Developing Practice for Thrombosis Prevention in Medical Patients at Queens Medical Centre Campus, Nottingham University Hospitals

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Summary

Thromboprophylaxis is vital to avoid thrombotic complications during the hospital stay of many at risk patients. These complications may account for 25,000 deaths per year in England and Wales (Health Select Committee Report 2004/2005) \(^1\). This project was undertaken to establish the current thromboprophylaxis prescribing within the medical directorate in this hospital.

A previous audit had demonstrated a poor prescribing rate of appropriate thromboprophylaxis in medical patients and as a result a new guideline had been introduced. The primary purpose of this project was to assess prescribing rates and improve them if necessary and to improve education and awareness of the problems of hospital acquired venous thromboembolism (VTE). Our second audit demonstrated an improvement in prescribing rates however some problem areas were highlighted which needed to be addressed.

We have improved the teaching of the importance of thromboprophylaxis to all members of the multidisciplinary team and are confident our appropriate prescribing rates are continuing to improve.

In addition we have been fortunate to be able to appoint a Thromboprophylaxis Nurse Specialist in February 2006. Her role has become invaluable.

Our guidelines have been reviewed and amended and will be re implemented in the near future. We have set up a Trust wide Thrombosis Committee, which will have representation from all specialities.
Background

Venous thromboembolism (VTE) is a major cause of morbidity and mortality in patients admitted to hospital. The beneficial effect of appropriate thromboprophylaxis is widely accepted in surgical patients. Medical patients are also at risk of VTE and there is good evidence that this can be prevented with the appropriate use of thromboprophylaxis in the form of Low Molecular Weight Heparin in patients with certain risk factors (Samara et al 1999, Kebler et al 1999). A number of groups of medical patients are recognized as being particularly at risk. These include patients with severe cardiac failure, acute respiratory failure and active cancer combined with immobility and other risk factors. In fact the majority of patients suffering VTE in hospital are medical patients.

A recent Health Select Committee report on the prevalence of venous thromboembolism suggested that poor awareness of the risks of VTE was significantly contributing to mortality and morbidity in hospitalised patients. The report further recommends that all patients who are admitted to hospital should undergo a risk assessment for venous thrombosis. It is recommended that thrombosis committees and teams should be established to promote best practice and be a source of education and training.

The American College of Chest Physicians published its first guidelines on thromboprophylaxis in 1986 and has recently published its seventh revision of the guidelines (Geerts et al 2004). Despite these guidelines physicians have been slow to accept assessment of risk of thrombosis as an integral part of the assessment of medical patients on admission to hospital. This may partly be due to perceived bleeding risk. Bleeding complications are often graphic and memorable. This contrasts to deep venous thrombosis (DVT) and pulmonary embolism (PE), which though potentially fatal often remained undiagnosed. Many medical patients have multiple problems and risks and benefits of thromboprophylaxis need to be weighed up.

The prescription of low molecular weight heparin for thromboprophylaxis against venous thromboembolism in medical patients was audited at our large teaching hospital for medical patients admitted acutely over one week in 2004. The hospital had recently changed its formulary low molecular weight heparin. This change had been accompanied by publicity and teaching regarding dosing so awareness would have been expected to be high. There were 301 admissions, 87 of whom were discharged the same day or the next day. Notes of the remaining 214 were requested. 199 were received and audited by retrospective review of medical and nursing notes and drug charts. Only 22% of eligible patients were prescribed appropriate thromboprophylaxis.
Since this initial audit guidelines based on the MEDENOX trial (Samara et al 1999)\textsuperscript{2} inclusion criteria have been circulated to clinical staff with posters displayed on all of the medical wards. The audit and guidelines were presented at the Medical Grand Round in December 2004. Following this there were various attempts to improve prescribing rates and education was primarily undertaken by the Sanofi- Aventis representative. However it was unclear how effective these interventions had been and a more systematic approach was required.

**Aims**

The aims of this project were

1. To decrease the risk of thrombosis in medical patients by improving the appropriate prescription of anti-thrombotic therapy in a large university teaching hospital.

2. To re audit the appropriate prescription of thromboprophylaxis to establish our current practice as a starting point of the project following the wide introduction and implementation of guidelines and an assessment tool.

3. To introduce on-going staff education to improve awareness of the multidisciplinary team of the risk of hospital acquired VTE and the importance of assessment and aimed to improve the appropriate prescription of thromboprophylaxis to reduce this risk.

4. To create a Thrombosis Committee with Trust wide representation with a wide multidisciplinary/specialty membership and following the merger of Queens Medical Centre, Nottingham with Nottingham City Hospital to form Nottingham University Hospitals Trust we aim to increase the membership and influence further.

**Process**

This project was carried out by a multidisciplinary team comprising Nurse Specialists, Pharmacist, and a Consultant Haematologist. The data were collected by Haemostasis and Thrombosis Nurse Specialists whose role normally primarily involves anticoagulation and the nurses' role was also introducing and refining methods of education and information dissemination to members of the multidisciplinary team. The Thromboprophylaxis Nurse Specialist has now taken on this education role.
The project was a multidisciplinary project using re-audit, education and development of a team-based strategy to approach the problem of prevention of hospital acquired thromboembolism in a large teaching hospital.

Audit
Prior to the commencement of the project an audit of the prescription of medical thromboprophylaxis was undertaken in March 2004, which revealed low levels of appropriate prescribing equating to 22% of patients at risk of VTE actually receiving appropriate treatment in 2004.

This project commenced with a re-audit in 2005 following the introduction of evidence-based guidelines throughout the Trust. Two Clinical Nurse Specialists performed a retrospective analysis of medical casenotes and prescription charts from patients admitted under the care of a physician from a selected week in April 2005; all patients were included as long as they were admitted for longer than 24 hours and their casenotes were available for review. One hundred and ninety six medical casenotes and prescription charts were analysed, replicating the previous audit and using an existing data collection tool. The results of the 2005 audit highlighted that the appropriate prescription of thromboprophylaxis had increased from 22% in 2004 to 56% thus demonstrating a significant increase in appropriate thromboprophylaxis prescription and administration.

However the 2005 audit indicated that the documentation of thrombosis risk assessment was poor and although an increase in levels of prescribing from the previous year was apparent, there was considerable scope for improvement in the appropriate prescribing of thromboprophylaxis. None of the reminder / prompt stickers implemented following the 2004 audit were seen in any of the 196 medical casenotes and prescription charts reviewed. The reason for excluding a patient from thromboprophylaxis was not documented in those medical casenotes reviewed. A number of changes were implemented as a result of this audit to further increase awareness among multi-disciplinary team members of the importance of appropriate risk assessment and prescription of thromboprophylaxis, which are discussed later.

In March 2006 a hospital wide audit of appropriate thromboprophylaxis use was undertaken. Prior to the hospital wide audit it was agreed by the Thrombosis Committee that the ward based pharmacist would be responsible for completing the audit forms. Appropriate education and training was given by the Anticoagulant Pharmacist to enable this to occur. Support was to be given by the Anticoagulant Pharmacist, the Thromboprophylaxis CNS and the Haemostasis CNS undertaking the project. All hospital in patients was to be audited on the same day;
however despite the planning we received completed audit forms on approximately half of all inpatients only. The medical directorate sent a higher percentage of completed forms. The medical directorate demonstrated a similar appropriate prescription and administration rate of thromboprophylaxis to our previous retrospective audit in 2005 (47%). A report of results and recommendations were disseminated to all individual directorates. Following our experience of trying to co-ordinate a hospital wide audit on the same day and its inherent problems, it was decided to continue instead with a rolling audit.

Further audit has been undertaken on the individual medical wards of the Queens Medical Centre. This has demonstrated 66 % appropriate prescription and administration rate of thromboprophylaxis in June 2006, 75 % in July 2006 and 50 % in August. These audits used a spot check method of all patients present on the designated date without any prior warning. These results have to be interpreted with caution, however, as individual wards have a complicated case mix, for example, the Emergency Admissions Ward. In other areas the numbers of eligible patients are often very low which may affect the prescribing rate.

**Education**

Education of staff has been seen as paramount and since the appointment of our Thromboprophylaxis Clinical Nurse Specialist (CNS) there has been a targeted approach. Medical staff have been given teaching in-house by both our CNS and a representative from Sanofi Aventis and also the Thromboprophylaxis CNS has taken an active role in ward rounds on our acute medical admissions ward to prompt both senior and junior medical staff of the importance of VTE risk assessment and prescription of thromboprophylaxis where appropriate. Nursing staff has been given teaching on thromboprophylaxis at induction to the Trust and in ward environments. The medical ward managers from both campuses have received updates at away-days. Pharmacists have been regularly updated too. The junior doctors have also been targeted on induction days and on Medical Grand Round training afternoons.

During the project, whilst discussing our progress with colleagues from Derby who are also on the FoNS/Sanofi Aventis project; it became apparent we were having similar problems with awareness of VTE risk assessment with our junior medical staff. As the junior medical staff in our region rotate through both our hospitals and we share the same medical school we devised and held a regional forum encouraging and inviting all members of the multidisciplinary team to attend an afternoon seminar to aim to increase knowledge, share our successes and problem areas and facilitate collaborative working. We have hosted the first meeting recently and aim to continue this collaborative working.
We also aimed to increase our local population’s knowledge of the risk of hospital acquired VTE because we thought that this would help to prevent DVT’s and have strived to do this during the project in various ways. Our Thrombosis CNS has given various local television and radio broadcasts since her appointment highlighting the importance of risk assessment, risk factors and mobility to our local population to aim to improve their awareness of the problem. Our Thromboprophylaxis CNS has also devised a patient information leaflet, which is awaiting publication, which will then be widely available for patients, to improve knowledge and awareness of the risks of VTE.

We also took part in "Healthy Legs Week" sponsored by Lifeblood. This involved a stand being set up in the main entrance of the hospital, a busy thoroughfare to many patients, relatives, staff and external members of the multidisciplinary team, to heighten awareness of the risk of hospital acquired VTE and the need for VTE risk assessment on admission and as the patients condition changes and the importance of prescribed thromboprophylaxis as appropriate.

During the project we have also presented our audit data both locally, nationally and internationally. The comparison audit from 2004-2005 was presented locally at our hospital audit prize day (achieved 3rd prize),

Our data has also been presented during the project at the British Society of Haematologists in Edinburgh in April 2006 and internationally at a Haematology Conference in Amsterdam in June 2006.

**Thrombosis Committee**

The Health Select Committee Report (2004 / 5) recommended that a thrombosis committee be established in each hospital, with a specialist thrombosis team. They felt that they should be modelled on the existing Blood Transfusion teams and committees.

The Queens Medical Centre Thrombosis Committee was established in 2005. It was felt to be an effective way of bringing together all the health professionals with an interest in the prevention of thrombosis to discuss prevention strategies in the Trust. It was established in the early stages of this project and has developed over the year. We established our membership, stakeholders and terms of reference and have since met regularly. The committee has a wide membership including a Haematologist, Physician, Radiologist, Vascular Surgeon, Orthopaedic Surgeon, Anaesthetist, Thromboprophylaxis CNS, Anticoagulant Pharmacist, Haemostasis and Thrombosis Nurse Specialist, Thrombosis Nurse Specialist (DVT) and an Audit Clerk.

Following the merger of the two hospitals the membership has been expanded to cover Consultant representation from both sites and Divisional Leaders from all specialities.
(excluding Obstetrics and Paediatrics at present) to aid ownership and disseminate good practice, also to flag problem areas and specific divisional issues that may cause concern. Our Consultant Haematologist has close links to the Obstetric Department. However following the merger several problems have become apparent: attendance at the meetings has been patchy and there has been difficulty gaining agreement on certain issues, such as changes to prescription charts. To overcome these issues the Thrombosis Committee now alternates the venue for its meetings across both sites and we are confident that the changes to the membership will facilitate decision making.

**Guidelines and Risk Assessment**

Following the 2004 audit poor result a team comprising of a Consultant Haematologist, Anticoagulant Pharmacist and a Senior Medical House Officer devised Thromboprophylaxis Guidelines (medical and surgical) based on best available evidence (Appendix 1). These guidelines were agreed and widely disseminated and implemented prior to the commencement of this project. Laminated poster copies of the guidelines, together with smaller versions were placed on all wards. Reminder yellow coloured stickers where to be placed on all prescription charts on admission to act as prompts for the junior medical staff to VTE risk assess.

The 2005 retrospective audit demonstrated that although the appropriate prescribing rate had significantly improved. It became apparent that the medical staff were not documenting the reason for excluding the patient. Also there was no evidence of VTE risk assessment in the medical casenotes, indeed no risk assessment reminder stickers were seen in any of the 196 casenotes and prescription charts reviewed for the audit for the week under investigation. The only evidence of VTE risk assessment was the appropriate prescription of the correct dose of thromboprophylaxis prescribed in a timely manner, as analysed by one of the two CNS performing the audit for this project.

Thus the team decided to amend the Thromboprophylaxis Guideline and VTE Risk Assessment to an exclusion criterion based guideline for medical patients only (appendix 2) early within the project. Although this guideline was agreed to be implemented by the QMC Thrombosis Committee the implementation has been delayed by the hospital merger. However at the recent Thrombosis Committee the new exclusion criteria based guideline was widely accepted by all present and is awaiting agreement prior to imminent implementation.

The Anticoagulant Pharmacist has also devised a risk assessment tool to be pre-printed on all medical prescription charts for completion by medical staff (Appendix 3). Again implementation
has been delayed by the merger as we have had difficulty gaining agreement on placing the assessment tool on the prescription chart, but we are continuing to battle with this issue.

**Discussion**

The project to develop practice for thrombosis prevention in medical patients at Queens Medical Centre campus has been one of steady progression and occasional pitfalls. The ongoing education of our multi disciplinary team of the risk of hospital acquired VTE has been successful and we are continuing to utilise every opportunity to increase knowledge and awareness of the importance of risk assessment and appropriate use of thromboprophylaxis.

The Thrombosis Committee is now well established, with a wide representation and remit and despite being initially hampered by the merger and its inherent problems it is now making trust wide decisions.

There are three areas that we have had problems and would have changed with hindsight. The 2005 audit highlighted that the use of reminder stickers as prompts, is reliant upon the person charged with applying the stickers consistently performing this role. Although it could be said that the colour and choice of where to position the reminder stickers may increase the benefit of using stickers, our experience demonstrated that no stickers were used on a given week under analysis. This has obvious pitfalls as demonstrated in the project and thus we have decided to change to pre-printed risk assessment on prescription charts as soon as possible.

Other lessons we have learnt is to trial audit forms on a small scale prior to implementation as despite wide collaboration in developing a hospital wide audit form. When the audit form was used it became apparent that there were certain aspects that needed to be changed to gain maximum information. This would have become obvious if trialled on a small multi-specialty audit.

Our experience of Hospital wide Thromboprophylaxis audit on the same day proved difficult to co-ordinate despite wide collaboration and we have decided to continue with a rolling audit at present.

**Personal Learning**

The project has enhanced my personal skills in audit and analysis of data. I have gained more experience in report writing and have had to present results from the audit and project locally, regionally and nationally which has had a positive impact upon my presentation skills.
During the project I have gained a broader perspective of the role of the Haemostasis and Thrombosis Clinical Nurse Specialist within the medicine directorate and the hospital as a whole. I have learnt a great deal about the national agenda on Thromboprophylaxis. I have thoroughly enjoyed being part of the project and plan to continue to be an active member of the trust Thrombosis Committee and continue with my interest in thromboprophylaxis.

**Plans for the Future**

We have many plans for the future. Although the project supported by the Foundation of Nursing Studies and Sanofi Aventis is concluding, the work to improve thrombosis prevention in medical patients and indeed all patients will continue.

We plan to continue our education of doctors and the multidisciplinary team. We look forward to the thromboprophylaxis information and guideline being accessible from the hospital Anticoagulant web site.

Following the successful secondment of a nurse specialist from the anticoagulant team to be the thromboprophylaxis nurse specialist (sponsored by Sanofi-Aventis) we feel that it is imperative to continue this role and the vital work to reduce the risk of hospital acquired VTE within our Trust. We are thus looking to create a permanent post when possible.

The thrombosis committee is now well established and following some initial problems after the merger we now plan to hold regular meetings on alternating sites.

We plan to continue collaborative meetings with neighbouring Trusts and the next regional meeting is planned for November in Derby.

Although this project has concentrated on the medical directorate many of the learning points have been rolled out across other directorates within our Trust. Although this project is drawing to a close the work continues.
Conclusions
We have established our current practice as a starting point of the project following the wide introduction and implementation of guidelines and an assessment tool.

The risk of thrombosis in medical patients has been reduced using audit, the use of evidence-based guidelines and reaudit although we recognise that more work is needed to substantially improve the appropriate prescribing rate.

We have introduced on-going staff education to improve awareness of the multidisciplinary team of the risk of hospital acquired VTE and the importance of assessment.

A Thrombosis Committee with Trust wide representation has been established with a wide multidisciplinary / specialty membership and following the merger of Queens Medical Centre, Nottingham with Nottingham City Hospital to form Nottingham University Hospitals Trust and we aim to increase the membership and influence further.

The funding for this project has been invaluable to enable us to continue the work and although the FoNS project if coming to a close we will endeavour to continue to improve practice in this area within our Trust to ensure that the recommendation of the Health Select Committee Report is met that all patients should be risk assessed on admission for the risk of VTE.
Appendix 1

Prevention of DVT and PE in Medical Patients

Medical patients considered to be at risk of VTE include those >40 years of age falling into one of the following 4 groups:

**IMMOBILITY+**

1. Severe Cardiac Failure
2. Acute Respiratory Failure
3. Active Cancer

**OR**

**IMMOBILITY+**

4. Acute Infection/Inflammation

+ 1 of the following risk factors:

- Chronic Heart Failure
- Chronic Respiratory Failure e.g. COPD
- >75 yrs old
- Previous VTE
- Obesity (BMI>30)
- Varicose veins
- Hormone therapy (excluding post menopausal HRT)

**Consider 40mg enoxaparin once daily sc unless contraindicated**

**CONTRAINDICATIONS**

- Known bleeding disorder/thrombocytopenia
- Haemorrhagic stroke or risk of central nervous system bleed e.g. head injury
- Risk of gastrointestinal bleed
- Bacterial endocarditis, pericarditis or thoracic aortic aneurysm (discuss with cardiologist)
- Heparin induced thrombocytopenia
- Anticoagulated or receiving treatment dose enoxaparin
- Renal failure GFR<30ml/min (reduce dose to 20mg sc od)

**OR**

- Other conditions with high risk of serious bleed
  
  **Discuss with Consultant if risk/benefit balance not clear (e.g. ischaemic stroke)**

*If contraindicated and peripheral pulses intact consider TEDS (thromboembolic deterrent stockings)*

*Please note these are guidelines only and do NOT replace good clinical judgement*

Authors: Dr Emily Bird, Dr B Myatt, Dr G Dole, Julian Holmes. November 2004 (review date: November 2006)
Appendix 2

Prevention of DVT and PE in MEDICAL patients

ALL immobile acute medical patients to receive enoxaparin 40mg s/c OD until FULLY mobile UNLESS CONTRAINDICATED i.e.

- Active bleeding
- Fully mobile
- Known bleeding disorder/thrombocytopenia
- Haemorrhagic stroke or risk of CNS bleed e.g. head injury or previous SAH
- Risk of GI bleed
- Thoracic aortic aneurysm (discuss with cardiologist), pericarditis or bacterial endocarditis
- Heparin induced thrombocytopenia
- Hypersensitivity to heparin or LMWH
- Receiving a treatment dose of UFH/LMWH or on oral anticoagulants
- Severe renal impairment (if creatinine clearance <10ml/min discuss with haematology)
- Other conditions with high risk of a serious bleed or where the risks outweigh the benefits (discuss with consultant if risk/benefit balance unclear)

N.B. Please document on the thromboprophylaxis risk assessment box of the drug chart if thromboprophylaxis is NOT indicated and state reason

ENOXAPARIN ADDITIONAL INFORMATION

- Enoxaparin dosage should be reduced to 20mg s/c OD in patients with creatinine clearance <30ml/min
- Monitor platelet count prior to starting and then every 3 days. If thrombocytopenia occurs haematological advice should be sought

If thromboprophylaxis is contraindicated and peripheral pulses intact consider graduated compression stockings

Contraindications to graduated compression stocking include:

- Dermatitis
- Gangrene
- Leg ulcers
- Symptomatic PVD
- Cellulitis
- Extreme deformity of the legs
- Recent skin graft
- Massive oedema of the legs or pulmonary oedema from CHF
- Peripheral neuropathy

ALL patients should receive adequate hydration. They should be encouraged to sit with their legs up when resting and should be mobilized as early as possible.

J.Holmes MTP 06.06 Review 06.07
Appendix 3

Prevention of DVT and PE in MEDICAL patients

**ALL immobile** acute medical patients to receive enoxaparin 40mg s/c OD (reduced to 20mg s/c OD if creatinine clearance <30ml/min) until **FULLY mobile UNLESS CONTRAINDICATED** (see full guideline for list)

Is thromboprophylaxis indicated? (Please tick which apply)

- Yes
- No

**If thromboprophylaxis NOT indicated please state reason:**

(If thromboprophylaxis contraindicated and peripheral pulses intact consider graduated compression stockings)

Prescriber’s signature:
Date:

References


