Recommendations from the British Committee for Standards in Haematology and National Patient Safety Agency

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The British Committee for Standards in Haematology (BCSH) published its third edition of Guidelines on Oral Anticoagulation in 1998 (British Committee for Standards in Haematology, 1998) with an update in 2006 (Baglin *et al*, 2006). These recommendations on safety indicators compliment those guidelines. Risks and recommendations are accompanied by lists of safety indicators for patients starting oral anticoagulant therapy and for patients established on oral anticoagulant therapy. Not all indicators will necessarily be adopted by every service; rather a selection is provided from which to choose those considered most useful for local circumstances and needs. It is envisaged that indicators will be used to set standards for service development and for controls assurance, either by monitoring or audit (see section on Governance).

As in the previous guidelines the term 'oral anticoagulant' refers to oral vitamin K antagonists (VKA), such as warfarin.

Initial drafts of the guideline were produced by the writing group and modified in accordance with comments from a multidisciplinary sounding board, the BCSH and the British Society for Haematology (BSH) and comments incorporated where appropriate. Criteria used to quote levels and grades of evidence are as in appendix 3 of the Procedure for Guidelines Commissioned by the BCSH (http://www.bcshguidelines.com).

The target audience for this guideline is healthcare professionals involved in the management of patients receiving oral anticoagulant therapy.

Background

It is estimated that, in the UK, there are approximately 500 000 patients currently prescribed oral anticoagulant drugs. Warfarin is the most frequently prescribed oral anticoagulant drug in the UK. Other, less commonly prescribed, oral anticoagulants include acenocoumarol and phenindione. These drugs require monitoring and frequent dose adjustment to maintain the desired therapeutic action and minimise adverse bleeding events. Underanticoagulation can result in thrombosis, which can be life-threatening. Overanticoagulation can result in haemorrhage, which can also be fatal. Duration of treatment varies, from 6 weeks to 6 months for venous thrombosis, to life for cardiac indications or recurrent thrombosis. The commonest indications for the use of oral anticoagulants are prevention of arterial thromboembolism in patients with atrial fibrillation and/or mechanical heart valves and treatment and prevention of deep vein thrombosis and pulmonary embolus (British Committee for Standards in Haematology, 1998; Baglin *et al*, 2006).

Patients taking oral anticoagulant drugs must have regular measurement of the International Normalized Ratio (INR) with appropriate anticoagulant dose adjustment. Some patients are particularly sensitive to oral anticoagulants and, in these individuals, small increases in dose, or introduction or discontinuation of interacting medicines, herbal preparations and certain foods can cause significant changes in the anticoagulant effect. Many patients have complex medical conditions and may be taking other medications. Oral anticoagulants interact with a wide variety of other commonly prescribed drugs, for example, antibiotics and analgesics. Most drug interactions result in an increased anticoagulant effect. Patients taking anticoagulants should be aware of the risks of taking other prescribed or purchased medicines, herbal products and certain foods without first seeking advice.

The dose of warfarin must be carefully adjusted for each patient. Patients are often given supplies of more than one strength of warfarin tablets, e.g. 1 mg, 3 mg and 5 mg, to enable doses to be adjusted. 0·5 mg tablets have been introduced recently to enable more accurate dose adjustment.

Supplying warfarin tablets in more than one strength may increase the risk of accidental overdose and requires additional patient education, especially in confused, older people (Reardon *et al*, 1995). Many patients are frail and elderly, or have working patterns and lifestyles that make frequent attendances for blood tests difficult. Successful, safe anticoagulation depends on patient education, good compliance and

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communication with the patient and between individuals responsible for their clinical care. The scope for occurrence of an adverse event related to warfarin is large because of the biological variation in response to treatment and because of the large number of individuals involved in the patient's care. Most published literature relates to pathological consequences, such as major or minor haemorrhage or thrombosis and does not directly correlate the incident with the quality of care delivered. An accepted standard of care is achievement of time within the target INR range (Rosendaal *et al*, 1993). Risk of haemorrhage whilst on long-term anticoagulation varies between 1 and 15% per annum and the risk of death increases with increasing INR, accepting that death may be due to co-morbidity, a high INR being an indicator of end stage disease (Oden & Fahlen, 2002).

A meta-analysis of studies using oral anticoagulant treatment for venous thromboembolism (VTE) has shown that major bleeding can have a serious clinical impact. The risk of major bleeding was greatest at the start of treatment; the rate was nearly as high for the first 3 months as for the entire year after this period (Linkins *et al*, 2003).

In primary care, anticoagulants are one of the classes of medicines most commonly associated with fatal medication errors. In secondary care, warfarin is one of the ten drugs most frequently associated with prescribing/dispensing errors. The National Health Service (NHS) Litigation Authority has reported that anticoagulants are one of the ten most common drugs involved in errors resulting in claims against NHS Trusts. Anticoagulants were included in the Department of Health Report regarding making medication practice safer as high-risk medicines that require the implementation of additional safety controls (Department of Health, 2004). The National Patient Safety Agency (NPSA) contacted the medical and pharmacy defence organisations as well as the NHS Litigation Authority and was informed that here have been 480 reported cases of harm or near harm from the use of anticoagulants in the UK from 1990–2002. In addition there have been 120 deaths reported over the same time period. Deaths from the use of warfarin were responsible for 77% (92) and heparin for 23% (28) of reports. The NPSA communicated with patient groups, patients and carers to obtain their views concerning their use of anticoagulants, undertook a comprehensive literature review and performed a risk assessment exercise with a multidisciplinary group on the use of anticoagulants in the NHS (http://www.npsa.nhs.uk). Risks were identified that contributed to the high incidence of patient harm with anticoagulants. Failure to implement professional guidelines and inadequate competencies of healthcare professionals prescribing, counselling, monitoring and administering anticoagulants are important underlying causes identified by the risk assessment process. These causes are perpetuated by local failure to effectively audit anticoagulant services or to act on audit results to improve clinical care and to alert Clinical Governance structures in NHS organisations of the extent of these risks.

Risks identified from the NPSA risk assessment

1 Inadequate competencies and training of staff undertaking anticoagulant duties.
2 Failure to initiate anticoagulant therapy where indicated.
3 Poor documentation of reason and treatment plan at commencement of therapy.
4 Prescribed wrong dose or no dose of anticoagulant (especially loading doses).
5 Unconsidered co-prescribing and monitoring of interacting drugs.
6 Unsafe arrangements and communication at discharge from hospital including failure to adequately transfer duty of care to patient's general practitioner.
7 Insufficient support and monitoring of warfarin therapy for the first 3 months and for vulnerable groups.
8 Inadequate safety checks at repeat prescribing and repeat dispensing in the community.
9 Confusion over anticoagulant management for dentistry, cardioversion, endoscopy and surgical procedures.
10 Potential confusion due to different strength tablets often presented in non-colour-coded packs.
11 The Yellow book (patient held information), in need of revision and translation into other languages.
12 Inflexible medicine presentation and arrangements in care homes to implement anticoagulant dose changes.
13 Inadequate quality assurance (QA) for near-patient testing equipment.
14 Inadequate audit of anticoagulant services and/or failure to act on identified risks.

Recommendations

As a result of the risk assessment exercise, safer practice solutions for anticoagulant use can be suggested:
1 **Identification of required competencies and training for staff responsible for anticoagulant care (see Skills for Health at http://www.dh.gov.uk/policyandguidance/humanresourcesandtraining/modernisingworkforceplanninghome).**
2 **Regular monitoring of safety indicators for inpatient and outpatient/community anticoagulant services with reporting to appropriate clinical governance committees and risk management.**
3 **Improved guidelines for loading doses and management of anticoagulation for dental surgery, surgery, cardioversion and endoscopy.**
4 **Promotion of the use of computer dosing software for decision support and audit.**
5 **Potential greater use of nurses and pharmacists to provide anticoagulant care, especially for hospital inpatients and for improving links between inpatient and outpatient services.**

6 **Improved arrangements and communication when patients are discharged from hospital, including transfer of duty of care directly to general practitioner.**

7 **Improved safety checks when interacting medicines are prescribed.**

8 **Improved support and monitoring of patients in the first 3 months of warfarin therapy.**

9 **Clarification of safety checks for general practitioner prescribing of repeat prescriptions of anticoagulant drugs and for the pharmacy supplying the anticoagulant drugs.**

10 **Revision of design and content of the patient held record.**

11 **Dosing regimens should be consistent within anticoagulant services.**

12 **Local systems should be implemented to minimise the potential for confusion relating to anticoagulant dose and strength of tablets.**

13 **Review of procedures for supply and administration of anticoagulant drugs in care homes.**

14 **Improvement of the design of forms/software for prescribing, monitoring and administering anticoagulants.**

15 **Improvement of QA procedures for near-patient testing equipment.**

Governance and safety indicators for oral anticoagulant therapy

Clinical Governance is a process of Controls Assurance in which:

- 'the way to do things' is defined in standard operational procedures, policies and protocols;
- ways of measuring 'the way things are being done' are introduced to indicate whether processes are working as intended; and
- risks are identified and action taken to reduce risk.

The NPSA and the BCSH have identified safety indicators for inpatient and outpatient oral anticoagulant care. Monitoring these indicators will help to identify risks and promote appropriate action to minimise risk. The safety indicators can also be used to audit the implementation of the recommendations made in this guideline.

Safety indicators for patients starting oral anticoagulant treatment

Different loading protocols are used depending upon the urgency to achieve a therapeutic level of anticoagulation, see section 4 of the 2005 update of guidelines on oral anticoagulation (Baglin et al, 2006).

1 Percentage of patients following a loading protocol appropriate to indication for anticoagulation.

2 Percentage of patients developing INR > 5·0 within first 2 months of therapy.

3 Percentage of patients in therapeutic range at discharge (for inpatients being transferred to outpatient care).

4 Percentage (incidence) of patients suffering a major bleed in first month of therapy and percentage suffering major bleed with INR above therapeutic range.

5 Percentage of new referrals to anticoagulant service (hospital or community-based) with incomplete information, e.g. diagnosis, target INR or inappropriate target with reference to BCSH guidelines, stop date for anticoagulant therapy, dose of warfarin on discharge, list of other drugs on discharge.

6 Percentage of patients that were not issued with patient held information and written dose instructions at start of therapy.

7 Percentage of patients that were discharged from hospital without an appointment for next INR measurement or for consultation with appropriate health care professional to review and discuss treatment plan, benefits, risks and patient education.

8 Percentage of patients with subtherapeutic INR when heparin stopped (fast loading patients only, e.g. treatment of acute VTE).

Safety indicators for patients established on oral anticoagulant treatment

1 Proportion of patient-time in range (if this is not measurable because of inadequate decision/support software then a secondary measure of percentage of INRs in range should be used).

2 Percentage of INRs > 5·0.

3 Percentage of INRs > 8·0.

4 Percentage of INRs > 1·0 INR unit below target (e.g. percentage of INRs < 1·5 for patients with target INR of 2·5).

5 Percentage of patients suffering adverse outcomes, categorised by type, e.g. major bleed.

6 Percentage of patients lost to follow up (and risk assessment of process for identifying patients lost to follow up).

7 Percentage of patients with unknown diagnosis, target INR or stop date.

8 Percentage of patients with inappropriate target INR for diagnosis, high and low.

9 Percentage of patients without written patient educational information.

10 Percentage of patients without appropriate written clinical information, e.g. diagnosis, target INR, last dosing record.

For some of these standards it is necessary to specify a time frame as a denominator, e.g. INRs > 5·0 per month. Such a denominator clearly applies to standards 1 to 4 above. For most anticoagulant services a time period of 1 month will be

appropriate. For practices looking after small numbers of patients a suitable denominator should be chosen, e.g. per patient year.

For audit purposes, criteria for the definition of 'established on treatment' need to be defined. We would suggest that anticoagulant therapy is established after at least two INRs within 1·0 INR unit of target or anticoagulant therapy for at least 2 months, whichever is the sooner.

The indicators are a suggested starting point. They should be tailored and developed according to local circumstances and need.

Disclaimer

While the advice and information in these recommendations is believed to be true and accurate at the time of going to press, neither the authors, the British Society for Haematology nor the publishers accept any legal responsibility for the content of these guidelines.

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None of the authors have declared a conflict of interest.

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