and 4.16.3.3 please ensure as sufficient supply to bridge until INR is therapeutic.**

4.11 Discontinuing oral anticoagulants

If anticoagulation is no longer required it is safe to stop warfarin abruptly. There is no need to taper the dose.

Discontinuation of warfarin therapy must be reported to ADAS and the general practitioner

4.12 Nursing staff responsibility

- Ensure that the patient takes the anticoagulant safely.
- If not already done, on discharge the nurse will provide an Anticoagulant Education Folder to all newly started warfarin patients.
- If not already done, on discharge, the nurse will counsel patients on warfarin therapy.

4.13 Pharmacy staff responsibility

- Ensure the prescription chart is filled in correctly.
- Ensure that INR is being monitored correctly and that dose adjustments are made if required.
- Monitor and check for interactions when new medication is started.
- Check the appropriateness of co-prescribing other anti-platelet medication.
- If not already done, on discharge, the pharmacist will counsel patients on warfarin therapy.
- Ensure that new patients receive an anticoagulant education pack and booklet.
- 28 x 1mg tablets and 28 x 3mg tablets should be supplied on discharge.
- The tablets will be labelled “Take as directed in the Anticoagulant Booklet”.
- Ensure on discharge that the anticoagulant booklet is completed and the patient has a clinic appointment confirmed.

4.14 Audit

ADAS will conduct an annual audit of patients on oral anticoagulants. The annual anticoagulant audit will monitor the % of new referrals with incomplete information; % of patients that were not issued with patient-held information and written dosage instructions; % of patients who were discharged from hospital without an appointment for the next INR measurement or for consultation with an appropriate healthcare professional to review and discuss treatment plans, benefits, risks and patient education.

4.15 Management of Over-Anti-Coagulation

4.15.1 Management of Asymptomatic Increases in INR

- The risk factors for excessive anticoagulation need to be considered. These include;
  - Age >70 years
  - Cognitive impairment
  - Poor hearing / eyesight
  - Multiple other medications, especially anti-platelet and anti-inflammatory agents
  - Thrombocytopenia / liver dysfunction / alcohol excess
  - Previous bleeding episodes

- Need to consider why the INR is high. These include;
  - Not taking the correct dose, i.e. unintentional overdose
  - Altered metabolism
  - Liver disease including alcohol binges
  - New drug(s) recently started?
  - Intercurrent illness
- Action depends on INR

INR between 3.0 to < 5.0 (target INR 2.5)	1. Decrease maintenance dose by 25 %.
INR between 5.0 – 8.0 no bleeding	1. Stop warfarin for 1-2 doses 2. The cause of elevated INR should be investigated 3. The maintenance dose should be reduced 4. Check INR next day 5. Restart when INR <5
INR >8.0 no bleeding	1. Stop warfarin 2. Give 2 mg of vitamin K (phytomenadione) orally. ⋕ 3. Recheck INR next day 4. Repeat dose of vitamin K (phytomenadione) orally if INR still high after 24 hours 5. The cause of elevated INR should be investigated 6. The maintenance dose should be reduced 7. Restart warfarin when INR < 5
INR between 5.0 – 8.0 minor bleeding	1. Stop warfarin 2. Give vitamin K 1-3mg by slow intravenous injection 3. Restart warfarin when INR < 5.0

⋕ For Vitamin K (phytomenadione) orally use Konakion®MM paediatric injections used orally. Draw up 2mg in 0.2ml using the oral dispenser provided and drop onto the tongue.

- There is good evidence that the intravenous preparation of vitamin K, administered orally, is a simple, safe and effective means of reversing asymptomatic over-anticoagulation. The anti-coagulant department at Blackpool Teaching Hospitals gives 2mg orally vitamin K to patients in the community who have an INR >8 at a clinic visit. This avoids the need to have intravenous access, as well as avoiding potential risk of anaphylaxis from the Intravenous (IV) formulation.
  - Re-start warfarin when INR <5

4.15.2 Management of an Increased INR Associated With Major Bleeding

Please Note: The use of fresh frozen plasma (FFP) in the reversal of warfarin anticoagulation is not used within the trust. The preferred agent is Octaplex a 4 factor prothrombin complex concentrate (PCC) – it should be noted that this is contra-indicated in patients with a known allergy to heparin or history of heparin induced thrombocytopenia (HIT). This contains active clotting factors whose levels have been depleted by warfarin, namely factors II (prothrombin), VII, IX and X.

PCC has the following advantages over FFP:

- No need for a blood group
- No need to thaw
- Reduced Volume
- Reduced risk of FFP-associated side-effects such as transfusion-related acute lung injury (TRALI)

4.15.3 Guidance

- Stop warfarin
- Give intravenous vitamin K 5mg. Haematology On-call can give advice on the actual dose to be given. The administration of vitamin K is vital to allow normal clotting factor production in 6-12 hours by the liver. If it is not given, then the effects of PCC will soon wear off, and the INR will rise back to presentation levels.
- **Requests for PCC must have been discussed with and agreed by a doctor of registrar grade or above.** It is their responsibility to calculate the dose and request it accordingly from the blood bank. The issuing of PCC does NOT have to be authorised by a Haematologist, and the Haematologist should only be contacted for clinical advice – not for authorisation.
- Each vial of PCC contains 500 units. The dose is dependent upon the initial INR:
    - INR 1.4 or less PCC is not required.
    - INR 1.5-4.9 give 15 units/ kg. Round to the nearest 500unit vial.
    - INR 5 and above give 30 units/ kg. (Max 3000units). Round to the nearest 500unit vial
    - More PCC may be required dependant on repeat INR.
- The PCC should be collected immediately from the blood bank. For intravenous administration start infusion at a slow speed: Initially 1ml per minute test dose, then no faster than 2-3 ml per minute. *(For additional information on dosage and administration of PCC refer to Appendix 4)*
- Repeat INR 30mins post PCC.
- The decision when to re-start warfarin following a major bleed can be very difficult. It is very much about the risk: benefit ratio of continuing with anticoagulation or not. The decision when to re-start warfarin in a patient with a metallic mitral valve requires

discussion between the haematologist and cardiologist to assess the risk of recurrent bleeding versus the risk of valve thrombosis. A short, initial period of no anti-coagulation immediately after the bleed may be appropriate.

4.16 Management of anti-coagulation before and after invasive procedures / operations

4.16.1 Management of anti-coagulation with warfarin prior to an urgent invasive procedure / operation

- An urgent procedure or operation is defined as one that needs to be performed within 24-48 hours but not immediately. A good example of this would be a hip replacement for a fractured neck of femur.
- Stop the Warfarin, check the INR and give 2.5mg-5mg Vitamin K intravenous (This will generally allow full reversal in 6-12 hours).
- The INR must be checked to ensure adequate correction prior to the procedure / operation.
- For management post-operatively see elective schedules below.

4.16.2 Management of anti-coagulation with warfarin prior to an emergency invasive procedure / operation

- An emergency operation / procedure is defined as one that needs to be performed immediately and cannot wait 6-12 hours for vitamin K to take its effect. A good example of this would be operative intervention for perforated bowel.

  Stop the Warfarin, check the INR, give 2.5mg- 5mg Vitamin K intravenous **and PCC.**

  The dose is dependent upon the initial INR:

  - INR <5 15 units/ kg. Round to the nearest 500unit vial.
  - INR >5 30 units/ kg. Round to the nearest 500unit vial.
- Repeat INR 30mins post PCC, and certainly before operation / procedure.
- More PCC may be required dependant on repeat INR
- For instruction guidance on reconstitution of PCC refer to Appendix 3
- For management post-operatively see elective schedules below

4.16.3 Management of anti-coagulation with warfarin prior to an elective invasive procedure / operation

- Decisions on management of patients prior to an elective invasive procedure / operation will depend on balancing the likely thrombotic risk during the interruption of anticoagulation versus the bleeding risk of the procedure/operation and individual patient comorbidities that may increase bleeding risk.

- Some procedures do not require interruption of anticoagulation – e.g. Cataract surgery; Dental procedures; Cardiac procedures – cardiac implantable devices, catheter ablation.
- The table below highlights patients at high risk of thromboembolic events and should be offered bridging with heparin pre and post operatively to minimise the time off anticoagulation as detailed in schedule 1.
- The low risk group should not be offered pre- operative bridging with heparin as the risk of perioperative bleeding generally outweighs the small risk of thromboembolic events without anticoagulation.
- There will be a group of patients who neither fall into the high or low risk categories detailed below. – e.g. Atrial fibrillation with $CHADS_2$ - 3/4. (Appendix 6).
- Recent evidence from the BRIDGE study suggests that patients in this category who were bridged preoperatively have a higher risk of postoperative bleeding with similar risks of thromboembolic events as those that were not bridged. **Therefore in general these patients should not have preoperative bridging**. However decisions should be made on a case by case basis.

4.16.3.1 Table 1 -Risk stratification for perioperative thromboembolism

Risk Category	MHV	Atrial Fibrillation	VTE
High	Any mitral valve prosthesis	$CHADS_2$ score of 5 or 6	Recent (<3months) VTE Or previous VTE during interruption of anticoagulation
	Aortic valve and any additional stroke risk factors	Recent (<3months) stroke / TIA	Severe / multiple thrombophilias e.g. Deficiency of protein C, Protein S or antithrombin; antiphospholipid antibodies; multiple abnormalities.
		Rheumatic Valvular heart disease	
Low	Bileaflet AVR without major risk factors for stroke	$CHADS_2$ score of 0-2 (and no prior stroke or TIA)	VTE > 12 months ago & no other risk factors

*TIA indicates transient ischemic attack; AVR, aortic valve replacement; ATE, arterial thromboembolism; VTE, venous thromboembolism; and MHV, mechanical heart valve.
See Appendix 6 for $CHADS_2$ score

4.16.3.2 Schedule 1 – High risk bridging protocol

Day	Intervention
-6 -5	Check INR Stop warfarin
-3	Start LMWH at therapeutic dose
-1	Last pre -procedural dose of LMWH administered no less than 24 h before procedure Check INR (consider Vitamin K if not in range)
Day of procedural Intervention	Check INR
0 or +1	Resume maintenance dose of warfarin on evening after procedure¨ Consider prophylactic doses of LMWH if adequate haemostasis.
Post-procedural Intervention	
+1	
	Continue prophylactic dose if high risk of bleeding Consider treatment dose LMWH administration if low risk of bleeding ; Resume warfarin therapy
+2 or +3	
	Restart LMWH at treatment dose
+4	
	INR testing (discontinue LMWH if INR is within therapeutic range)

4.16.3.3 Schedule 2 - Low risk Bridging protocol

Day	Intervention
-6 **-5**	**Check INR** **Stop Warfarin**
-1	**Check INR – (consider vitamin K if not in range)**
Day of procedural intervention	**Check INR**
0 or +1	Resume maintenance dose of warfarin on evening of or morning after procedure. Consider prophylactic doses of LMWH if adequate haemostasis.
Post-procedural intervention	
+1	Restart LMWH at prophylactic dose; resume warfarin therapy
+4	INR testing (discontinue LMWH if INR is within therapeutic range)

5 References and Associated Documents

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Appendix 1: Warfarin Counselling Record – Obtain VS458 from General Stores

FILE IN SECTION 3

Blackpool Teaching Hospitals NHS
NHS Foundation Trust

WARFARIN COUNSELLING RECORD

Abbreviations used in this document to be listed here with the full description:
OTC medicines: - Over the Counter medicines

Write patient details or affix Identification label

Hospital Number:
Name:
Address:

Date of Birth:
NHS Number:

This patient has been given verbal and written information on warfarin therapy, by a Doctor, Pharmacist or Nurse in accordance with the guidance overleaf.

The anticoagulant book MUST be fully completed prior to discharge including information regarding recent inpatient dosing, discharge dose and follow-up appointment details.

	Counselling point	Signature	Comments
1	The use of the Oral Anticoagulant Therapy Record book.		
2	Standard dispensing labels (i.e. 'take as directed')		
3	Basic mode of action of warfarin		
4	Indication for therapy		
5	Expected duration of therapy		Specify duration if known
6	Tablet identification – colour of the different tablet strengths		
7	Dose: Varied dosing Time of day to take warfarin How to use the different tablet strengths to make up intended dose Action to take if dose missed; NOT to take extra doses		
8	Compliance and ways of remembering to take the tablets e.g. using a calendar		
9	Monitoring: • Target INR • Outpatient monitoring clinics (importance of attendance)		
10	Acute illness		
11	Side effects of warfarin and poor control of anticoagulation (and what to do if experienced) • Signs/symptoms of excess anticoagulation: bleeding or bruising • Recurrence of thromboembolism		
12	Potential for drug interactions: aspirin, ibuprofen (paracetamol is the preferred analgesic), antibiotics, herbal remedies, glucosamine and other supplements, OTC medicines, alternative therapies. Seek advice.		
13	Diet (vitamin K containing foods, importance of avoiding major fluctuations in dietary intake; cranberry juice/capsule interaction)		
14	Alcohol intake		
15	Contraception, pregnancy, and hormone replacement therapy (if relevant)		
16	Surgical procedures (inc. day surgery /dental treatment) & hospital admission)		
17	Hobbies and leisure activities (including flying)		
18	Injections (including immunisation)		
19	How to obtain further supplies of warfarin		
20	Who to contact for advice/ further information		

Counselled by (Signature and Print Name): ..... Date: .....

Patient's Signature: ..... Date: .....

Approved by the Health Records Committee 23/6/08 VS458

Appendix 1: Warfarin Counselling Record – Obtain VS458 from General Stores

Warfarin Counselling Guidelines

1. **Use of the Anticoagulant Therapy Record book** (yellow book). Go through the yellow book with them. Tell them that it is the only record of dosing information available for the patient, since (2) the dispensing labels on the warfarin boxes will be labelled as 'Take as directed in the Anticoagulant Book". Therefore it is important to keep it up to date at all times and to understand the dosing instructions. Explain to the patient that they will receive an additional wallet containing more information and an Alert Card when they go for their first clinic appointment with the Anticoagulant Dosing & Advisory Service(ADAS).
2. **See above**
3. **Basic mode of action of warfarin** – 'thins the blood' or 'reduces the bloods ability to form clots'
4. **Indication for therapy** – explain why the patient is taking warfarin. Common examples and patient explanations include:
   - DVT/PE – 'to prevent clot getting bigger or returning'
   - AF – 'when the heart is not beating regularly, the blood will not flow smoothly. Therefore, there is a risk of getting a clot, which may float through the body and cause damage e.g. stroke'
   - Pre & post DC cardioversion for AF
   - Heart valves – 'there is a risk of getting clots around the valve, which may float through the body and cause damage; also to prevent valve damage'
   - Some cancer patients who are receiving thalidomide in combination with chemotherapy and dexamethasone – 'to reduce the risk of getting a clot which is sometimes associated with this group of patients'.
5. **Expected duration of therapy** (if known) – if unsure, check with Doctor. Do not assume or guess.
   - DVT/PE – may be a short course (3-6 months) or lifelong if recurrent
   - AF/ heart valves – treatment will be lifelong
   - DC cardioversion – e.g. at least 4 weeks before and 4 weeks after, the latter depending on success of DC cardioversion
   - Cancer patients receiving thalidomide in combination with chemotherapy and dexamethasone – until end of treatment
6. **Tablet identification**
   - Explain colour of the different tablet strengths and that they will always be the same colour for each strength even if the supplier is different. White 500microgram(0.5mg)/ Brown 1mg tablets / Blue 3mg tablets / Pink 5mg tablets. It is unusual to get all strengths.
7. **Dose**
   - Varied dosing according to blood result / INR
   - Warfarin should be taken at same time of day every day (which is often around teatime / 6-7pm). If patient decides to take it in the morning, tell patient to inform hospital staff if (s)he is ever admitted, to reduce the risk of getting a double dose (since many hospitals prescribe in-patient warfarin at 6pm).
   - How to use the different tablets strengths to make up the dose intended
   - If a dose is missed, OK to take on the same day within 6 hours of when dose was due. NEVER double up on a dose but carry on as normal on next day if dose is missed. Make a note of the date the dose was missed in the yellow book and let anticoagulant clinic/doctor know. If unsure, then it is better to miss the dose rather than risk taking a double dose
8. **Compliance** and ways of remembering to take the tablets e.g. using a calendar to mark off whether a dose has been taken
9. **Monitoring**
   - INR is monitored regularly initially (every few days) and gradually less often once dose and INR settles (monthly to 12 weekly)
   - Outpatient monitoring clinics (and importance of attendance)
10. **Any Change in Medical Condition** – Inform treating Doctor (e.g. GP) of acute illness, as more regular INR check may become necessary.
11. **Side effects** of warfarin and poor control of anticoagulation (and what to do if experienced)
    - Recurrence of thromboembolism: contact doctor if original symptoms recur
    - Signs/symptoms of excess dosing: severe bleeding or multiple bruising with or without high INR is the most common side effect: contact doctor immediately if unusual or severe
    - Contact clinic/ GP/ hospital if these occur: bloody stools or urine, nose bleeds (if lasting for > 5mins or if pt does not usually suffer from nose bleeds), blood shot eye, coughing or vomiting blood, excessive vaginal bleeding, cuts that take longer than 5 minutes to stop bleeding. Bleeding from gums (use a soft toothbrush)
    - Any other side-effects: discuss with GP or anticoagulant clinic
12. **Potential for drug interactions:** may be affected by many medicines, therefore:
    - Patient should always let doctor/dentist/pharmacist know that s/he on warfarin.
    - Not to take aspirin unless prescribed by doctor. Care with OTC painkillers (e.g. ibuprofen/aspirin). Paracetamol is preferred
    - Caution with antibiotics and always check with pharmacist/anticoagulant clinic before taking herbal remedies.
    - Inform anticoagulant clinic of any drugs stopped, started or if doses are changed.
13. **Diet:** some foods contain high levels of vitamin K which may interfere with warfarin action (e.g. broccoli, brussel sprouts, cauliflower, cabbage, chickpeas, kale, spinach, turnip greens, liver). Patients may have these foods in moderation, but important to avoid major changes in regular diet or crash diets. Report any major changes in diet to anticoagulant clinic. Cranberry juice may raise INR – avoid or limit intake of cranberry juice whilst on warfarin.
14. **Alcohol intake:** check patient's current alcohol intake and baseline LFTs/clotting. If patient a heavy drinker (known alcoholic, or drinks > recommended units/wk), discuss with Dr re plan for alcohol reduction and also warfarin implications/suitability. Ideally, keep intake to a minimum. Small to moderate amounts (e.g. 1 glass of wine / ½ pint beer/lager per night or 2-3 x per week) shouldn't affect warfarin control in otherwise healthy individuals with no liver problems. Avoid binge drinking.
15. **Contraception, pregnancy, and hormone replacement therapy** (if relevant): this will be discussed in detail in the anticoagulant clinic according to separate guidance. Check that there is no possibility of the patient being pregnant at the time of starting warfarin therapy and that she understands the importance of effective contraception. Pregnancy should be planned following discussion with anticoagulant clinic/ GP.
16. **Surgical procedures** (inc. dental treatment) and hospital admission: patient must inform Doctor/dentist that s/he is on warfarin.
17. **Hobbies and leisure activities** (including flying): avoid contact sports (e.g. boxing) and other higher risk sports (e.g. skiing and horse riding), as increased risk of bruising/bleeding. Inform Dr/anticoagulant clinic if flying in the near future.
18. **Injections** (including immunisations): patient must inform GP/ practice nurse that s/he is on warfarin.
19. Further supplies of warfarin are obtained from your GP. The GP and Chemist will ask to see the yellow book before they can prescribe and dispense. Make sure never to run out of warfarin tablets, especially when on holidays.
20. Further advice/information from anticoagulant clinic on (01253)306719, GP, pharmacy medicines information dept, or in an emergency A&E dept.

(to be filed in medical records)

Appendix 1: Warfarin Counselling Record – Obtain VS458 from General Stores

This patient has been given verbal and written information on warfarin therapy, by a Doctor, Pharmacist or Nurse in accordance with the guidance overleaf.

The anticoagulant book MUST be fully completed prior to discharge including information regarding recent inpatient dosing, discharge dose and follow-up appointment details.

For in-patients, it is the responsibility of the discharging doctor to ensure that this occurs

Appendix 2: Oral Vitamin K

- The smallest available tablet of vitamin K is 10mg. Therefore to give 1-2mg, need to use liquid vitamin K. The formulation in this Trust is Konakion MM Paediatric 2mg in 0.2ml
- To administer, open the vial. Using a syringe, draw up 0.1ml if need 1mg, or draw up the whole vial contents i.e. 0.2ml if need 2mg.
- Give orally with a glass of water.

Appendix 3: PCC checklist

Patient details

Patient's surname/family name …… Ward / clinical area…….

Patient's first name …… □ Male □ Female

Date of birth …… Consultant in charge …….

Hospital No (or other identifier) ……..

PROTHROMBIN COMPLEX CONCENTRATE (Octaplex®) ISSUE CHECKLIST

PCC can only be issued if "Yes" answered to all 4 questions below

Is the patient on warfarin? Yes ☐ No ☐

Does the patient have a serious or life-threatening bleed, or require an emergency procedure within the next 6-12 hours? Yes ☐ No ☐

Has PCC use been discussed with a responsible Registrar or Consultant **(this is the parent team, not the haematologist on call)** Yes ☐ No ☐

The requester understands that they must prescribe the octaplex on the transfusion prescription document and that by doing so they are taking responsibility for the dose prescribed? Yes ☐ No ☐

INR…… **Total body weight of patient (kg)** …….

Dose of PCC to be Administered

- INR 1.5 – 4.9 give 15 units/kg (if INR is 1.4 or less PCC is **not** required)
- INR 5.0 or above give 30 units/kg
- All doses should be rounded up or down to the nearest 500 unit vial, **with 3000 units the max dose**
- It is the responsibility of the requester to calculate the dose of PCC, not the laboratory scientist

Additional Instructions to Requester:

- Send a completed signed transfusion request form **immediately** down to the lab with the person picking up the PCC – **this is an emergency situation, speed is vital**
- **Must** follow "Reversal of Anti-Coagulation" policy on Intranet – **especially note need for vitamin K**
- **Must** repeat INR 30 minutes after PCC dose. Reversal of warfarin effect is usually very reliable however, so if emergency surgery or line insertion is required, and the responsible clinician determines the risk of waiting for the repeat INR result is too high, they should proceed.
- Give an additional 500 units PCC if repeat INR 2 or above.
- **Full** completion of this checklist allows authorisation of PCC issue. There is no need to contact the haematologist on call unless further advice is required.

Appendix 3: PCC checklist

Name of requester……..……

Bleep Number…….**Grade**……..

Name of Registrar / Consultant authorising PCC use……..

Name of laboratory scientist issuing the PCC: ……..

Dose of PCC issued……..

Signature……Date: ……Time……..…

Appendix 4: Octaplex Mix2Vial Instructions for Reconstitution

octaplex®

(500 IU coagulation factor IX per vial, powder and solvent for infusion, Human Prothrombin Complex)

octaplex® Mix2Vial™ Instructions for reconstitution

Follow the hospital's aseptic procedures at all times. Working on a clean flat surface, remove the vials from the outer packaging and remove the flip top lids. Disinfect the vial injection sites with an alcohol swab.

Step 1

Remove the top of the Mix2Vial™ package. Do not remove the device from the package.

Step 2

Seat the blue end of the device on the water vial, using the blister pack as a holder. Push down until the spike penetrates the stopper and the device snaps in place.

Step 3

Remove the plastic package and discard it. Take care not to touch the exposed end of the device.

Step 4

Turn the water vial upside down and insert the clear end into the powdered octaplex® vial, pushing down until the spike penetrates the stopper and the device snaps in place.

Step 5

The water will automatically flow into the octaplex® vial. Gently swirl the vial to make sure the octaplex® is thoroughly mixed.

Step 6

Remove the water vial by turning it anti-clockwise. Attach a syringe to the octaplex® vial.

Step 7

Turn the octaplex® vial upside down and withdraw the solution into the syringe. Remove the syringe by turning the barrel counter clockwise. octaplex® is now ready for administration.

The reconstitution guidelines above have been adapted from octaplex® Summary of product characteristics and reconstitution direction from Mix2Vial™ of West Pharmaceutical Services.

Date of preparation: October 2013 20NOV2013

octapharma

Appendix 5: Abbreviated Prescribing Information octaplex

Abbreviated Prescribing Information octaplex® (500 IU coagulation factor IX per vial, powder and solvent for infusion, Human Prothrombin Complex) Please refer to the Summary of Product Characteristics (SmPC) before prescribing. **Presentation:** Powder and solvent for solution for infusion. Each vial contains coagulation factors II (280 - 760 IU), VII (180 - 480 IU), IX (500 IU) and X (360 - 600 IU), Protein C (260 - 620 IU), Protein S (240 - 640 IU) and total protein (260 - 820mg). FIX specific activity ≥ 0.6 IU/mg proteins. **Indications:** Treatment and perioperative prophylaxis of bleeding in 1) acquired deficiency of prothrombin complex coagulation factors when rapid correction of the deficiency is required and 2) congenital deficiency of the vitamin K dependent coagulation factors II and X when purified specific coagulation factor product is not available. **Dosage and Method of Administration:** Treatment should be initiated under the supervision of a physician experienced in the treatment of coagulation disorders. The dosage and duration of substitution therapy depends on the severity of the coagulation disorder, location and extent of bleeding, half-life of the different coagulation factors and patient's clinical condition. Regular determination of either individual plasma levels of coagulation factors or global tests of prothrombin complex levels (prothrombin time, INR) are needed for dosing. *Guidance for bleeding and bleeding prophylaxis during vitamin K antagonist treatment:* Dose will depend on INR before treatment and target INR. Prothrombin complex factor correction persists for approximately 6 - 8 hours. *Guidance for initial dosage for congenital deficiency:* 1 IU/kg body weight raises the activity of factor II by 0.02 IU/ml and factor X by 0.017 IU/ml. For intravenous administration only. Start infusion rate at 1 ml/min followed by 2 - 3 ml/min. **Contraindications:** Hypersensitivity to active substance, excipients or heparin. History of heparin induced thrombocytopenia. **Special Warnings and Precautions:** The advice of a specialist experienced in management of coagulation disorders should be sought. Stop infusion if allergic or anaphylactic reactions occur. Despite measures to prevent infection, possibility of infective transmission cannot be totally excluded - record patient name and product batch number. Appropriate vaccination (hepatitis A and B) is recommended for patients in regular/repeated receipt of human plasma derived prothrombin complex products. Infusion of prothrombin complex may exacerbate underlying hypercoagulable state in patients receiving vitamin K antagonists. Repeated dosing in patients with congenital or acquired bleeding defect is associated with a risk of thrombosis or disseminated intravascular coagulation (DIC). Closely monitor when administering to patients with a history of coronary heart disease or liver disease, to peri- or post-operative patients, to neonates, and to patients at risk of thrombosis or DIC. octaplex® contains 75 - 125 mg sodium per vial and this should be taken into consideration in patients on controlled sodium diet. Only use in pregnancy and lactation if clearly indicated. **Undesirable Effects:** Risk of thromboembolic episodes. Headache, transient rise in liver transaminases, allergic or anaphylactic - type reactions including increase in body temperature may occur rarely. Replacement therapy may rarely lead to inhibitor formation manifesting as poor clinical response. octaplex® contains heparin therefore sudden allergy induced thrombocytopenia may occur. For further information on side effects please refer to SmPC. **Legal category:** POM **Marketing Authorisation Numbers:** PL 10673/0027 (UK); PA 521/13/1 (ROI) **Package Quantities and Basic NHS Cost:** Vial containing 500 IU Factor IX: £245 (UK) Further information is available from the **Marketing Authorisation Holder:** Octapharma Limited, The Zenith Building, 26 Spring Gardens, Manchester, M2 1AB. United Kingdom. **Date of Preparation:** September 2013 OPX/13/11

Adverse events should be reported. Reporting forms and information can be found at www.mhra.gov.uk/yellowcard or www.imb.ie.
Adverse events should also be reported to Octapharma on +44 (0)1748 828855.

Appendix 6: CHADS $_2$ score	
Score	**CHADS$_2$ Risk Criteria**
1 point	Congestive heart failure
1 point	Hypertension
1 point	Age >75 years
1 point	Diabetes mellitus
2 points	Stroke / transient ischemic attack

Appendix 7: Equality Impact Assessment Form

Department	Organisation wise	**Service or Policy**	Procedure	**Date Completed:**	October 2019

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?	The Procedural Document is to ensure that all members of staff have clear guidance on processes to be followed. The target audience is all staff across the Organisation who undertakes this process.	Raise awareness of the Organisations format and processes involved in relation to the procedural document.	Yes – Clear processes identified	
Does the service, leaflet or policy/ development impact on community safety • Crime • Community cohesion	Not applicable to community safety or crime	N/A	N/A	
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.	No	N/A	N/A	
Does the service, leaflet or development/ policy have a negative impact on any geographical or sub group of the population?	No	N/A	N/A	
How does the service, leaflet or policy/ development promote equality and diversity?	Ensures a cohesive approach across the Organisation in relation to the procedural document.			
Does the service, leaflet or policy/ development explicitly include a commitment to equality and diversity and meeting needs? How does it demonstrate its impact?	The Procedure includes a completed EA which provides the opportunity to highlight any potential for a negative / adverse impact.			
Does the Organisation or service workforce reflect the local population? Do we employ people from disadvantaged groups	Our workforce is reflective of the local population.			
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/A			
Does the service, leaflet or policy/ development promote equity of lifelong learning?	N/A			
Does the service, leaflet or policy/ development encourage healthy lifestyles and reduce risks to health?	N/A			
Does the service, leaflet or policy/ development impact on transport? What are the implications of this?	N/A			
Does the service, leaflet or policy/development impact on housing, housing needs, homelessness, or a person's ability to remain at home?	N/A			
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/A			

Appendix 7: Equality Impact Assessment Form

Does the policy/development promote access to services and facilities for any group in particular?	N/A			
Does the service, leaflet or policy/development impact on the environment • During development • At implementation?	N/A			
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:**	**Dr Seye Kolade**		**Date Signed:**	**1st October 2019**
Name of Lead Person: **Signature of Lead Person:**			**Date Signed:**	
Name of Manager: **Signature of Manager**			**Date Signed:**	