Guidelines for the Management of Patients on Warfarin

February 2005

Contents

Introduction

These guidelines have been developed by a multidisciplinary team to ensure a safe, effective and consistent approach to the management of adult patients in primary and secondary care receiving warfarin. The prescribing information contained in these guidelines is issued on the understanding that it is the best practice from available resources at the time of issue.

Scope of Guideline

These guidelines give advice to prescribers and other healthcare professionals on managing patients on warfarin eg prescribing considerations, monitoring requirements and factors affecting warfarin therapy. The user is reminded of the importance of the patient's handheld record in the form of an anticoagulant therapy record booklet.

Relationship between primary and secondary care

Due to the inherent complexity associated with warfarin use, communication between primary and secondary care is of utmost importance particularly since very often patients are initiated in secondary care and managed in primary care.

Initiation of Warfarin

A diagnosis, target International Normalised Ratio (INR) and likely duration of treatment must be established:

- Assess patient compliance.
- Take baseline blood samples (LFTs, FBC, APTT/PT, U&Es, creatinine), full medical history (any cautions or contraindications, pregnancy) and full medication history (consider interactions, herbal and over the counter medicines).
- Develop an individual management plan and discuss with the patient.

Transfer from secondary to primary care

Therapeutic factors

- Ensure INR is within therapeutic range and ideally has been within range for 2 – 3 days.

- Consider whether discharge is being made at a weekend or a public holiday since the patient may not have easy access to primary care.

Patient related factors/effective communication

- It should be documented that:
  - the oral anticoagulant therapy record booklet has been completed and that the patient has been taken systematically through the booklet.

  - the patient has been given written information on the date and place of their next monitoring visit. Ideally the patient should have an appointment with primary care within 3 days of discharge.

  - the patient has enough tablets to last until their follow up appointment.

Initiation of Warfarin (continued)

- Ensure that the GP has been notified timeously in writing with clear recommendations and specifying the following information:

  - reason for warfarin therapy
  - target INR and results of recent INR tests
  - date warfarin started
  - proposed duration of warfarin therapy
  - warfarin dose on discharge
  - other relevant information such as additional medication and comorbid disease states
  - follow up appointments for INR check and/or check up at GP practice
  - confirm that patient has an an anticoagulant therapy record booklet

Warfarin Monitoring in Primary Care

- An annual review of the patient's health should be carried out if the patient is on long-term warfarin (including any change in medication or changes in concomitant conditions).

- Determine where the patient will obtain warfarin from, ensuring there are no access problems. Determine where the patient will receive warfarin monitoring.

- Confirm there are methods in place to ensure that the quality of service being offered is safe, effective and consistent. Monitoring should be supervised by trained staff and systems in place to audit clinical performance.

- Ensure that an appropriate recording and documentation system is in place. This must include documentation of cumulative records of INRs and warfarin dosages. Every result should be entered in the patient's anticoagulant therapy record booklet and in the practice record. The practice record should serve as the patient's primary and permanent record.

- A patient recall and review system should be in place and the following factors should be considered:
  - formal arrangements for processing reports to ensure that the result reaches the doctor timeously.
  - INR results not within range or marked as urgent reach the clinician on day of receipt.
  - a system is in place for informing patients of results and dose changes.
  - arrangements for weekend or public holiday periods are clearly set out.
  - practice guidelines exist detailing referral pattern to secondary care when needed.

Warfarin Monitoring in Primary Care (continued)

Transfer from primary to secondary care

- Ensure that there are clear practice guidelines detailing when to refer the patient to specialist care.
- Advise the patient to take their oral anticoagulant therapy record booklet to the specialist.
- Notify the specialist that the patient is on oral anticoagulation therapy and given details of the GP responsible for monitoring the patient.
- Information to be given to secondary care should include: indication and target INR, current dose, date when warfarin started, recent changes and INR results, coexisting medications and worsening of comorbid conditions.

Patients attending hospital based DVT clinic

Patients are referred to the nurse led Deep Vein Thrombosis (DVT) clinic at the Royal Infirmary of Edinburgh (RIE) following diagnosis of a DVT at the combined assessment unit. Patients are started on low molecular weight heparin (LMWH) and a loading dose of warfarin. Please refer to the Lothian Joint Formulary (LJF) www.ljf.scot.nhs.uk for the LMWH drug of choice. Patients attend the clinic daily where the INR is checked. When the target INR has been achieved and stabilisation has been confirmed, patients are transferred to the care of their GP. Prior to transfer, secondary care will arrange an appointment with the primary care practitioner within 3 days of discharge and fax all relevant information.
A similar system is in operation at the Western General Hospital (WGH) and St. John's Hospital (medical patients only).

Target INR and Duration of Therapy According to Indication

Note: The following recommendations relate to warfarin use in adult males and adult non-pregnant females. See page 22 for information on warfarin in pregnancy.

1. Venous Thromboembolism

1.1 Treatment of thromboembolism

Indication	Target INR	Duration
Post-op calf vein thrombosis with no persistent risk factors	2.5	6 weeks
Isolated calf vein DVT with no risk factors[1*] in nonsurgical patients	2.5	3 months
First event proximal vein thrombosis/PE with no risk factors[1*]	2.5	6 months
Isolated calf vein DVT, proximal vein thrombosis/PE and post-op calf vein thrombosis with persistent risk factors[1*]	2.5	Long term or until risk factors resolve
Recurrence of DVT/PE **off** warfarin		
a) Two episodes of idiopathic DVT/PE	2.5	Long term
b) Repeated provoked DVT/PE	2.5	6 months or until risk factors resolve
Recurrence of DVT/PE **on** warfarin If recurrent DVT at INR 3.5, discuss with specialist	3.5	Long term or until risk factors resolve

1*. Cancer, thrombophilia (antithrombin III deficiency, Protein C and S deficiency), antiphospholipid syndrome, chronic infection, inflammatory bowel disease, nephrotic syndrome, pulmonary hypertension.

Target INR and Duration of Therapy According to Indication (continued)

1.2 Prophylaxis of thromboembolism

Indication	Target INR	Duration
Cancer patients – minidose 1mg warfarin in patients with central venous catheter	No INR monitoring	Length of time with catheter and usually until 1 week after removal of catheter
Patients with Stage IV breast cancer who are receiving chemotherapy, on advice of oncologist	Likely to be 1.6	Duration of chemotherapy – specialised use. INR and duration needs to be made clear by hospital team

2. Atrial Fibrillation

2.1 Nonvalvular (Non-rheumatic) atrial fibrillation[2*]

Indication	Target INR	Duration
Continuous or paroxysmal AF with at least one risk factor[3*] to develop thromboembolism	2.5	Long term
AF associated with a) clinical thyrotoxicosis b) intracardiac thrombus c) non-cerebral thromboembolism d) congenital heart disease	2.5	a) Until controlled b) As recommended by cardiologist c) Long term d) Long term
Elective cardioversion	2.5	3 weeks before until 4 weeks after

2*. Definition of nonvalvular atrial fibrillation: Nonvalvular AF is restricted to cases in which the rhythm disturbance occurs in the absence of rheumatic mitral valve disease or a prosthetic heart valve.

3*. Advancing age (> 65 years), history of hypertension, diabetes, heart failure, left ventricular dysfuntion, previous ischaemic stroke or TIA, history of thromboembolism. The risk/benefit of warfarin needs to be determined for every individual patient above 75 years of age and needs to be reassessed annually particularly in this age group, in view of the increased haemorrhagic risk in this group.

Target INR and Duration of Therapy According to Indication (continued)

2.2 Atrial Fibrillation associated with valvular disease (Rheumatic heart disease)

Indication	Target INR	Duration
Rheumatic mitral valve disease and atrial fibrillation	2.5	Long term

3. Valvular Heart Disease

3.1 Heart valve disease

Indication	Target INR	Duration
Rheumatic mitral valve disease, mitral valve prolapse, mitral annular calcification, aortic valve disease each with previous systemic embolism or AF	2.5	Long term

3.2 Heart valve prostheses

Or as per guidance from cardiac unit since target INR may depend on site of valve replacement and manufacturer.

Indication	Target INR	Duration
Mechanical heart valves	3.5	Long term
Bioprosthetic heart valves: - after implant surgery	2.5	3 months or as per guidance from cardiac unit
- associated risk factors[4*]	2.5	Long term

4*. Atrial fibrillation, history of systemic embolism, evidence of left atrial thrombus at surgery, persistent left atrial enlargement, or persistent heart failure.

Target INR and Duration of Therapy According to Indication (continued)

4. Other indications

Indications	Target INR	Duration
Cardiomyopathy and heart failure	2.5	Long term
Post myocardial infarction: (a) Post myocardial infarction if persistent risk[5*] of systemic or pulmonary thromboembolism (b) Secondary prophylaxis in patients with atrial fibrillation, heart failure or left ventricular dysfunction	 2.5 2.5	 3 months Long term
Ischaemic stroke Preferred to aspirin in patients with atrial fibrillation or if there is some other potential cardiac source of embolism – eg valvular heart disease. Warfarin usually started at least 14 days after acute episode	2.5	Long term
Peripheral arterial embolism and AF or other source of embolism	2.5	Long term or until source of embolism resolves
Recurrent arterial thrombosis and embolism on warfarin (seek specialist advice)	3.5	Long term

5*. Large anterior Q-wave infarction, severe left ventricular dysfunction, coronary heart failure, history of systemic or pulmonary embolism or thrombophilia, mural thrombus, persistent atrial fibrillation, prolonged immobilisation, marked obesity.

Starting Therapy

Different schedules may be used for the initiation of warfarin. A rapid loading dose is likely to be used in hospitalised patients with active thromboembolism where 5-10mg/day warfarin is administered on day one and day two; thereafter dosing is determined according to the daily INR. This is also referred to as the 'Fennerty regimen' and details of this are available at Appendix III (page 32).

In non-acute situations eg atrial fibrillation, outpatients may be commenced on long term warfarin prophylaxis using a less intense initiation regimen. Refer to Appendix IV (page 33) for guidance on initiating warfarin in primary care.

Stopping Therapy

- Oral anticoagulant therapy should be tailed off over a short period (7-10 days, depending on the maintenance dose).
- Reductions of 1-2mg warfarin every 2-3 days are advised.
- INR monitoring is not required during this time.

Dose Adjustments, Maintenance Therapy

- Dose adjustments should not be made in isolation – the patient's dosing history needs to be considered at all times.

- Dose adjustment is not required for minor fluctuations of INR as long as the results remain within the patient's target ±0.5.

- Fluctuations of INR outwith the patient's target ±0.5 should always be investigated and corrected where possible. Consider causes such as change in dosage of warfarin, patient compliance, medication profile, change in diet or alcohol intake, initiation of an interacting drug and intercurrent illness.

Practice Point	**Changes in warfarin dosage may take several days to affect INR. Frequent dose adjustment is not recommended.**

Dose Adjustments, Maintenance Therapy (continued)

Target INR 2.5 ± 0.5

- Relevant patient information (eg concurrent treatment, intercurrent illness, compliance) needs to be considered in conjunction with dosing tables.
- 'Dose' refers to daily dose, unless otherwise stated.

INR	Dose adjustment	Next Appointment
1.1 – 1.4	One time dose of additional amount equal to 20% of weekly dose plus usual maintenance dose. Then increase weekly total dose by 20%, and divide this by 7, to get new maintenance dose. Note: this may involve different doses Mon-Fri (eg 5mg) vs Sat-Sun (4mg), or different doses on alternate days (ie 3mg/4mg/3mg) Eg patient on maintenance dose of 5mg – Weekly dose = 35mg 20% = 7mg + previous daily dose 5mg Therefore, one time top-up dose = 12mg New daily dose = 35mg +7mg = 42mg ÷ 7 Maintenance dose now 6mg	1 week
1.5 – 1.9	Increase weekly dose by 10% then divide by 7 for new daily dose	1 week
2.0 – 3.0	No change	Refer to Maximum Recall Periods , Maintenance Therapy page 14
3.1 – 3.9	Decrease weekly dose by 10% then divide by 7 for new daily dose	1 week
4.0-5.0	Omit 1 dose. Decrease weekly dose by 10% - 20% then divide by 7 for new daily dose	4-5 days
> 5.0	See Management of Overanticoagulation and Bleeding, pages 15-17	

Dose Adjustments, Maintenance Therapy (continued)

Target INR 3.5 ± 0.5

INR	Dose adjustment	Next Appointment
1.1 – 1.4	One time dose of additional amount equal to 20% of weekly dose plus usual maintenance dose. Then increase weekly total dose by 20%, and divide this by 7, to get new maintenance dose. Note: this may involve different doses Mon-Fri (eg 5mg) vs Sat-Sun (4mg), or different doses on alternate days (ie 3mg/4mg/3mg) Eg Patient on maintenance dose of 5mg – Weekly dose = 35mg 20% = 7mg + previous daily dose 5mg Therefore, one time top-up dose = 12mg New daily dose = 35mg +7mg = 42mg ÷ 7 Maintenance dose now 6mg	1 week
1.5 – 1.9	Increase weekly dose by 20% then divide by 7 for new daily dose	1 week
2.0 – 2.9	Increase weekly dose by 10% then divide by 7 for new daily dose	1 week
3.0 – 4.0	No change	Refer to Maximum Recall Periods, Maintenance Therapy page 14
4.1 – 4.9	Decrease weekly dose by 10% then divide by 7 for new daily dose	1 week
5.0-6.0	Omit 1 dose. Decrease weekly dose by 10% - 20% then divide by 7 for new daily dose.	4-5 days
>6.0	See Management of Overanticoagulation and Bleeding, pages 15-17	

Maximum Recall Periods, Maintenance Therapy

Relevant patient information and dosing/INR history must also be considered when determining timing of next appointment, for example difficulty in achieving initial therapeutic INR should prompt a repeat INR earlier than the 2 weeks recommended period.

Current INR	Next INR check
One INR therapeutic (about 6 weeks after elective induction or at discharge from hospital)	2 weeks
Two INRs therapeutic at two weekly monitoring intervals	4 weeks
Two INRs therapeutic at four weekly monitoring intervals	8 weeks
Two INRs therapeutic at eight weekly monitoring intervals	12 weeks

This guidance does not apply to patients with prosthetic heart valves where the maximum recall is 6 weeks. This patient group may need more frequent INRs in the first few weeks following discharge from hospital.

Management of Overanticoagulation and Bleeding

- Patients must be assessed for signs/symptoms of bleeding.

- Risk factors for bleeding include: history of past bleeding, recent surgery, hypertension, cerebrovascular disease or stroke, serious heart disease or recent Mycardial Infarction (MI), renal insufficiency, liver disease, other pre-existing bleeding disorder eg thrombocytopenia, age > 65 years, severe anaemia, diabetes, concomitant medications that potentiate bleeding.

- Bleeding that occurs whilst the INR is within the therapeutic range should be investigated for other underlying causes.

- Minor bleeding includes haemoptysis, purpura, unexplained or excessive haematomas, epistaxis and haematuria.

- Major bleeding includes gastrointestinal, intracranial, intra-articular, intraspinal, intraocular or retroperintoneal.

- Dose reduction is not always necessary if a reason for the high INR can be identified eg binge drinking.

- The absorption of intravenous (IV) vitamin K_1 preparation given orally is as complete and onset of action as rapid as the IV preparation given IV. Therefore IV access may not be required when reversing excess anticoagulation.

- If vitamin K_1 tablets are used, these should be chewed or allowed to dissolve slowly in the mouth.

- Re-education of patients who are overanticoagulated is crucial. This should include medicines to avoid, what to look out for that suggests overanticoagulation, what to do if this occurs, where to get their INR tested in an emergency.

- Poorly compliant elderly patients may require more frequent monitoring.

Management of Overanticoagulation and Bleeding (continued)

Target 2.5 ± 0.5

- INR 3.1 – 4.9: refer to maintenance dosage adjustment on pages 11-13
- Patient must be assessed for signs/symptoms of bleeding if overanticoagulated (ie INR > 5)
- Reason for anticoagulation and patient risk factors must be considered when deciding on next appointment

INR	Dose adjustment	Next Appointment
5.0 – 6.0	(1) Omit warfarin for 2 days. (2) Restart warfarin and reduce weekly dose by 20%, then divide by 7 to get new maintenance daily dose	5 days after restarting warfarin
6.1 – 8.0	(1) Stop warfarin (2) Restart warfarin when INR < 5 (3) Reduce weekly dose of warfarin by 20% then divide by 7 to get new maintenance dose	Daily appointment until INR < 5 3-5 days after warfarin restarted
> 8.0 and no bleeding or minor bleeding	(1) Stop warfarin (2) Assess patient for risk factors associated with increased risk of bleeding (see page 15) (3) Consider administering vitamin K_1 – Konakion® MM Paediatric (phytomenadione injection 10mg/mL), 5mg (0.5mL) **by mouth** or 2mg (0.2mL) by **slow intravenous injection.** If patient has ≥ 1 risk factor, consider hospitalisation for overnight observation. Discuss with secondary care (4) If INR unchanged or higher the next day, dose of Vitamin K_1 may be repeated. Repeat INR can be checked 6 hours or more after the vitamin K_1 has been given (5) Restart warfarin when INR < 5 (6) Reduce weekly dose of warfarin by 20% then divide by 7 to get new maintenance dose	Daily appointment until INR < 5 3-5 days after warfarin restarted
Major bleeding	(1) Stop warfarin (2) Resuscitate and transfer to hospital immediately, where specialists will initiate immediate, urgent, warfarin reversal	As directed by specialist care

Management of Overanticoagulation and Bleeding (continued)

Target 3.5 ± 0.5

- INR 4.1 – 5.9: refer to maintenance dosage adjustment on page 11-13
- Patient must be assessed for signs and symptoms of bleeding if overanticoagulated (ie INR > 6)
- Reason for anticoagulation and patient risk factors must be considered when deciding on next appointment

INR	Dosage adjustment	Next Appointment
6.1 – 8.0	(1) Stop warfarin (2) Restart warfarin when INR < 6 (3) Reduce weekly dose of warfarin by 20% then divide by 7 to get new maintenance dose	Daily appointment until INR < 6 3-5 days after warfarin restarted
> 8.0 and no bleeding or minor bleeding	(1) Stop warfarin (2) Assess patient for risk factors associated with increased risk of bleeding (see page 15) (3) Consider administering vitamin K_1 – Konakion® MM Paediatric (phytomenadione injection 10mg/mL), 5mg (0.5mL) **by mouth** or 2mg (0.2mL) by **slow intravenous injection**. If patient has ≥ 1 risk factor, consider hospitalisation for overnight observation. Discuss with secondary care (4) If INR unchanged or higher the next day, dose of Vitamin K_1 may be repeated. Repeat INR can be checked 6 hours or more after the vitamin K_1 has been given (5) Restart warfarin when INR < 6 (6) Reduce weekly dose of warfarin by 20% then divide by 7 to get new maintenance dose	Daily appointment until INR < 6 3-5 days after warfarin restarted
Major bleeding	(1) Stop warfarin (2) Resuscitate and transfer to hospital immediately, where specialists will initiate immediate, urgent, warfarin reversal	As directed by specialist care

Side Effects

- Increased risk of bleeding which is not necessarily accompanied by a high INR (See Management of Overanticoagulation and Bleeding on pages 15-17)
- Skin necrosis
- Alopecia
- Urticaria, dermatitis
- Fever
- Nausea, diarrhoea and abdominal cramps
- Anorexia
- Unexplained drop in haematocrit
- Jaundice, hepatic dysfunction and pancreatitis

Report suspected adverse reactions to CSM Scotland, www.show.scot.nhs.uk/CSMScotland (Freepost NAT3271, Edinburgh, EH16 4BR, tel. 0131 242 2919, using the yellow card reporting system, email: CSMScotland@luht.scot.nhs.uk).

Contraindications

Contraindications depend on individual circumstances and are seldom absolute. An individual risk/benefit assessment prior to initiating warfarin, and then annually as a minimum, is recommended. If doubt exists over the suitability of a patient for warfarin therapy, specialist advice should be sought. A risk/benefit assessment should be done each time the patient's condition or circumstances change.

- Purple toes syndrome
- Known bleeding tendency
- Thrombocytopenia (platelets < 50 x 10^3/μl)
- Uncontrolled hypertension (BP > 160/90mmHg)
- Uncompensated cirrhosis
- Non compliance with medication and/or with monitoring
- Drug abuse
- Haemorrhagic stroke
- Trauma related activities, recurrent falls
- Recent trauma or surgery to central nervous system (CNS) or eye
- Intra-articular injections are contraindicated in patients on warfarin
- Contraception and pregnancy (see Specialist Advice page 22 and Useful Contacts pages 25-26)
- Avoid intramuscular (IM) injections where possible.

- **Interactions**

- Where possible prescribe a non-interacting drug or therapeutically change an interacting drug with a non-interacting one.

- When in doubt, check with a suitable source eg BNF (www.bnf.org), Medicines Information Department (see Useful Contacts page 26).

- Patients may be on more than one drug so there may be an unpredictable response.

- Monitoring is more important during introduction, discontinuation and dosage adjustments of potentially interacting drugs.

- If the drug change lasts < 5 days there should be either no change in dose, minor dose reduction or omit one complete dose of warfarin if a known potentiating drug is given.

- If the drug change lasts > 5 days, check INR one week after start of new drug and adjust warfarin dose on basis of result.

- Where no information is available, repeat INR within 4 -7 days after starting or stopping treatment.

Complimentary therapies and herbal medicines

- Alternative therapies also have the potential to interact with warfarin and increase the bleeding risk with no effect on INR.

- Assume an interaction occurs unless you know otherwise.

Interactions (continued)

- When there is a **potential** for interaction:
  - Patients should be advised to stop the drug before starting warfarin.
  - If the patient insists on taking these medicines, closer monitoring for signs and symptoms of bleeding is necessary.
  - If the patient starts taking a medicine without advice, advise the patient to stop the medicine and recheck INR within 4 - 7 days and then again until stable.

- If there is a documented report of interaction in the literature, consider combination as contraindicated due to potential risk of thrombotic/haemorrhagic complications.

- Herbal products may have several common and scientific names.

- Question patients about the use of alternative therapies since they often will not inform you.

Diet and warfarin

- Foods rich in vitamin K may interfere with warfarin metabolism eg leafy vegetables, liver, broccoli, brussel sprouts.

- Other foods that may affect warfarin metabolism include grapefruit juice and cranberry juice.

- Patients should be advised to have consistent intakes of these foods.

- All patients should be advised to moderate their alcohol intake while on warfarin and avoid binge drinking.

- Acute excess intake of alcohol may result in an increase in the effect of warfarin.

- Chronic alcohol consumption may result in a decrease in the effect of warfarin.

Specialist Advice

Specialist advice may be sought in the following circumstances:

- Recurrent DVT/PE if INR > 3.5.
- Screening and management of patients with thrombophilia.
- Management of chronic venous insufficiency/post-phlebitic syndrome.
- Patient on another vitamin K antagonist – eg phenindione, acenocoumarol (nicoumalone).
- Prior to surgical interventions – advice on acceptable INRs and dose reductions will vary according to the nature of the surgical procedure.
- Episodes of skin necrosis or purple toe syndrome.
- Women of childbearing age receiving warfarin should be warned about the teratogenic and harmful effects of warfarin, especially in early pregnancy. They should be advised to use secure methods of contraception while on warfarin. If they suspect they are pregnant, they should be offered an early pregnancy test (5 weeks from last menstrual period). Conversion to therapeutic once daily LMWH prior to conception may be possible. Specialist advice should be sought if such a woman becomes pregnant unexpectedly or requires conversion to LMWH; women on long term anticoagulation should be referred to pre-pregnancy counselling.

Management of the Primary Care Dental Patient on Warfarin

Warfarin does not need to be stopped before primary care dental surgical procedures. However an INR should be measured not more than 24 hours before the dental procedure. If the patient is on a short course of warfarin, consider delaying the procedure until the course has been completed.

- Patients requiring dental surgical procedures who have an INR < 3.5 should continue warfarin therapy without dose adjustment.
- Bleeding is easily treated with local measures; procedure should be made as atraumatic as possible and any bleeding managed using local measures.
- The risk of thromboembolism after withdrawal of warfarin treatment outweighs the risk of oral bleeding.

Patients should **not** undergo surgical procedures in primary care if:

- INR > 3.5.
- Liver impairment and/or alcoholism.
- Thrombocytopenia, haemophilia or other disorders of haemostasis.
- Previous endocarditis.
- On-going/recent cytotoxic or radiotherapy.

Tranexamic acid mouthwash should not be used in primary care, unless on the advice of a specialist.

Management of the Primary Care Dental Patient on Warfarin (continued)

Avoid: non-steroidal anti-inflammatory drugs (NSAIDs) - use paracetamol where possible

Significant interactions - avoid where possible:
(If used check INR within 2-4 days):

- metronidazole
- macrolides (eg erythromycin, azithromycin)
- antifungals (eg miconazole topical preparations including oral gel)
- doxycycline

Insignificant or no interactions:

- amoxicillin (single 3g used for prophylaxis)
- clindamycin (600mg as a single dose)
- aciclovir
- nystatin topical preparations

Useful Contacts

Haematology Departments:

Royal Infirmary of Edinburgh (RIE)
Monday – Friday 09:00 – 17:00
☎ 0131 242 6814

Out of hours:
Consultant haematologist on-call:
Via RIE switchboard
☎ 0131 536 1000

SpR
24 hours/7 days
Via RIE switch board:
☎ 0131 536 1000 Bleep 6466

Combined High Risk Antenatal Clinic:
RIE Haematology
Monday – Friday 09:00 – 17:00
☎ 0131 242 6814

Out of hours:
Consultant haematologist on-call:
Via RIE switchboard
☎ 0131 536 1000

Western General Hospital (WGH)
Consultant/ SpR
24 hours/7 days
Via WGH switchboard:
☎ 0131 537 1000
Ask for on-call haematology consultant/SpR

Useful Contacts (continued)

St John's Hospital – Livingston
Monday – Friday 09:00 – 17:00
Via St John's switchboard
☎01506 419666 ext 3358

Out of hours:
Via WGH switchboard
☎ 0131 537 1000
Ask for on-call haematology consultant

SpR
Monday – Friday 09:00 – 17:00
Via St John's switchboard
☎ 01506 419666
Ask for haematology SpR

Out of hours:
Via WGH switchboard:
☎0131 537 1000
Ask for on-call haematology SpR

Medicines Information Departments:

Lothian Primary and Community Division (LPCD)
Pharmacy, Royal Edinburgh Hospital (REH)
Monday – Friday 08:30 – 17:00
(answering machine if dept not manned)
☎ 0131 537 6421

Out of hours:
On call pharmacist
Via REH switchboard
☎ 0131 537 6000

Lothian University Hospital Division (LUHD)
Pharmacy, RIE
Monday – Friday 08:30 – 18:30
Saturday – Sunday 08:30 – 15:00
☎ 0131 242 2920

Out of hours:
On call pharmacist
Via RIE switchboard
☎ 0131 536 1000

West Lothian Healthcare Division (WLHD)
Pharmacy, St John's Hospital Livingston
Monday – Friday 0900 – 17:00
☎ 01506 419666 ext 2258

Out of hours:
On call pharmacist
Via St John's switchboard
☎ 01506 419666

Useful Contacts (continued)

Further information about warfarin therapy

www.bcshguidelines.com – British Society of Haematology Guidelines, 3rd edition, 1998.

www.sign.ac.uk – Scottish Intercollegiate Guidelines Network SIGN 36 – Antithrombotic Therapy, March 1999.

www.bma.org - Guidance on anticoagulation as a National Enhanced Service, British Medical Association, May 2003.

www.elib.scot.nhs.uk - Stockley Drug Interactions –
A Pharmaceutical Press Publication, 2003.

Lothian Referral Guidance – Refhelp (electronic version)
http://refhelp/index.htm (intranet)
www.refhelp.org.uk (internet)

To obtain anticoagulant therapy record booklets
(free of charge):
Banner Business Supplies, 20 South Gyle Crescent,
Edinburgh EH12 9EB Tel: 0131 479 3279 Fax: 01506 448 400

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For further information and copies of the guideline please contact the Guideline Team in the first instance.

Appendix I - Suggested Audit Points for Warfarin Management

Practice Point	Audit Point
Indication for anticoagulation	Appropriate indication (refer to pages 6 to 9)
Documentation through up-to-date register	Include: name, date of birth, indication, length of treatment, target INR
Screening investigations	Results including: full blood count including platelet count, urea and electrolytes, liver function tests, APTT/PT available at baseline
Individual management plan	Discuss with patient including: diagnosis, planned duration and therapeutic range, risks and benefits of treatment
Clinical procedures	Patient's health reviewed at start and annually. Risk factors considered: age, past medical history, drug history, complete list of concomitant diagnoses and current drugs documented at each visit
Anticoagulant dose and control	INR and dose documented at each visit; dose adjustments communicated to patients; policy to ensure management of bleeding and excessive anticoagulation
Follow up and recall	Systematic call of patients; date of clinic visit documented; recall patients not attending; maximum extension call 12 weeks in well stabilised patients; patients quickly contacted regarding any change of dose
Patient education	Patients given anticoagulation booklet; patient taken systematically through booklet; booklet completed and updated at each visit
Professional links, organisation, training	Necessary training and skills for all staff involved; level of responsibility defined; named clinician in charge of clinic and alerted if INR>8; dose recommendations made according to written protocols or computer assisted guidelines; work with other professionals when appropriate
Audit	Regular audit of care and documentation kept; percentage of INRs within target range at each visit (50% of INRs within 0.5 units + 80% within 0.75 INR units of target); review patient outcome if INR>8 or requiring interventions to reverse anticoagulant effect
Referral	Refer to other services as per written policies
Computer-assisted anticoagulation	Refer to the British Society of Haematology Guidelines on oral anticoagulation – see page 27.

Appendix II - Checklist of Drug Interactions with Warfarin

This list is not exhaustive. If in doubt consult the British National Formulary (www.bnf.org) or a local Medicines Information Department (see Useful Contacts page 26).

AVOID		MONITOR INR	
Aspirin	Except where low dose aspirin and combination indicated	**Antiarrythmics**	quinidine
Analgesics	co-proxamol ketorolac (postoperative)	**Lipid lowering agents**	cholestryamine statins
Antifungals	miconazole	**Antidepressants**	SSRIs
Reverting hypoglycaemia	glucagon	**Antibiotics** **Antifungals**	Consult BNF if not listed in other sections
NSAIDs	azapropazone phenylbutazone	**Oral hypoglycaemic agents**	tolbutamide
Others	Enteral feeds containing vitamin K	**NSAIDs**	If not listed in other sections
		Others	anabolic steroids corticosteroids hormone antagonists ifosfamide influenza vaccine rawachol sucralfate

Appendix II - Checklist of Drug Interactions with Warfarin (continued)

ADJUST DOSE			
Ulcer healing	cimetidine omperazole	**Antiarrythmics**	amiodarone propafenone
Lipid lowering	fibrates	**Antiepileptics**	carbamazepine phenobarbitone phenytoin primidone
Alcohol dependence	disulfiram	**NSAIDs**	diflusinal
Thyroid and antithyroid drugs	carbimazole thiouracils thyroxine	**Antihyperuricaemic agents**	allopurinol sulphinpyrazone
Antibiotics **Antifungals**	aztreonam cephamandole chloramphenicol ciprofloxacin co-trimoxazole erythromycin griseofulvin metronidazole ofloxacin rifampicin sulphonamides	**Others**	aminogluthetimide barbiturates ciclosporin mercaptopurine oral contraceptive steroids

Adapted from SIGN Guideline 36: Antithrombotic Therapy, 1999

Appendix III - Rapid anticoagulation in secondary care (Fennerty Regimen)

Note: This is unlikely to be required in primary care but is used in secondary care where rapid anticoagulation may be required.

Day	INR – checked am	Warfarin dose (mg) administered pm
1	<1.4	10
2	<1.8	10
	1.8	1
	>1.8	0.5
3	<2.0	10
	2.0-2.1	5
	2.2-2.3	4.5
	2.4-2.5	4
	2.6-2.7	3.5
	2.8-2.9	3
	3.0-3.1	2.5
	3.2-3.3	2
	3.4	1.5
	3.5	1
	4.6-4.0	0.5
	>4.0	OMIT
4	<1.4	>8
	1.4	8
	1.5	7.5
	1.6-1.7	7
	1.8	6.5
	1.9	6
	2.0-2.1	5.5
	2.2-2.3	5
	2.4-2.6	4.5
	2.7-3.0	4
	3.1-3.5	3.5
	3.6-4.0	3
	4.1-4.5	Miss out next day's dose, then give 2mg
	>4.5	Miss out 2 day doses, then give 1mg