Expert Forum

VTE in NZ Hospitals

Making Education Easy

February 2010

This publication is a summary of the recent VTE Experts' Forum chaired by Dr Vinod Singh, chairman of the Steering Committee NZ Prevention Group. The forum's objectives included:

- sharing experiences in managing programmes for the prevention of in-hospital VTE
- discussing a national policy for effect VTE prophylaxis in NZ hospitals

The creation of this publication and support for the event has been supplied by sanofi-aventis.

In this review:

Welcome

to this review of the recent NZ venous thromboembolism (VTE) Experts' Forum in Auckland. This review is a summary of: 1) the information presented at the forum regarding the status of VTE prophylaxis in NZ hospitals, including an address by the Health and Disabilities Commissioner; 2) a presentation on the National Initiative in England; and 3) the progress that has been made thus far, including summaries of presentations and spontaneous reports from attendees on what has been achieved in their regions/institutions.

VTE prophylaxis in NZ hospitals – Steering Committee update

Dr Vinod Singh, FRACP, Chairman, New Zealand VTE Prevention Steering Committee
Honorary Clinical Senior Lecturer in Medicine, Consultant Physician in Internal Medicine and Stroke with the Waitemata DHB

Since the last Experts' Forum in May 2009, the Steering Committee has successfully lobbied the Ministry of Health through two submissions (a verbal submission and a written submission on 14th August) made to the Quality Improvement Committee (QIC). The proposals/suggestions in the written submission included:

- the need for formal recognition of VTE prophylaxis as a key patient safety initiative in NZ at a national level to elevate its priority for local District Health Boards (DHBs)
- the provision of appropriate DHB funding to facilitate implementation of evidence-based practice
- identification of a group of clinicians within each DHB who are able to provide the necessary leadership in VTE prevention and develop local policies, guidelines and protocols; it is clear that such individuals do already exist in most DHBs
- a simple, passive policy framework approach is not sufficient, as evidenced internationally and demonstrated by the initiatives undertaken by the Bay of Plenty DHB
- the processes must be dynamic, with well-resourced people in the group to provide ongoing staff and patient education, continually revisit key areas, and upgrade, modify and re-audit practices.

The submission's summary noted that over the last 18 months, the NZ VTE prevention group has recruited a number of motivated individuals who have identified that VTE prophylaxis is suboptimal in both surgical and medical patients. As a result of this work, some DHBs have developed local policies and guidelines to improve VTE prophylaxis; however, guidelines and policies are insufficient to change practice, and adequate resources are needed to effectively implement current evidence-based guidelines. VTE prophylaxis is a key patient safety factor that needs to be appropriately acknowledged at a national level and properly resourced at a local DHB level. Successful implementation will result in significant cost savings as well as reductions in patient morbidity and mortality.

Some very positive feedback has been received since the submissions were made, but the QIC and the government have yet to formally decide how to move forward, and unfortunately the QIC is currently undergoing restructure. The committee feels that it is the responsibility of the government to deal with this very important health issue, but health professionals should continue to do as much as possible. Dr Singh concluded by thanking everyone for their valuable efforts so far, and encouraged the attendees to recruit others to become involved.

VTE burden, evidence, literature, efficacy and safety

Dr Vinod Singh

VTE is the commonest preventable cause of hospital-acquired mortality, with 10% of hospital deaths due to PE and 1% of all admissions dying from PE. Moreover, sequelae of DVT is significant, with post-thrombotic syndrome affecting 20–50% of patients who have a DVT and pulmonary hypertension with a cumulative incidence of 3.1% at 1 year among patients who experience an acute PE.[1,2] Furthermore, many cases of VTE are not detected, with 80% being asymptomatic. The mortality rate among medical patients is around 3 times greater than for surgical patients, and the rate of fatal PE in surgical patients decreased by 71% between 1966 and 2000, while the rate in medical patients only decreased by 18% over the same period.[3-5] Many VTE cases also occur outside hospitals. Identifying medical patients at the greatest risk can help to target prevention. High-risk factors include stroke, myocardial infarction, congestive heart failure, ICU admission, respiratory disease and general medical patients.[6]

Prevention of VTE in medical patients involves the use of early and adequate mobilisation (30 mins/day), leg stockings, pneumatic pumps (expensive) and anticoagulant therapy. There have been a number of studies that have consistently demonstrated the efficacy of thromboprophylaxis.[7-14]

Safety

Several studies have demonstrated that the risk of DVT and PE is reduced, without any increase in the risk of major bleeding.[7-9] Hull et al found that bleeding at 28 days occurred more often with enoxaparin than with placebo, but the magnitude of the increased risk is not big.[10] A pooled analysis of data from seven studies (Cochrane review) found that LMWH was favoured over unfractionated heparin in terms of bleeding safety (overall relative risk 0.43 (95% CI 0.22, 0.87).[15] It is now internationally accepted that VTE prophylaxis is effective and safe.

The magnitude of the problem

The ENDORSE study reported global data from >68,000 patients indicating that around 52% of hospitalised patients are at risk.[16] Data from the Counties Manukau and Waitemata DHBs showed that around a quarter of hospitalised patients were eligible for VTE prophylaxis according to international guidelines, and only around a quarter of those patients actually received thromboprophylaxis (predominantly chemical; see figure), but it is hoped this has improved.

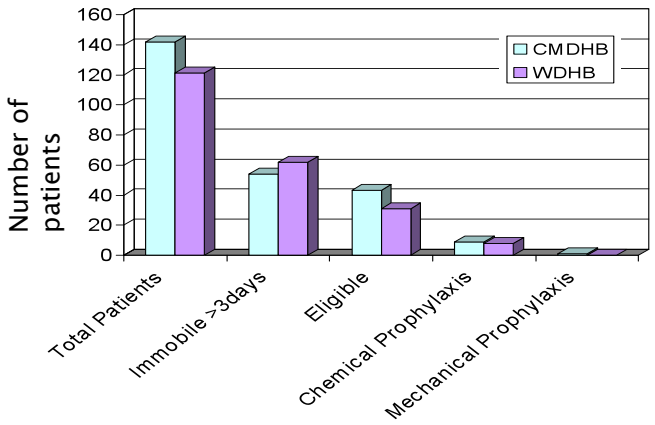

Figure. VTE thromboprophylaxis in the Counties Manukau and Waitemata DHBs October 2006 – April 2007

Global Measures

The UK has pioneered VTE prevention, and their achievements are the subject of the keynote speech summarised on p3. In the US, the 'Coalition to Prevent Deep Vein Thrombosis' was formed. It was made up of 50 bodies, including every large organisation from the American College of Haematologists to pharmacists and osteopaths. Recommendations were made and the Surgeon General wrote to each physician advising of their responsibility of formally assessing every admitted patient for VTE prevention.

In NZ, the VTE Expert Forum was established in 2008, and there is now an extensive membership. The main goal now is to continue educating physicians and patients.

References

1. Kahn SR & Ginsberg JS. Relationship between deep venous thrombosis and the postthrombotic syndrome. Arch Intern Med 2004;164(1):17–26
2. Pengo V et al. Incidence of chronic thromboembolic pulmonary hypertension after pulmonary embolism. N Engl J Med 2004;350(22):2257–64
3. Sandler DA & Martin JF. Autopsy proven pulmonary embolism in hospital patients: are we detecting enough deep vein thrombosis? J R Soc Med 1989;82(4):203–5
4. Cohen AT et al. The changing pattern of venous thromboembolic disease. Haemostasis 1996;26(2):65–71
5. Cohen AT et al. American Society of Hematology 46th Annual Meeting and Exposition, 4–7 Dec 2004, San Diego, CA, USA
6. Spyropoulos AC. Emerging strategies in the prevention of venous thromboembolism in hospitalized medical patients. Chest 2005;128(2):958–69
7. Samama MM et al. A comparison of enoxaparin with placebo for the prevention of venous thromboembolism in acutely ill medical patients. Prophylaxis in Medical Patients with Enoxaparin Study Group. N Engl J Med 1999;341(11):793–800
8. Leizorovicz A et al, PREVENT Medical Thromboprophylaxis Study Group. Randomized, placebo-controlled trial of dalteparin for the prevention of venous thromboembolism in acutely ill medical patients. Circulation 2004;110(7):874–9
9. Cohen AT et al. Efficacy and safety of fondaparinux for the prevention of venous thromboembolism in older acute medical patients: randomised placebo controlled trial. BMJ 2006;332(7537):325–9
10. Hull RD et al. XXIst Conference of the ISTH; July 2007; Geneva, Switzerland [abstract O-S-001]
11. Lechler E et al. The venous thrombotic risk in non-surgical patients: epidemiological data and efficacy/safety profile of a low-molecular-weight heparin (enoxaparin). The Prime Study Group. Haemostasis 1996;26 Suppl 2:49–56
12. Kleber F-X et al, THE-PRINCE Study Group. Randomized comparison of enoxaparin with unfractionated heparin for the prevention of venous thromboembolism in medical patients with heart failure or severe respiratory disease. Am Heart J 2003;145(4):614–21
13. Hillbom M et al. Enoxaparin vs heparin for prevention of deep-vein thrombosis in acute ischaemic stroke: a randomized, double-blind study. Acta Neurol Scand 2002;106(2):84–92
14. Sherman DG et al, PREVAIL Investigators. The efficacy and safety of enoxaparin versus unfractionated heparin for the prevention of venous thromboembolism after acute ischaemic stroke (PREVAIL Study): an open-label randomised comparison. Lancet 2007;369(9570):1347–55
15. Alikhan R, Cohen AT. Heparin for prevention of venous thromboembolism in general medical patients (excluding stroke and MI) (Protocol). Cochrane Database of Systematic Reviews 2002, Issue 3. Art. No.: CD003747
16. Cohen AT et al. Venous thromboembolism risk and prophylaxis in the acute hospital care setting (ENDORSE study): a multinational cross-sectional study. Lancet 2008; 371(9610):387–94

Key note address: Health and Disability Commissioner

Mr Ron Paterson, LLB (Hons), BCL Oxon

In his address to the forum, Mr Paterson expressed his delight to be present, praising the Steering Committee members/attendees for the work they had done on leading the way forward on VTE prophylaxis for the country.

Mr Paterson spoke about the role of the Commission as focussing on education, with the philosophy 'learning not lynching, resolution not retribution'. In NZ there has been a big decline in disciplinary actions against health professionals, which contrasts with the situation in other countries. He pointed out that doctors, nurses and managers are all trying to improve safety and quality of services, as is the Health and Disability Commissioner.

Mr Paterson outlined a complaint that had been reported to the Commission by a 47-year-old woman from Tauranga who was unhappy about her experience. She had developed a DVT 2 weeks after undergoing an orthopaedic procedure for a metatarsal fracture, and she was readmitted and treated with enoxaparin sodium. She had not been identified as being at risk, despite receiving oral contraceptives. She felt that the hospital had breached its duty of care, and that if the risks had been explained to her, she would have been better prepared for the warning signs as they occurred. As a consequence, the DHB was approached and asked what could be done regarding the broader question of VTE prophylaxis. Dr Mary Seddon reviewed the woman's case, and noted that VTE prophylaxis is a real national concern. She added that any patient immobilised for any period of time should receive VTE prophylaxis, and that this is not done often enough; many orthopaedic surgeons are reluctant due to the risk of bleeding into joints, even though benefits usually outweigh the risks. To their credit, the Bay of Plenty DHB developed brochures, protocols, etc, and appointed a VTE nurse who led an education programme, involving primary care as well as the hospitals, aimed at VTE prophylaxis education.

Mr Paterson commented that VTE prophylaxis has been identified as one of the key issues that need to be addressed to make hospital care safer. It is clear that at a national level, not all patients are being assessed, and that not all patients who are assessed as at risk are necessarily receiving appropriate prophylaxis. He also noted that performing audits is a key task, which Tauranga and other DHBs have already undertaken.

Another key issue Mr Paterson raised is the need for better coordination and collaboration of efforts to make healthcare safer. He has called for a national body, and is delighted to hear that the Minister of Health has announced there is to be a new commission on safety in healthcare. Mr Paterson believes this is a move in the right direction, as NZ is far too small to rely on individual initiatives. He noted that VTE prophylaxis should be one of the first initiatives addressed to reduce surgical complications, as it is an area where morbidity and mortality can clearly be reduced for hospitalised patients. He hopes that the good work that has been done by the Steering Committee (e.g. submission to QIC) will be picked up by the new commission. He undertook to continue to take a keen interest in ongoing work in his new role as Professor of Health Law and Policy at the University of Auckland.

Key note speakers: VTE Prevention in England

Dr Anita J Thomas OBE, Chair, Chief Medical Officer's (CMO; England) VTE Implementation Working Group, Consultant Physician in Acute Medicine, Plymouth Hospitals NHS Trust, England

Mr Tim Brown, VTE Policy Advisor, Chief Medical Officer's (England) VTE Implementation Working Group, England

Dr Thomas noted that VTE prophylaxis initiatives explore a number of generic themes. Firstly, the awareness of VTE prophylaxis in the wider community is increased. Secondly, evaluations of the systems for data retrieval and collections for the purpose of audits, validation, etc are undertaken. Often, when requests for data are made, the response is that 'it's too difficult'; however, Dr Thomas made the point that this is often due to limitations/inadequacies of the systems, as data required to investigate important causes of death should be readily available. Thirdly, the roles of different health professionals are explored.

The UK VTE prophylaxis experience

Dr Thomas' began her presentation on what has been undertaken over the last 5 years on VTE prevention in the UK by pointing out that contrary to what might be perceived by many of the attendees, the UK programme has only involved a small number of people and a limited budget, and the achievements have only been possible with the help of dedicated individuals within the NHS. She also noted that the national bodies that have been approached have become engaged with the issue after only about 5 minutes into presentations, as it is such an important issue. Thus, there have been a lot of constructive partnerships that have not involved any exchange of money. She identified the processes required for the evolution of a national strategy: 1) awareness; 2) recognition of a problem; 3) policy evolution; 4) implementation; and 5) evaluation. In the UK, the implementation phase has been reached.

Many individuals are not aware of the risk of experiencing a VTE during hospitalisation, and many will consider themselves 'lucky' if a VTE occurs while in hospital. Although medical professionals may therefore feel "somewhat comfortable", it is vitally important that they take responsibility. Another important aspect of this is the fact that individuals who do experience a VTE while hospitalised subsequently carry a 2- to 3-fold increased risk of a second thromboembolic event, and the risk increases exponentially with each subsequent event. Furthermore, the risks of post-thrombotic syndrome and pulmonary hypertension are also increased.

Prior to setting out on the VTE prevention initiative, the following description of success in a hospital setting was defined.

- Hospitalised patients need to be aware of VTE prophylaxis and feel able to ask about it.
- Hospital workers need to be aware of VTE risk and able to institute timely prophylaxis.
- Each individual's VTE risk is assessed.
- An appropriate prevention strategy is implemented.
- Outcomes are evaluated.

This requires a systems-based approach, where actions are taken at the organisational, regional and national levels.

The House of Commons health committee produced a report that said the situation was 'very bad', with no consistent guidelines and far too many people dying, and asked what can be done about this? The CMO asked for a government response to this report, which resulted in the foundation of the expert group, which published a report in 2007. There is now an implementation strategy and national guidance on VTE prophylaxis; the guidance in the 2007 report from the expert working group was time limited, and has now been superseded by NICE guidance.

The following three components were identified as important to implement a systems-based approach (as requested by the CMO): 1) a nationally available template for VTE risk assessment; 2) increased awareness; and 3) recognition and naming of exemplar centres with good VTE prophylaxis processes (including variations in region and type).

Epidemiological models estimate that there are about 25,000 avoidable VTE deaths in hospitalised patients each year in the UK. This figure is about 5 and 15 times greater than the number of deaths due to hospital-acquired infections and MRSA infections, respectively, yet VTE does not currently attract the same attention as these. Over the European Union, >0.5 million deaths per year can be expected, which is more than the combined total for AIDS, breast cancer, prostate cancer and traffic accidents.

The US Agency for Healthcare Research and Quality has ranked VTE prevention the highest of 79 safety practices evaluated in terms of effectiveness. The ENDORSE study reported that about 50% of hospitalised patients are it risk of VTE, but only around half of eligible patients received prophylaxis.[1]

Health economics

Health economics (costs and bed days) also need to be considered along with deaths and disabilities. The total cost of VTE management in the UK is around NZ$1670 million, while litigation costs between 1995–2005 were nearly NZ$180 million. A tool used to calculate hypothetical potential savings associated with the implementation of a policy revealed that, based on 12 million admitted patients per year, with half being at risk of VTE and half of those receiving prophylaxis, around 300,000 events could be prevented.

Data on secondary PE in-hospital mortality rates across UK hospitals are highly variable (perhaps partly due to inconsistencies in their systems). In comparison, similar data for hospital-acquired infections were less variable after effective policy implementation at a national level.

Risk assessment

A risk assessment was published in Sept 2008, and it has just been revised and republished. The plan is that this will be the national tool and it will be integrated seamlessly with the NICE guidance. Furthermore, work is being done to develop an electronic version of this tool.

Update: On 24th March 2010, the UK Department of Health Chief Medical Officer, Sir Liam Donaldson, and NHS Medical Director, Prof. Sir Bruce Keogh, sent a letter to the Medical Directors of all Primary Care Trusts, NHS Trusts, NHS Foundation Trusts and Strategic Health Authorities in England. The letter asked that by the 1st June 2010: 1) Chief Executives of all acute providers ensure that procedures are introduced to support the forthcoming mandatory VTE risk assessment data collection; and 2) all Medical Directors ensure that the criteria in any risk assessment templates currently being used reflect those of the revised National risk assessment tool. An attachment to the letter included a summary of inter-related measures that are currently being introduced to ensure a comprehensive National VTE Prevention Programme for the NHS.

Lifeblood – The Thrombosis Charity, Anti Coagulation Europe and the Thrombosis Research Institute are third sector organisations that have become involved. Anti Coagulation Europe had a pilot project aimed at constructively utilising the media to help get the VTE message across, including patient experiences on local news programmes.

A national VTE risk assessment pathway that can be developed for local requirements has been published on the NHS choices website (http://www.nhs.uk). There is also a link to a one-hour e-Learning session on VTE that all health professionals can freely access (http://www.e-lfh.org.uk/projects/vte). Usage of this resource is monitored, so data on the individuals who have completed the session (i.e. grade of staff, location, organisation) are available.

VTE risk assessment is included in the WHO Surgical Safety Checklist, and this has been important; however, it is also important for medical patients as well. It is possible that VTE risk may be something that is considered by surgeons more than physicians due to differences in the way they work with patients.

Data acquisition issues

It is important to consider the adequacy of datasets for accurately estimating the number of avoidable deaths due to VTE. However, one of the problems is the source of data. The nature of clinical record data collection, from a multitude of handwritten notes, and misinterpretation or miscoding of diseases by those who enter these data into the systems can be a considerable source of error. Moreover, the codes have been drawn from a clinical mindset, and do not provide useful data for the purposes of VTE prevention (e.g. acute versus chronic VTE, avoidable proportion, hospital-acquired VTE). For the UK analysis, a proxy for hospital-acquired VTE has been defined as people presenting with a PE or DVT who had also been hospitalised within the previous 90 days. In terms of coding, the current approach is to aggregate existing codes to see if they can be used, as the creation of new codes is very expensive.

Predicted vs. actual data

There is a conundrum surrounding the numbers of actual reported deaths and the epidemiological estimates, partly due to issues around reporting, but probably also because they only represent the tip of the iceberg. We know that 80–90% of fatal PE diagnoses are missed before the patient dies, and this is why risk assessment is so important. It also helps to explain why reported deaths are so fewer than expected. There were around 11,500 hospital deaths in England in 2007 where VTE was mentioned on the death certificate, of which VTE was charted as the cause of death in >4412, which is considerably less than the aforementioned epidemiological estimate (25,000). However, the number of avoidable deaths is unacceptable irrespective of whether the estimated and actual figures agree.

Around half of patients presenting with VTE as an emergency have been hospitalised within the preceding month, and around two-thirds have been hospitalised within the

preceding 3 months. Also, 15% of these patients with a primary diagnosis of VTE died within a year of discharge, and 40% of patients with a secondary diagnosis of VTE were dead within a year. This compares with a death rate of around 20% when there is no secondary diagnosis of VTE, suggesting that deaths due to non-VTE causes accounted for only about half of those deaths.

Mr Brown spoke about the Southwest SHA initiative, which included an exemplar centre, the Kings Thrombosis Centre, which has a lot of useful, freely available information on its website (http://www.kingsthrombosiscentre.org.uk). This includes a questionnaire about VTE prevention for hospitals in the area to complete. An SHA team also went out to investigate what hospitals were doing, and it was found that there were some discrepancies between the team's findings and the questionnaire data.

VTE prevention is now in the NHS operating framework, which indicates that it is now a true priority issue for the next 5 years. There are other things that have happened to raise it is a priority. By applying to the CQUIN commission for quality improvement, hospitals get funding (enough to develop a reporting system for VTE risk assessment) if they reach local and national goals – e.g. 90% of all patients are risk assessed using the national protocol that has just been released). The NHS contract has been changed, so that from 1st April all hospitals have to: a) report locally and audit on appropriate thromboprophylaxis based on the national risk assessment template; and b) undertake a root-cause analysis of every hospital-acquired VTE death. The Care Quality Commission is a regulatory body that is developing indicators that auditors will be able to use to measure compliance with VTE prophylaxis guidance in hospitals.

Reference

1. Cohen AT et al for the ENDORSE Investigators. Venous thromboembolism risk and prophylaxis in the acute hospital care setting (ENDORSE study): a multinational cross-sectional study. Lancet 2008;371(9610):387–94

NZ VTE project updates

Southland

Mr Leonard Bagley and (title?) Diane Redding, Pharmacists, Southland Hospital

After attending the VTE workshop in 2008, inconsistent practices around VTE prophylaxis were noticed during daily ward work. There was no documented policy on VTE risk assessment or prophylaxis at Southland Hospital, so work on an audit was started. This initial work stalled due to time commitments and, after attending the 2009 meeting, it was resolved to get the audit back on track. The audit tool was fine tuned, and it was decided that the ACCP guidelines would be used.

Included patients were the first, third and fifth from each consultant from midnight on Monday each week until 20 patients were selected from each area (medical, general surgical and orthopaedic). Checks for risk assessment were performed within 48 hours, which resulted in the exclusion of patients with stroke. Only the investigators and their manager were aware that the audit was taking place. Data processing involved adapting the NICS database, with the addition of documentation of risk and choice of thromboprophylaxis, and appropriate reports were generated.

Overall, the results were pleasing (see table 1); however, documentation was poor, with risk assessment documentation completed for only 1 patient and intention to use prophylaxis was documented in only 26.7% of patients. The results for the orthopaedic patients were affected by a concurrent trial investigating a combination of aspirin, thromboembolic stockings and foot pumps, none of which are guideline consistent. There were also a small number of low-risk patients who received chemical prophylaxis when it was not indicated.

Future intentions include: 1) obtaining support from senior medical and surgical staff; 2) develop (or adapt from another hospital) a user-friendly hospital VTE risk assessment process and policies for prophylaxis for individual areas; and 3) perform a re-audit 6 months after implementation.

These relatively good results were largely attributed to the people, with two very proactive consultants and a visiting respiratory consultant putting pressure on the registrars (who do most of the admissions). The practices around VTE prophylaxis then flowed through the hospital as the registrars switched between teams.

Table. 1 Thromboprophylaxis practises at Southland Hospital for medical (n=20), general surgical (n=20) and orthopaedic (n=20) patients between 10–27 Aug 2009

High risk patients		Low risk patients	
Number of patients eligible for prophylaxis/ total	% eligible patients receiving guideline-consistent prophylaxis	Number of patients eligible for prophylaxis/ total	% eligible patients receiving guideline-consistent prophylaxis
Medical			
7/12	100%	5/8	100%
Surgical			
11/12	72.7%	7/8	85.7%
Orthopaedic			
9/9	0.0%	11/11	81.8%
Overall			
27/33	55.6%	23/27	87.0%

Take home points

- Guideline-appropriate use of VTE prophylaxis was good
- Looking towards a formal VTE prevention policy at Southland Hospital
- Looking to create an improved user friendly process for documentation of VTE risk and choice of VTE prophylaxis

Hawkes Bay

Ms Johanna Lim, Pharmacist, Hawkes Bay Hospital

A cross-sectional audit has been undertaken at Hawke's Bay Hospital. The audit included 157 patients from medical, surgical and orthopaedic wards over a 2-week period (preceded by a pilot audit 1 week beforehand). The audit tool was adapted from materials from the 'VTE safety zone' programme, and the VTE assessment tool was adapted from the Waitemata DHB assessment tool. The most common risk factors for VTE were immobility, age >75 years, acute infectious disease, chronic heart failure, active malignancy, previous VTE and acute inflammatory disorder.

Few high-risk patients received ACCP-recommended thromboprophylaxis and many did not receive any form of prophylaxis (see table 2), although there was a tendency for better thromboprophylactic practices in the surgical and orthopaedic wards, possibly due to a) longer time that benefits have been recognised, with trials in medical patients being more recent; and b) simpler risk assessment in surgical/orthopaedic patients. Enoxaparin and warfarin were the most frequently used prophylactic agents in the medical high-risk patients, enoxaparin was the main agent used in surgical patients, and orthopaedic patients mainly received prophylactic enoxaparin. Moreover, not all patients who received prophylaxis received the most appropriate form.

Inaccuracies may have arisen due to data being obtained from medicine charts and clinical notes, rather than patient interviews. Particular issues were under-reporting of obesity and poor documentation of catheter use. Factors influencing delays, changes or cessation of thromboprophylaxis were not included in the data collection. The cross-sectional design also meant that the duration of adherence to VTE prophylaxis could not be assessed. The issue of differing opinions among physicians about which patients were at risk was raised, and awareness among physicians and surgeons that the audit was being undertaken cannot be ruled out.

Local assessment guidelines for medical, surgical and orthopaedic patients are currently being developed, with implementation planned within the next few months. VTE risk assessment and prophylaxis recommendations are designated to become part of the pharmacists' duties. VTE prophylaxis alert stickers may also be implemented. Further presentations of this audit are planned, and a re-audit will be undertaken 3–6 months after guideline implementation.

Table 2. Thromboprophylaxis practises at Hawkes Bay Hospital 21st Jul to 4th Aug 09

Number of patients	High risk (%)	ACCP recommended VTE prophylaxis (% of high risk patients)	No form of prophylaxis (% of high-risk patients)
Medical			
85	65.9%	8.9%	51.8%
Surgical			
42	71.4%	13.3%	36.7%
Orthopaedic			
30	96.7%	20.7%	27.6%

Take home points

- Pharmacological and mechanical methods of VTE prophylaxis are underutilised in medical, surgical and orthopaedic patients at Hawke's Bay Hospital
- Many at-risk patients are not treated
- Where VTE prophylaxis was ordered, it consistently fell short of the ACCP guidelines

Other hospitals/DHBs

Wellington Hospital

There is currently no hospital-wide protocol, but gynaecology and orthopaedic departments do have there own protocols. The gynaecologists have a good risk assessment tool, while the orthopaedic protocol is largely aspirin based. An audit in 2007 of 128 surgical patients revealed that >50% of gynaecologists were adhering to protocol, but there were still a large number of very high risk patients who were not receiving any thromboprophylaxis. Only a few orthopaedic patients (17%) received LMWH, but often not at the appropriate dosage. Reasons identified for not providing thromboprophylaxis were: 1) risk of bleeding (orthopaedics); 2) spinal anaesthesia (anaesthetists); 3) widespread lack of knowledge of VTE risk among patients; and 4) no DHB-wide policy. Some key people in the DHB have been interested and engaged, and VTE prophylaxis is part of a large policy update looking at all aspects of thromboembolism. A DHB-wide VTE registry was planned, but funding was declined.

Palmerston North

Some more key people have become engaged since last year. A simple risk assessment tool has been developed (awaiting signoff) and it is hoped it will be included in the medical assessment book. Guidelines are in development. An information pamphlet for patients has been approved, initially targeting medical patients, and posters are to be put up in the ED and medical wards. There will be a grand rounds presentation, followed by a larger education programme. Pharmacists are on board and will be included in the education programme. As a result of what other said at the meeting, including a talk by an affected patient at the education sessions is now also being considered.

Waikato Hospital

Waikato hospital is just starting to address VTE prophylaxis. A medical audit has been completed, but data analysis is not complete. Preliminary results indicate the situation is 'pretty bad'. A surgical protocol has been in place for about 8 years, but the department is not interested in being audited. A medical protocol was updated last year.

Nelson/Marlborough

The situation became very good in Nelson after the 2008 meeting when an audit nurse who has collected data on every medical patient was employed. These data have been presented to physicians every month, and the rates of thromboprophylaxis have increased as a result. However, there are still a number of physicians who are not convinced there is a need for VTE risk assessment and thromboprophylaxis protocols. An important outstanding issue is the quality of the risk assessment tool being used, which is not always in line with more frequently used tools. The next step is to draw up standardised guidelines based on best practice, followed by an implementation strategy.

Middlemore Hospital

Middlemore Hospital currently has a pamphlet to give to patients, and an audit risk assessment tool is ready for implementation, but funding for a person to drive this is lacking. There has been some interest and acceptance from individuals from surgery and orthopaedics, but there is still along way to go, and audits have shown a lack of good practice in medical wards.

Auckland Hospital

Auckland Hospital is still at initial stages. An audit was undertaken in the surgical ward at the end of 2009, but the results are still being analysed. An audit in medical wards is planned. The audit results will be used to push for the development of a formal policy and risk assessment tool.

Preliminary discussions on a PhD research project on VTE in NZ

Ms Anne Blumgart, Principle pharmacist DUE, Middlemore Hospital

VTE is fertile ground for research, and Ms Blumgart plans to undertake a PhD project to: 1) examine and describe the prevalence of VTE in NZ and overall extent of its incidence in NZ at 3 months postdischarge; 2) document and describe the current standard of care across NZ; and 3) develop and implement a robust intervention based on best practice from NZ and overseas. The project is still in the scoping stage, with ongoing discussions with key opinion leaders and working out the preliminary proposal. Clinical questions are currently being worked up. It is envisaged that the project will involve the following 4-stage process.

1) Establish the problem.
   - Systematic literature review.
   - Obtain the NHIs of the first 100 admissions in general surgery/medical/orthopaedic departments on a specific date.
   - Obtain notes and look at risk factors, comorbidities and prophylaxis after coding, postdischarge.
   - Three-month follow-up of readmission with VTE from NZ Health Information System data.
   - National joint register data from the Canterbury DHB.
   - Other relevant sources not yet identified.
2) Survey all DHBs to establish current standard of care and VTE programmes (guidelines, risk assessment tools and VTE teams).
3) Develop an electronic VTE decision-support tool that can be integrated in institutions across NZ that:
   - identifies at-risk hospitalised patients using weighted risk factors
   - is linked to patient information management systems
   - flags patients needing VTE risk assessment.
4) Undertake a pre-post validation study of the electronic decision making tool to evaluate:
   - physician uptake/acceptance
   - VTE incidence during 3-months postdischarge.

Workshop & general comments

The audit findings from the individual DHBs have been quite consistent. While numbers are usually small, it was noted that, unlike a clinical trial where small differences are investigated, these audits are identifying a large difference in practices, and largely confirming what previous audits have found, so audits on relatively small numbers of patients that minimise resources are appropriate.

After the presentation of the audit results from Hawke's Bay Hospital, Ron Paterson commented that the results were "appalling", and the board should be made aware of the findings. He undertook to write to the CEO, to ask if he realises there is an issue, and that there are things that can be done to improve the situation. He was asked if it would be possible to extend this to all CEOs/boards, and he added that he would think about how to write nationally, also noting Dr Mary Seddon's comment from last year's meeting the importance of including a patient vignette with the data to help obtain engagement.

There was some discussion around the variations between guidelines that have been adapted in some hospitals around NZ and those of the ACCP. Ron Paterson commented that there will not be any protection where guidelines that are not evidence based have been followed.

Some hospitals have vetoed patient pamphlets due to concerns around liability. The benefits of including contraindications in the pamphlet were discussed. It was suggested that a secure web-based central repository for sharing resources could be set up. The inclusion of such a repository in a more extensive website was proposed. Tracey Woulfe (Thrombosis Nurse Specialist at Waitakere Hospital) offered to coordinate the sharing of forms/resources for all hospitals in the interim. A number of attendees also expressed strong support for the idea of neck tags to be worn by staff to help remind them of the procedures/protocols.

Another issue that crops up at many hospitals is individuals not believing there is a problem. One possible solution is to make a case out of incidents of VTE; e.g. copy of discharge summary and/or emails to applicable individuals when a patient does experience a thrombotic event. Another suggested option is to get the person asking how to treat VTE after discharge to contact the consultant to check they are happy that the patient starts anticoagulation therapy.

The important ongoing issue of continuing thromboprophylaxis following discharge was raised. It was accepted that this is an area in which little has probably be done to date, but it is something that will need to be addressed.

How private health providers fit into the processes was raised, particularly for patients who present at public hospitals, but then go to private providers for surgery/treatment and may therefore miss out on the benefits they would otherwise receive. It was asked that such patients at least receive pamphlets at pre-admission clinics, as it is likely that most private hospitals would not be happy to provide such pamphlets at admission. It was also noted that private health providers should probably have better representation at these meetings.

The importance of research was mentioned, as was the notion that the PhD to be undertaken by Ms Blumgart has the potential to provide very valuable data that can be presented to DHBs. Furthermore, the prospect that the national decision support tool included in the scope of the PhD could help resolve many of the issues around inadequate VTE prophylaxis in NZ was raised.

Conclusions

Dr Singh felt that it is time that a national guideline was developed. There was general consensus that there is little point in 'reinventing the wheel', and that basing NZ guidelines on another country's is the best approach. The Australian guidelines are to be released shortly, and given the existing alignment between NZ and Australian Health services (particularly at the college level), it was suggested that these should be adopted for NZ. The advantage of having college support, rather than just health authorities, is also likely to improve uptake and compliance by some of the more resistant individuals. It was noted that it will be helpful to ensure that DHB representatives are included in the implementation phase.

Dr Singh undertook to procure the Australian guidelines when they become available, and forward them to all members of the Steering Committee. He also asked that any hospital with existing guidelines send a copy to him, and he would also distribute those to the committee members. Once a consensus guideline is formed, he will distribute it to all members; a time frame of 3 months to achieve this was set. He expressed a desire to get some secretarial support to help deal with the workload, but it was concluded that it would be best to wait until the QIC restructure is complete.

Thrombolysis for pulmonary embolism

Dr Sanjeev Chunilal, Haematologist, North Shore Hospital

This presentation focussed on identifying PE patients who are most likely to benefit from thrombolysis. The incidence of VTE is approximately 0.1%, with PE accounting for about one-third of cases.[1] While the mortality rate associated with PE is 15.3%, only about half of these deaths are due to PE rather than another concomitant disease. Around 4–5% of PEs are massive with associated hypotension and shock, and the mortality rate is 58%. For first PE survivors, about 8% will have a recurrence, and one-third of those are fatal.

One meta-analysis of 11 RCTs (n=748) provides the only evidence for the use of thrombolysis in PE.[2] However, only 5 of these RCTs included haemodynamically unstable patients. Compared with heparin, thrombolysis did not significantly lower the risk of the combined endpoint of death or recurrent PE, and the results were similar for death or recurrent PE alone. Moreover, there was an increased risk of nonmajor bleeding associated with thrombolysis compared with heparin (OR 2.63 [95% CI 1.53, 4.54]). However, a subgroup analysis revealed a clear benefit for patients with haemodynamic instability, with an OR reduction of 0.50 for death or recurrence associated with thrombolysis, but a 2-fold increased risk of major bleeding. Unfortunately, the data are clouded by poor definitions of haemodynamic instability, as well as inconsistent definitions of right ventricular (RV) dysfunction. Registry data show that mortality is greater in patients with RV hypokinesis, suggesting that this is a group of patients who might require more aggressive treatment.[1]

Prognostic markers

Most of the prognostic markers for poor outcomes in PE are surrogates of RV dysfunction (e.g. echocardiogram, ECG, CT, biomarkers and clinical scoring systems). Around 44% of haemodynamically stable patients have evidence of RV dysfunction, and mortality in such patients is around 10%, compared with 3% in patients with no RV dysfunction.[3] Another study has shown that signs of RV strain on ECG is associated with significantly higher rates of mortality and deterioration compared with no evidence of RV strain.[4] Interestingly, the mortality rate more than doubled in patients with both RV dilatation on echocardiography and RV strain on ECG compared with patients with just one of these RV abnormalities. The mortality rate has also been found to be greater in: a) patients with RV dilatation versus no RV dilatation on spiral CT; b) elevated versus normal cardiac troponin levels, including in normotensive patients; and c) elevated versus normal brain natriuretic peptide (BNP) and NT-proBNP levels; these markers also correlated well with RV dysfunction on echocardiography.[3,5] In terms of clinical risk stratification, when the PESI score model was applied to a prospective validation cohort of patients with PE, there was a clear gradation of increasing mortality as risk increased.

The problems with using these prognostic markers for identifying which PE patients to thrombolyse are: 1) RV dysfunction patients are very heterogeneous as a group; and 2) biomarkers have limited positive predictive value for mortality. Only one study has provided data for thrombolysis (alteplase plus heparin) versus heparin alone in patients with RV dysfunction.[6] The superiority of the thrombolysis group was largely driven by a lower secondary lysis rate, but the integrity of the data was compromised as the treating physician was able to unblind the participant prior to administering secondary lysis therapy at his/her discretion.

Thrombolysis regimens

FDA approved thrombolysis regimens are: a) streptokinase 250,000IU over 30 minutes then 100,000 IU/h for 12–24 hours; b) urokinase 4400IU over 10 minutes then 4400 IU/h for 12–24 hours; and c) r-TPA 100mg over 2 hours or 0.6 mg/kg over 15 minutes (maximum 50mg; with or without concomitant unfractionated heparin). However, available evidence from studies investigating r-TPA regimens suggests that: a) there is uncertainty about the safety and efficacy of bolus dosing, and if it is used, heparin should be started ≤2 hours after the bolus dose is administered; and b) low-dose r-TPA (50mg over 2 hours) should be considered in patients with a bodyweight <65kg.[7,8]

Safety of thrombolysis

Much safety data come from clinical trials, but participants are generally younger, healthier and have better outcomes than 'real-world' patients. Registry data are more useful to determine safety, and data from ICOPER show that the rates for intracranial and major bleeding were 3.0% and 21.7%, respectively, in PE patients who received thrombolysis (compared with respective rates of 0.3% and 8.8% for nonthrombolysed patients).[1] Acute coronary syndrome data suggest that bleeding rates associated with thrombolysis are greater for females than males.[9] Data from the German MAPPET registry also showed that women who received thrombolysis were more likely to experience a major bleeding event than those who just received heparin (27.1% vs. 8.4%), while the difference for men was not statistically significant (15.1% vs. 6.9%). It would be interesting to know the bodyweight of the patients who experienced bleeding, but these data are not available. Given the aforementioned improved safety of low-dose r-TPA in lower bodyweight patients, it seems plausible that being female could be a surrogate for lower bodyweight.

Take home points

- There are clear data to support thrombolysis in patients with shock or hypertension
- No clear data to support thrombolysing patients with RV dysfunction, although there does appear to be an undefined subgroup who may benefit
  - Decision should be guided by clinical judgement, including high risk (PESI score), elevated troponin and RV strain on ECG
- Low-dose r-TPA recommended for patients <65kg
- Strong suggestion of higher bleeding rates in PE patients compared with acute MI/CVA
  - Possibly due to more comorbidities
  - Bleeding rates are higher in women, but may be confounded by bodyweight
- Adequate thromboprophylaxis reduces the need for thrombolysis

References

1. Goldhaber SZ et al. Acute pulmonary embolism: clinical outcomes in the International Cooperative Pulmonary Embolism Registry (ICOPER). Lancet 1999;353(9162):1386–9
2. Wan S et al. Thrombolysis compared with heparin for the initial treatment of pulmonary embolism: a meta-analysis of the randomized controlled trials. Circulation 2004;110(6):744–9
3. Aujesky D et al. Short-term prognosis of pulmonary embolism. J Thromb Haemost 2009;7 Suppl 1:318–21
4. Vanni S et al. Prognostic value of ECG among patients with acute pulmonary embolism and normal blood pressure. Am J Med.2009;122(3):257–64
5. Klok FA et al. Brain-type natriuretic peptide levels in the prediction of adverse outcome in patients with pulmonary embolism: a systematic review and meta-analysis. Am J Respir Crit Care Med 2008;178(4):425–30
6. Konstantinides S et al. Heparin plus alteplase compared with heparin alone in patients with submassive pulmonary embolism. N Engl J Med 2002;347(15):1143–50
7. Goldhaber SZ et al. Reduced dose bolus alteplase vs conventional alteplase infusion for pulmonary embolism thrombolysis. An international multicenter randomized trial. The Bolus Alteplase Pulmonary Embolism Group. Chest 1994;106(3):718–24
8. Wang C et al for the China Venous Thromboembolism (VTE) Study Group. Efficacy and safety of low dose recombinant tissue-type plasminogen activator for the treatment of acute pulmonary thromboembolism: a randomized, multicenter, controlled trial. Chest 2010;137(2):254–62
9. Schulman S et al. Hemorrhagic Complications of anticoagulant and thrombolytic treatment. American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Chest 2008;133(6 suppl):257S–98S