

Supported by

UK/CVS-141017 Date of preparation: March 2014

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2013 ഗ NNOVATION AWARD



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Foreword



he Thrombus Innovation Awards were held on 7 February 2014 at BMA House in London. The awards aim to encourage innovative ideas in the area of thrombosis and

anticoagulant management. Once again, there was an excellent response with many applications from multidisciplinary teams in secondary and primary care. The surge of entries we received from primary care was encouraging and reflects the increase in commissioning of service delivery in primary care. Abstracts from the successful entries are included in this supplement. They reflect the challenges we face in the management of venous thrombosis and hopefully provide some ideas and solutions to readers. One of the major aims of the awards is to encourage the sharing of good practice and innovative solutions.

As with all successful events, there is a lot of planning and support needed. I would, therefore, like to thank the judges from the *Thrombus* Editorial Board for their hard work in assessing applications – a task that becomes increasingly difficult each year. I am extremely grateful to Boehringer Ingelheim who sponsored the awards this year, and to those from Hayward Medical Communications who organise the awards. My thanks also goes to Dr Steve Kitchen, the guest speaker and winner of the Anticoagulation in Practice Lifetime Achievement Award, who illustrated the need for close collaboration between laboratory and clinical developments in the field of haemostasis.

Finally, I would like to thank all those who entered the awards for their hard work. I encourage all our readers to let us know if they are involved with any new developments, such as a provision of service that they have developed and would like to share. We hope to continue to provide practical content relevant to improving management and clinical practice in the field of thrombosis.

Peter Rose, Editor

Winners and highly commended entries

4 1st place

The use of modified computer-assisted strain gauge plethysmography (Venometer V3) as an additional screening test for patients with suspected DVTs *South West Essex Community Services*

5 2nd place

A local VTE prevention programme driving novel initiatives

Chelsea and Westminster Hospital NHS Foundation Trust

7 3rd place

GP Care Community DVT Service GP Care UK Limited, Bristol

8 Highly commended

Establishing a care pathway for assessing housebound patients with suspected DVT *DVT Service, City Health Care Partnership CIC, Hull*

Modernisation of the home visit process for warfarin management of housebound patients

Anticoagulation Service, City Health Care Partnership CIC, Hull

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Printed by Williams Press Ltd.

Cover pictures: Robin Beckham





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Project: The use of modified computer-assisted strain gauge plethysmography (Venometer V3) as an additional screening test for patients with suspected DVTs South West Essex Community Services

Project lead: Andrew Hughes

Team members: Ben Hall, Beverley Piper, Katie Jennings, Georgia Page, Ashley Newport, Gerry Ferdinando, Chris Smith, Lyn Owles, Lorraine McIntyre, Florence Charova and Fran Dzora

urrently, only 15% of patients with suspected deep vein thrombosis (DVT) have a thrombus confirmed by Doppler ultrasound scan. For many patients, investigation can involve time-consuming visits to acute trusts for further assessment, with many having negative Doppler scans. Those with **Doppler-confirmed DVTs may require regular** visits to the anticoagulant clinic. In April 2009, a community-based DVT assessment, diagnosis and management service was set up at Brentwood Community Hospital, part of South West Essex Community Services and North East London NHS Foundation Trust. GPs can refer patients directly to the unit via telephone or a direct computer link with the GP record system, SystmOne. Initial assessments are carried out by our nursing team, using two established screening tests: the three-level Wells score and a quantitative point-of-care (POC) Ddimer blood test (Roche Diagnostics).

Doppler scanning is provided onsite by two visiting advanced ultrasonographer practitioners. Those with scan-confirmed DVTs have anticoagulation initiated and monitored by our on-site, nurse-led anticoagulation clinic, comprising four registered general nurses and a community support worker, utilising capillary international normalised ratios and a computerised decision-support system.

During the first 18 months, we found that, in individuals with discordant screening tests,

>90% of their Doppler scans were normal. We evaluated a third non-invasive screening test: computer-assisted strain gauge plethysmography (Venometer V3, Amtec, UK). Our objectives were: to see if the Venometer V3 could improve the discrimination of the initial screening tests; to allow more patients to have DVTs safely excluded on a single visit; and to decrease the number of Doppler scans required, thus making better use of a time-consuming and expensive resource.

Innovation

Computer-assisted strain gauge plethysmography (Venometer) was introduced in 1991. Initial hospitalbased studies showed negative predictive values (NPVs) of 97–98% for proximal DVT, compared with either venography or Doppler ultrasonography. The false negative rate was 4–10%.¹⁻³

Subsequent hospital-based studies combined Venometer scanning with a Wells score and D-dimer measurement and were compared with Doppler ultrasonography. This showed NPVs of 99% and a potential reduction in the need for Doppler scans by up to 70%.⁴⁻⁶ The original Venometer V2 was then modified to improve its sensitivity, to produce the Venometer V3. Our pilot study was used to evaluate the new V3 model to determine if adding V3 scanning to our two existing screening tests could help us to achieve our objectives.

Results

Between January 2011 and May 2013, 342 patients with suspected DVTs had a Venometer V3 scan, as well as a Wells score and POC D-dimer. Doppler scans were performed on 236 patients according to our protocol, if they had either a moderate- or high-probability Wells score or a raised D-dimer or both; 140 (58%) of these had negative V3 scans and only four of them had positive Doppler scans; therefore, a negative V3 scan was highly predictive of a negative Doppler scan.





The sensitivity and NPV of V3 scanning for excluding proximal DVTs were 100%. For excluding all DVTs, these were 90% and 97% respectively. The overall Doppler scan rate for patients in the study was 69%. If those patients who had discordance between the Wells score and D-dimer result with a negative V3 scan were discharged without a Doppler scan, the scanning rate would have decreased to 47%. Only one calf DVT would have been missed. Therefore, adding a V3 scan to the existing two screening tests for patients with suspected DVTs may enable more DVTs to be safely excluded, without the need for Doppler ultrasound scanning.

In secondary care, this could improve the efficiency of DVT screening by decreasing the number of visits and Doppler scans required. This could also relieve pressure on radiology departments and enable them to more readily comply with the current National Institute for Health and Care Excellence (NICE) guidelines on Doppler scanning in patients with suspected DVTs. In primary care, adding V3 scanning could further decrease the need to refer patients to secondary care. As a result of setting up our community-based service in Brentwood, we estimate there are annual savings of £50,000. Additional savings of £4,000 per year could be made internally by introducing V3 scanning.

Sustainability

We aim to influence NICE when it comes to reviewing the 2012 guidelines on diagnosis and management of venous thromboembolism so that V3 scans may have a place in the screening pathway for suspected DVT.

In setting up our community-based DVT assessment service, we can provide a model for others who wish to set up similar services. The technique of V3 scanning can be taught to any healthcare worker in three hours. We have already shared our knowledge and experience with various clinical commissioning groups.

Additional comments

The Venometer V3 computer programme allows the result to be displayed as either positive or negative, so no subjective interpretation is required. It provides an objective result, unlike the subjective nature of part of the Wells score. It is also unaffected by additional factors that can elevate the D-dimer •

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Dewar C, Selby C, Jamieson K, Rogers S. Emergency department nurse-based outpatient diagnosis of DVT using an evidence-based protocol. *Emerg Med J* 2008; 25: 411–416.

6. Langford NJ, Tonks K, Singh M. Out-patient detection of deep vein thrombosis using a combination of risk scoring and strain-gauge plethysmography: a follow-up study. *Acute Med* 2009; **8**: 127–130.

2nd **place**

Project: A local VTE prevention programme driving novel initiatives

Chelsea and Westminster Hospital NHS Foundation Trust

Project leads: Sheena Patel and Helen Yarranton **Team members:** Amer Raza, Claire Shard, Malin Zettergren, Warwick Radford, Philip Lee and the Electronic Prescribing Team

> he House of Commons Health Committee's second report of session 2004/05¹ disclosed that 25-32,000 people in England die from venous thromboembolism (VTE) contracted in hospital each year. The figures are alarmingly high, especially because many of these deaths are preventable.

A number of teams and departments in our acute care hospital work together to deliver the national and local VTE prevention programme. The hospital's top patient safety priority is to have no hospital-associated preventable VTEs.

VTE prevention is being recognised as a national clinical priority. Our trust wanted to make sure that:

- Adult patients were being risk-assessed for VTE
- Patients at risk of VTE were being offered appropriate thromboprophylaxis
- Patients are educated on the signs and symptoms of VTE and when to seek urgent medical attention
- There was a reduction in hospital-associated preventable VTE events
- VTE prevention quality indicators are supported and progress is monitored monthly.

Innovation

Two electronic VTE risk assessment tools were designed and implemented to risk-assess medical, surgical and obstetric patients by identifying their risk of VTE, and prompting the prescribing of appropriate pharmacological and mechanical thromboprophylaxis. Following the launch of the electronic VTE risk assessments, completion rates in 2010 were around 50%. There was no way to identify preventable VTEs.

Two anticoagulation pocket guides were developed for medical, surgical and obstetric patients on VTE prevention and treatment to offer guidance to healthcare

^{1.} Flanagan DE, Creasy T, Thomas P, Cavan D, Armitage M. Computer-assisted venous occlusion plethysmography in the diagnosis of acute deep venous thrombosis. *Q J Med* 2000; **93**: 277–282.

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professionals and ensure patients receive appropriate treatment. There was no systematic way of recording whether patients received the VTE patient information leaflet, and so it was agreed to add VTE information to the hospital's admission and discharge checklist. Three specific patient information leaflets for inpatients, pregnant women, patients seen in A&E and outpatient clinics were introduced to give information on VTE.

To address hospital-associated VTE events, a multifaceted approach with the radiology department has helped produce weekly radiology reports of VTE diagnoses. The specialist anticoagulation pharmacist screens the radiology reports to identify positive VTE diagnosis and establish whether the VTE event was hospital-associated or not.

A 'No More Clots' campaign was introduced to increase VTE awareness among staff and patients via educational meetings, VTE bulletins and posters in public areas.

Results

The hospital quality committee supported three quality targets and indicators. These were:

- To ensure 90% of adult patients have a VTE risk assessment completed on admission to the hospital
- To ensure 90% of adult patients receive appropriate pharmacological and mechanical thromboprophylaxis
- To achieve a 25% reduction in hospital-associated preventable VTEs from the target set in 2011/12, which means no more than 13 hospital-associated preventable VTEs in 2012/13.

In 2012–13, over 90% of adult patients had VTE risk assessments completed on hospital admission, and we achieved our local and national VTE target. For 2013/14, the target for completed VTE risk assessments has been increased to 95%, which the trust has achieved.

In 2012/13, over 90% of adult patients received appropriate pharmacological thromboprophylaxis; however, only 76% of patients



received appropriate mechanical thromboprophylaxis. Following multidisciplinary discussions, we found that it was unclear which staff group was responsible for prescribing anti-embolism stockings (AES). We agreed that the medical staff should prescribe AES, with support from the pharmacy and nursing departments.

Thirteen hospital-associated preventable VTEs were identified in 2012/13, and our target was achieved. We plan to address the contributory factors for hospitalassociated preventable VTEs in 2013/14 by:

- Continuing to provide weekly and monthly feedback on VTE risk assessment performance
- Setting up a taskforce to address why prescribed doses of thromboprophylaxis were not administered during admission
- Establishing good practice for documentation of omitted and delayed medicine doses
- Establishing a process for agency nursing staff to sign and document medication doses on our electronic prescribing system.

Sustainability

Seeking support from senior management helps prioritise tasks among departments. It is important to involve stakeholders and to understand the local requirements.

Multidisciplinary staff have found the feedback on the performance of VTE risk assessments and appropriate thromboprophylaxis useful.

Stakeholders were regularly informed of proposed developments; for example, collaborative feedback ensuring the specific electronic risk assessments were user friendly and fit for purpose was obtained via:

- Individual/educational meetings with leads and frontline staff to deliberate on concerns and changes to practice
- Trustwide communication through emails, desktop screen savers and VTE bulletins.

By developing our sustainable and robust risk assessment system with validated reports we are able to reliably and accurately report the percentage of VTE risk assessments completed for all patients admitted to our hospital without the need to use patient sample data or employ extra data collectors at external cost.

We continue to monitor hospital performance and provide frequent performance reports.

Additional comments

Specific electronic VTE risk assessments were created for patients to identify their level of risk for developing VTE with preventative measures in place. Training was provided for staff, including videos, accessed via our homepage of the intranet, demonstrating how to complete the VTE risk assessment •

Reference

1. www.publications.parliament.uk/pa/cm200405/cmselect/cmhealth/ 99/99.pdf (last accessed 28/02/14)



Project: GP Care Community DVT Service

GP Care UK Limited, Bristol

Project lead: Neil Crichton **Team members:** Lina Bridges, Lucy Stanley and Teresa Caddick

G P Care has been providing a comprehensive community deep vein thrombosis (DVT) service for NHS patients in Bristol and South Gloucestershire for the last five years. Following NICE approval of rivaroxaban, GP Care developed a safe alternative pathway to the existing warfarin pathway. The aims of the new rivaroxaban pathway were to ensure:

Further cost benefits to the NHS

- Further development of working relationships with primary and secondary care
- Benefits to patients (greater treatment choice, less impact on daily life, more independence, less time spent at GP surgeries and broadening of inclusion criteria for community care).

Innovation

Until July 2012, patients with a confirmed DVT were treated with warfarin and injections of low molecular weight heparin (LWMH). Rivaroxaban received NICE approval following two major clinical trials, EINSTEIN DVT and ROCKET AF. These studies suggested a negligible difference in the number of adverse side effects when compared with warfarin. There were obvious benefits to patients in offering rivaroxaban as an alternative treatment.

Working closely with the head of medicines management at NHS Bristol, GP Care developed a safe and robust governance structure to allow the introduction of rivaroxaban as a treatment option in DVT. Key to the success of this was regular liaison with a wide-ranging clinical team.

We felt it was important to involve the manufacturer, Bayer Healthcare, directly with the training of staff and development of new protocols. Rivaroxaban was not widely available in high street pharmacies. We therefore worked alongside local pharmacy managers and pharmacists to ensure that there was a reliable supply of rivaroxaban in Bristol and South Gloucestershire pharmacies. We also took the opportunity to introduce assessment for, and prescription of, class II compression hosiery to all patients confirmed to have a DVT.

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The service is available to an area with a population nearing 500,000. With up to 30 new DVT patients a month to date, 75% of our patients have chosen to be treated with rivaroxaban over warfarin.

Results

Despite initial pressures, it did not take long for the benefits to patients to be noticed. These included:

- A greater sense of involvement in care decisions
- More independence and less impact on their daily lives
- Avoiding daily injections of LMWH to the stomach
- Fewer dietary considerations
- Straightforward dosing requirements as opposed to the continually changing doses of warfarin.

GP Care has realised a reduction in the cost of the rivaroxaban pathway. There have been an estimated 14,000 hospital attendances avoided and estimated savings to NHS commissioners of £2.5million (compared with local hospitals). On top of this, 97.5% of patients rate their overall experience as 'Excellent' or 'Very good'; and 100% of patients are being offered an ultrasound scan on the same or the next working day as referral.

Sustainability

Despite wide coverage of the licensing of rivaroxaban for treatment of DVT, there has been a slow uptake in offering it to patients. Where many health providers try to avoid risk, GP Care identifies and manages the risks by carefully constructing a safe treatment pathway with a stringent governance infrastructure.

With 75% of our patients opting for rivaroxaban over warfarin, we have an evidence base to prove that this model of treatment is sustainable. We strongly believe that this model could be rolled out to other areas

and GP Care is talking to commissioners to introduce the Community DVT Service to other clinical commissioning groups.

Additional comments

GP Care is always looking for ways to improve care pathways. In the interest of providing better patient care while delivering cost efficiencies, we are proud to offer patients a safe and convenient alternative treatment to warfarin •

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Project: Establishing a care pathway for assessing housebound patients with suspected DVT

DVT Service, City Health Care Partnership CIC, Hull

Project lead: Helen Connington **Team members:** Emma Tomlinson and Adam King

C ity Health Care Partnership CIC, provide a nurseled community deep vein thrombosis (DVT) service for patients registered with a Hull GP, covering a population of 256,000. Patients who are considered to be housebound, and are unable to attend the clinic, have in the past had to be admitted to hospital for assessment and treatment of unilateral leg pain and swelling. We have worked with key stakeholders to introduce a care pathway for assessing housebound patients within their home, or care home.

Our objectives were to provide a responsive, accessible service so patients are seen and assessed within four hours of referral from the GP. This enables housebound patients with suspected DVT to receive the same assessment and treatment within their home as they would in our clinic.

Highly commended

We piloted a pathway for the assessment and treatment of housebound patients with suspected DVT, which included the following elements for patients: a comprehensive assessment of any pain, swelling and general health; a D-dimer blood test and, if positive, a blood chemistry profile and full blood count sent to the labs; and negotiation and assessment to enable Doppler ultrasound investigation to be undertaken. Patients with suspected DVT are given a prescription for dalteparin until they receive an ultrasound scan, and those with diagnosed DVT are prescribed warfarin and dalteparin and receive direct referral to the community anticoagulation service. GPs receive a comprehensive discharge letter for those patients who have been assessed by the service.

Results

All the patients seen on the home visit pathway were happy with the service and grateful that they were not going to be admitted to hospital. In line with this, no patients seen on the housebound pathway have had to be subsequently admitted to hospital. The average number of patients seen on the housebound pathway is approximately three per month. This is a small percentage of the total number of patients that we see; however, this is very costeffective as the patients are not admitted to hospital.

There is increasing provision for assessment of patients with suspected DVT being set up throughout the country and our innovation could be easily included in such practice. The nurse practitioners from the DVT service would be happy to support other services in implementing this •

Project: Modernisation of the home visit process for warfarin management of housebound patients

Anticoagulation Service, City Health Care Partnership CIC, Hull

Project lead: Michelle Kennedy **Team members:** Anticoagulation Team

Patient feedback prompted us to critically review and re-design the home visit process to build an accessible and responsive service structured around patients' needs. Our objectives were to: develop a home visit process allowing patients to be booked on the specific day the international normalised ratio (INR) check is required; split the city into three clear home visit localities; simplify the filing system for patient notes and the 'pulling' of notes for home visits; and develop a system that ensures failed home visits can be identified on the day the visit is planned.

The first stage of this project began with representatives from all staff groups in the anticoagulation service brought together to map the existing home visit process to establish a clear baseline of the pathway. We set a three-month timescale for implementation

Highly commended

of the proposed changes to the home visit process. These initial planning stages took six weeks to complete. The next stage was to introduce the suggested changes into practice, which also took six weeks to complete. This included: setting up daily clinic lists on DAWN (computer-assisted software); defining the exact geographical area of each locality; allocating the 530 housebound patients to the appropriate home visit list by postcode; informing patients of the changes; and training staff members. This was followed by an ongoing period of review where issues were identified to ensure we achieved continued improvement.

Results

All patients are now given a specific day for their home visit. This ability to book home visits on the day that the patient's INR is required ensures safe anticoagulation management. On top of this, anticoagulation service staff can quickly establish when patients will be seen and by whom. This makes co-ordination of each shift much safer and more efficient. This process ensures the healthcare assistants' workload can be managed effectively by the co-ordinator and redistributed as necessary. Daily lists make the 'pulling' of patient notes quicker, simpler and safer. Feedback from patients indicates we are respecting and meeting their wishes to receive a specific day for home visits.

Many anticoagulation services use computer-assisted dosing software; therefore, it would be simple to replicate this system in other services. There would be no cost to adding this to current computer systems as the dosing software is already in place •