Venous Thromboembolism Audit; where are we now and how can we improve?

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ABSTRACT

Introduction: Venous Thromboembolism (VTE) is the term used to describe blood clots in the deep veins. It is considered to be a significant healthcare topic due to the high incidence in hospitalised patients. National body in the UK (NICE) recommends risk assessment, the appropriate prescription of thromboprophylaxis and the provision of patient information to all patients over the age of 18 years admitted to hospital. Despite the introduction of national guidance, patients develop hospital related VTE. It is therefore essential to establish compliance of VTE prevention policy and provide recommendations where improvements are necessary.

Purpose: To assess current practice within an acute hospital in reducing the risk of VTE in patients admitted to hospital against NICE guidance and to identify methods of improvement to ensure adherence to VTE prevention guidelines.

Materials and methods: A local audit was carried out using a tool which was designed to measure clinical practice against national standards for VTE prevention. PDSA cycle was used for a systematic process to be followed. A snapshot sample of 60 inpatient records was selected to be audited on medical and surgical wards of an acute trust. Data was analysed using excel, histograms were produced and percentages calculated to identify adherence of VTE prevention policy in practice.

Results: The audit found that 67% (n=40/60) audit proformas were completed in the allocated time frame; 88% (n=35) of patients had a recorded risk assessed for VTE and bleeding on admission to hospital. Only 18% (n=7) of patients in the audit received verbal information on VTE prevention on admission and none received written information. Furthermore, 10% (n=4) of patients who required anti- embolism stockings did not receive them and 40% (n=16) of patients did not receive appropriate chemical thromboprophylaxis.

Conclusion: Risk assessment and administration of prevention methods can considerably reduce the risks of patients developing VTE thus enhancing patient safety and quality of care provided by the healthcare sector. This audit demonstrates inconsistencies in providing correct VTE prevention methods to patients throughout an acute hospital trust and highlights key recommendations for improvement.

Key words: Venous thromboembolism; hospitalised patients; thromboprophylaxis; audit; prevention.

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INTRODUCTION

Venous Thromboembolism (VTE) is the term to describe deep vein thrombosis (DVT) and pulmonary embolism (PE). A disease that is responsible for the highest incidence of death in hospitalised patients, which can often be preventable. This work based learning project will report on an audit that was carried out across two acute hospitals in South London and Surrey. Inpatient records were reviewed and an audit tool was used to assess if appropriate prevention methods were in place for patients in hospital to prevent VTE. Results were analysed and recommendations drawn to improve future practice. A review of existing literature was carried out to obtain further knowledge and understanding of evidence based research on this significant healthcare topic. With financial constraints on the National Health Service (NHS) savings can be made by preventing VTE whilst also improving patient outcomes and experience. The high incident rates of VTE are recognised in healthcare as a major health issue and it is a well-known fact that patients are at an increased risk during an inpatient stay in hospital. The profile of VTE has been raised among the public and healthcare professionals due to cases in the media being publicised and hospital campaigns for prevention. The Department of Health [1] reported that VTE was no longer "everyone's problem but no-one's disease" and declared it a top clinical priority for the NHS. This was on the back of a report that 25,000 people die each year of hospital preventable VTE and this poses a considerable economic burden costing the NHS £640 million per year to manage the disease [2]. Following this statement, the National Institute of Clinical Excellence (NICE) published guidance on the prevention of VTE to apply to all patients admitted to hospital over the age of 18 years [3]. NHS England [4] included the risk assessment of patients admitted to hospital as part of a financial incentive scheme to encourage hospitals to work with their commissioners to implement the NICE guidance however this is now mandatory and fines are sanctioned if targets are missed.

Most hospitals employ a VTE clinical nurse specialist who is involved in ensuring policy and guidance on VTE is implemented across an acute healthcare trust. All clinical staff receive mandatory VTE prevention training and the compliance of risk assessment is regularly monitored and reported to the Trust executive committee and NHS England however, the compliance of appropriate VTE prevention methods is not regularly audited. An evaluation of current practice will therefore be valuable to determine compliance and provide recommendations for any areas that may need improvement ultimately reducing patient morbidity and mortality.

Previous audits monitoring compliance of VTE prevention in the hospitals have been carried out by various specialities however different audit tools have been used causing inconsistencies in results. This has led to incomparable previous data. The last trust wide audit was undertaken in November 2015, carried out by junior doctors working in all specialities. There were no specific instructions and the audit tool was complicated and laborious. This created variation to what the auditors determined as 'correct thrombopro-phylaxis' and the results were flawed. It is therefore critical that a specialist in the area is involved in order to guide auditors to meet specific criteria to avoid discrepancies in results.

Aims

The aims of the audit were to:

- Conduct an audit to establish current practice within an acute hospital in reducing the risk of VTE in patients admitted to hospital against NICE guidance.
- Identify methods of improvement to ensure adherence to VTE prevention guidelines.

Objectives

Audit objectives proposed:

- Data collection using an audit tool on VTE assessment and prophylaxis, auditing patients records on medical and surgical wards.
- To analyse the results and compare to the standards set out in the NICE quality standard guidelines for VTE prevention.
- To highlight any discrepancies and evaluate where practical improvements can be made to help improve VTE assessment and prophylaxis if the trust is not reaching the standards set out by NICE.

Background

A common hospital related complication; VTE can often be avoided with correct thromboprophylaxis (TP). Patients admitted to hospital are deemed at an increased risk compared to individuals in the community due to risk factors highlighted in Table 1.

The process of implementing the NICE VTE prevention quality standards across the trust has been described in Appendix 1. Early risk assessment detects patient risk factors and therefore enables early intervention of prevention methods to reduce the risk of the patient developing VTE. Absence of appropriate TP can result in potential avoidable hospital associated thrombosis (HAT). HAT is defined as VTE diagnosed during an inpatient stay of more than 48 hours or within 90 days of discharge and is a notifiable incident which requires concise investigation by the patient's clinical team [5].

Table 1. Risk factors associated with VTE (adapted from NICE) [3]

Procedure related	Patient related
Surgery	Age >60 years
Immobilisation	Dehydration
	Known Thrombophillias
	Obesity
	One or more medical co-morbidities
	Personal or 1st degree relative affected
	Pregnancy
	Oral contraceptives or HRT
	Varicose veins with phlebitis

Figures of HAT between 1st April 2014 and 31st March 2016 from the hospital trust concerned in the audit are demonstrated in Table 2. Common themes highlighted from investigations include; lack of VTE risk assessment, missed doses of TP, incorrect dose of TP, no mechanical TP and delay in prescribing and administering TP. Roberts et al [6] report that 80% of HAT cases occur despite appropriate thromboprophylaxis however, it has been reported by many that appropriate prevention methods can reduce HAT of medical and surgical patients by 60% and 70% respectively [3].

Table 2. Numbers of patients diagnosed with VTE for hospital associated thrombosis

Type of VTE related to the trust	2014-2015 (%)	2015-2016 (%)
Community associated VTE	398 (74)	425 (72)
Hospital associated VTE	134 (25)	157 (27)
Other Hospital VTE	4 (1)	6 (1)
Total	**536**	**588**

Recently published data from the All Party Parliamentary Thrombosis group (APPTG) [7] reported an average incidence of 72 HAT cases from data collected from 29 Trusts in England between 1st April 2015 and 31st March 2016. This is a significantly lower rate than the Trust concerned in this audit report however, there is no information regarding the bed capacity of the Trusts included in the APPTG report which could reflect the results, nor is there any information on the accuracy of how the Trusts collect data on HAT. In the future, it would be valuable to obtain percentage of HAT nationally compared to patient population.

Literature Review

A literature review was carried out to examine studies assessing the value of VTE prevention in hospitals. A computerised search using the terms 'venous thromboembolism prevention in hospital' in 2005-2016 was carried out using the universities iCAT database. Articles from peer reviewed journals were included in order to ensure advanced knowledge in the subject. Other search engines used include Google and thrombosis charity websites.

Most text books describe the pathophysiology of VTE as caused by stasis, hypercoagulability (sticky blood) and vessel injury [8]. At least one of these factors is found in the majority of patients admitted to hospital who are immobile or who have infection or have undergone surgery for example. The coagulation cascade was first described by Virchow in the 1859 and later heparin was discovered in 1916 by medical student Jay Mclean. It was later revealed that heparin prevented thrombus formation and its first use in humans was in April 1937.

In the adult population, about 1 in 1000 per year will develop VTE [9]. A study exploring European data in the hospital and community setting found that the incidence of death caused by PE could be as high as 60 000 per year [10]. However, in spite of ample clinical evidence, VTE prevention has failed to be executed internationally [11]. This observational study included 68,183 patients throughout 358 hospitals in 32 countries including 6 continents. Cohen et al concluded that over half of patients admitted to hospital are at risk of VTE and only half of patients receive appropriate prevention treatment. Further studies have stated VTE prophylaxis is implemented in the care of 13% - 64% of patients [12,13]. This variation may be due to the studies examining specific patient groups such as orthopaedics – a high risk area where the majority of patients would require VTE prophylaxis. Other factors for variation could include; clinician knowledge, prevalence of education among physicians, accessibility of guidelines and funding.

Catterick and Hunt [14] carried out an enquiry in England focusing on the impact of the national VTE risk assessment tool against rates of HAT, readmission rates and mortality rates. It is estimated that around 2000 diagnoses of HAT and 1200 90-day readmissions have been eluded since the introduction of the NICE VTE prevention guidance in 2010. Likewise, 940 mortalities due to VTE have been avoided in England in 2011 and 2012.

However, it is difficult to assume that it is solely the implementation of the guidance that has caused these reductions over a short period of time and perhaps clinician's knowledge of the disease has improved and therefore patients are being diagnosed and treated efficiently attributing to fewer fatalities. Another salient point to note is that deaths were collected on a National database and therefore could not differentiate between those VTE diagnosed with a related hospital admission and

therefore may not fully reveal the impact of the VTE prevention guidance.

The majority of hospitalised patients have at least one risk factor for VTE. Gerts et al. [15] report that approximately 15% of medical patients are at risk of VTE and 50-60% of patients admitted for orthopaedic surgery and treatment of acute stroke [16]. It has been argued that even with explicit risk factors it is impossible to foresee which patients will develop VTE with 80% of DVT being clinically asymptomatic [17]. It is insufficient to perform investigative tests on all patients at risk of VTE due to ultrasound screening having low sensitivity rate for VTE diagnosis and it is also not cost effective [18]. Consequently the reasonable approach is to risk assess all patients admitted to hospital and provide appropriate TP to those in high risk groups.

MATERIALS AND METHODS

A local audit was carried out to evaluate the status of VTE prevention policy implementation in the trust. Clinical audit is defined by NHS England [19] as an approach to regulate if healthcare is being delivered in line with standards and determine if quality enhancements can be made to improve patient outcomes. An audit can provide an objective review of the quality of care to derive supportive recommendations to improve patient care [20]. According to Johnston [21], apparent benefits of clinical audit include; improved communication among employees, improved patient care and professional gratification. Some disadvantages comprise; reduced clinical ownership, fear of malpractice and professional seclusion. These hindrances can be overcome by appropriate planning of audit, effective project management, and enthusiastic staff and shared results between directorates.

Plan-do-study-act (PDSA) can be used as a model for improvement [22]. Practical ideologies of PDSA cycles endorse processes to test interventions and adapt changes thus ensuring solid solutions are developed for a project to flourish [23]. A PDSA cycle was devised for the audit project (Figure 1) in order to create a systematic approach for processes to be followed.

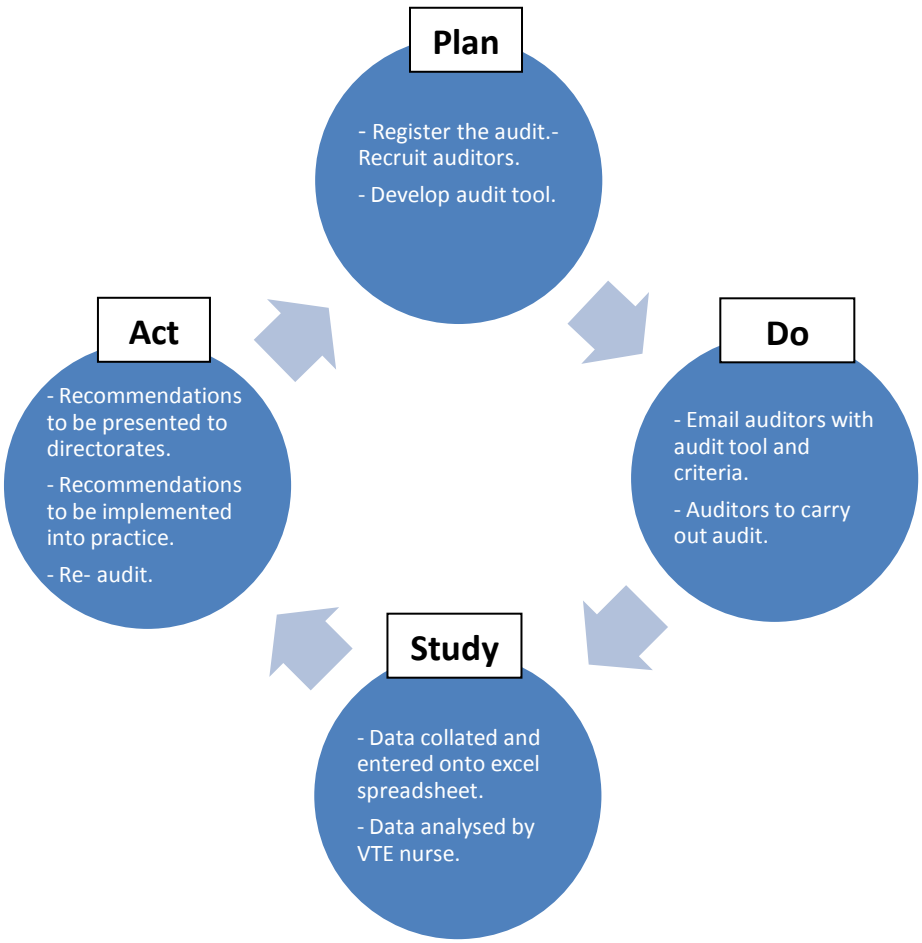

Figure 1. PDSA cycle for VTE audit

Sample and Scope

Ideally all patients admitted to hospital would have their records inspected to audit if they received appropriate thromboprophylaxis during their hospital stay however this would be extremely time consuming and impractical. In order to represent the population [24], a snapshot sample of the overall population has been selected instead – 60 patient records on 6 different wards including medicine and surgery. These included current inpatients who met the criteria in Appendix 2. The VTE prevention policy does not cover patients under the age of 18, patients admitted for treatment of VTE or patients admitted for less than 24 hours and therefore these cohorts of patients are excluded from the audit.

Data Collection

Doctors were recruited to help collect the audit data. The data was collected over a three week period between 21/11/2016 – 12/12/2016. Each participant was given a criteria sheet and 10 audit proformas which were created to incorporate the VTE prevention policy. It is imperative that clinicians comprehend the aim of the audit and understand their role in it [25]. It was appropriate to involve doctors as they have excellent clinical knowledge and also learn the importance of VTE prevention and areas that need improvement which they may oversea in their everyday practice. The General Medical Council advises that all doctors must take part in clinical audit and report results in order to improve practice [26]. Patient medical records, medical notes, drug charts (paper and electronic) electronic risk assessments and blood results were used to collect the data.

Data Analysis

In order for a project to flourish, data analysis is an important step to provide systematic valid results which can be used to draw conclusions and recommendations. Data was transferred into excel spreadsheet for ease of analysis. The data was separated by directorate; medical and surgical. Visual presentation was created including tables, graphs and bar charts.

Ethical Consideration

Organisations are accountable for assuring audits are carried out effectively and are of high quality [27]. The audit was registered within the clinical effective and assurance committee with the premise that it will be reported and presented back to the clinical teams. A clinical audit that involves measuring current service against standards does not require ethical approval according to NHS Health Research Authority [28]. There was no patient identifiable information included in the audit [29,30].

RESULTS

A total of 67% (n=40/60) audit proformas were completed in the allocated time frame. These included 48% (n=19) medical patients and 52% (n=21) surgical patients. All forms were completed correctly and therefore suitable to use for analysis. The data was entered into an excel spreadsheet and subsequently analysed. Compliance rates for each directorate against each of the NICE VTE prevention quality standards have been identified.

DISCUSSION

The data collected in the audit has been evaluated to determine its relevance and clinical effectiveness. Also to identify other work that collaborates with the findings to derive conclusions. The results from the audit reveal that out of the 40 patients included in the audit, only 88% (n=35) were risk assessed for VTE and bleeding on admission to hospital, 71% (n=25) of the risk assessments completed were done within the recommended 12 hours and 20% (n=8) were risk assessed within 24 hours of admission. This is a significantly lower figure than the target that has been set by the NHS standards contract [31]. The consequences of failure to risk assess patients admitted to hospital for VTE and bleeding are; inadequate prescription and administration of TP potentially leading to an increased risk of the patient developing VTE or increased risk of bleeding. From the literature it is evident that patients in hospital are at a high risk of developing VTE due to acuity of illness and immobilisation [11]. It is crucial to risk assess patients for VTE and bleeding before administering TP to rationalise its safety and efficacy. Patients identified at risk of bleeding should be given mechanical devices such as anti-embolism stockings or sequential compression [10]. Failure to risk assess can lead to increased incidence of HAT, readmission to hospital and an increased rate of mortality.

Figures 2 and 3 illustrate break down of risk assessment by departments e.g. medical and surgical.

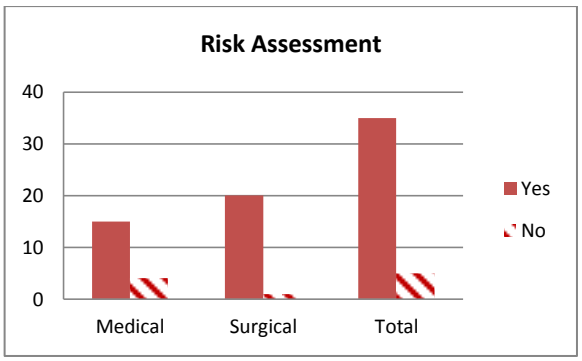

Figure 2. Risk assessment completed on audited records

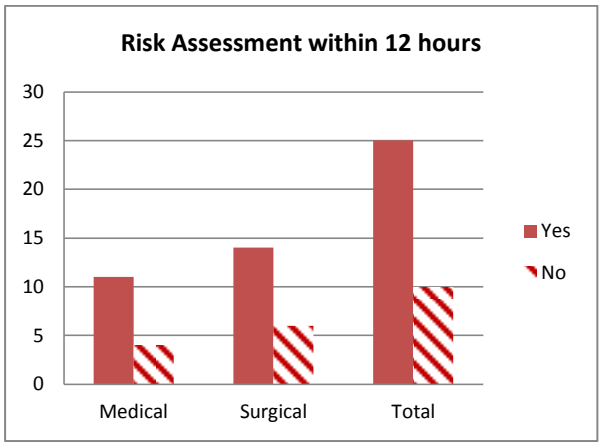

Figure 3. Record of risk assessment within 12 hours

It has been previously reported [32] that nurses lack confidence to cascade information on VTE prevention to their patients. However, VTE prevention is a multidisciplinary responsibility. The audit demonstrated that only 18% (n=7) of patients in the audit received verbal information on VTE prevention on admission, and 28% (n=11) were not applicable (i.e confusion or language barrier).

None of patients received written information on VTE prevention and 13% (n=5) were reported as not applicable.

Lack of VTE education for patients can lead to absence in their knowledge of the condition thus a decrease in adherence to prevention measures. The lack of patient education evident from the audit might be due to poor clinician knowledge acting as a barrier to provide patients with information on VTE prevention.

Most incidences of HAT are diagnosed in patients who have been discharged from hospital following an inpatient stay [33]. It is therefore essential that patients are aware of their potential risks of developing VTE following an episode of infirmity. Patients' knowledge of the disease and its signs and symptoms could potentially lead to an early diagnosis and elude mortality.

The audit revealed that 10% (n= 4) of patients who required anti- embolism stockings did not receive them and 40% (n= 16) of patients did not receive appropriate chemical TP (see Fig.4 and 5). This population of patients pose an eight-fold increased risk of developing VTE during hospitalisation [34] and lack of administering VTE prevention methods could result in patient morbidity or mortality.

Furthermore, patients who fail to receive appropriate TP may go on to develop VTE which could lead to litigation claims for malpractice. Themes for absence of appropriate TP are highlighted in Table 4. This highlights various failings and therefore the need for a multidisciplinary effort to improve VTE prevention for patients admitted to the trust concerned in the audit.

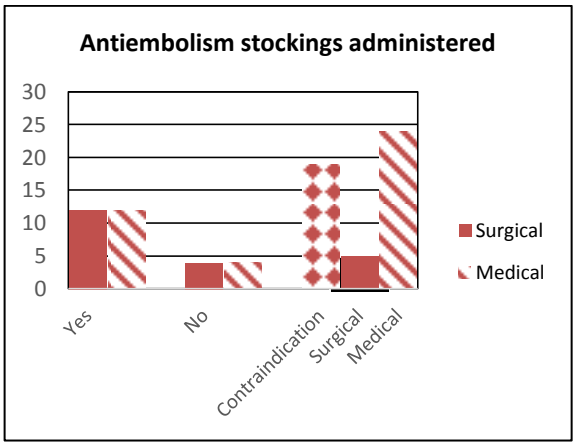

Figure 4. Antiembolism stockings administered by departments

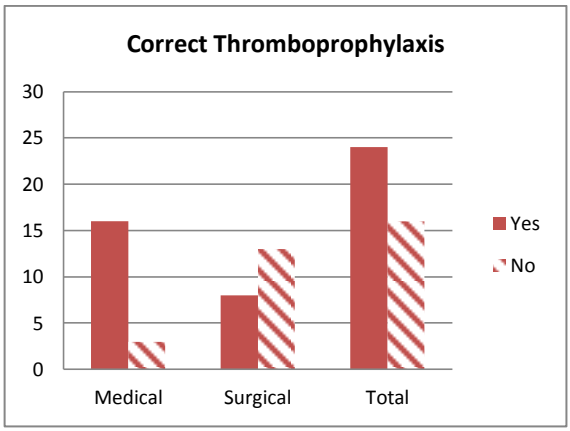

Figure 5. Correct thromboprophylaxis administered by departments

Table 3. Incorrect or absent TP administration

Themes of Incorrect TP	Medical	Surgical	Total
No Chemical TP	4	2	6
No Mechanical TP	6	5	11
Delay in TP	8	8	16
Incorrect Dose	4	4	8
Missing Doses	1	1	2
* Patient may have one or more reason for incorrect TP			

Limitations

Although the auditors had strict criteria to follow and an audit proforma, results could be skewed if they highlighted to their colleagues any discrepancies in VTE prevention methods. The fact a VTE prevention audit was being carried out could have made clinicians more aware and more vigilant when completing VTE risk assessment and prescribing TP.

Future recommendations

- All patients over the age of 18 to be assessed for VTE and bleeding within 12 hours of admission.
- Patients and or their careers to be offered verbal and written information on VTE prevention on admission to hospital.
- Patients provided with anti-embolism stockings where appropriate.
- Patients re-assessed for VTE and bleeding within 24 hours of admission
- Patients to be offered thromboprophylaxis as appropriate.

It is clear from the audit that it is essential for improvements to be made in order to ensure that patients admitted to hospital receive appropriate TP to ultimately reduce risks of the development of VTE. Recommendations in practice for each of the NICE quality standards for VTE prevention should be followed. Education and regular audits are key methods to improve clinician compliance to implement the NICE VTE prevention standards into practice which ultimately improves patient safety and quality of care. Michota [35] recommends quality improvement methods including audit and feedback to address the shortfall in VTE prevention in hospitals.

Other strategies to enhance VTE prevention include:

- VTE risk assessment and prevention to form part of hand over within medical and nursing teams
- Education sessions to focus on areas in need of improvement
- Re-launch of the VTE champions to act as advocates for VTE prevention
- Regular spot checks by the VTE prevention specialist nurses across the trust
- Audit results to be disseminated to clinical teams and presented to the trust
- Raise VTE awareness through national thrombosis days, patient education days and forums.

CONCLUSIONS

VTE is a significant cause of mortality and morbidity in hospitalised patients. Risk assessment and the administration of prevention methods can considerably reduce the risks of patients developing VTE thus reducing the incidence of HAT and improving patient safety and quality of care provided by the healthcare sector. This audit demonstrates inconsistencies in providing correct VTE prevention methods to patients throughout the hospital trust concerned and highlights key recommendations for improvement. It will be valuable to cascade the results throughout the directorates concerned, implement the recommendations and carry out continuous audit to measure progress and success in implementing the NICE VTE prevention standards.

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Conflicts of interest

None.

Financial disclosure/funding

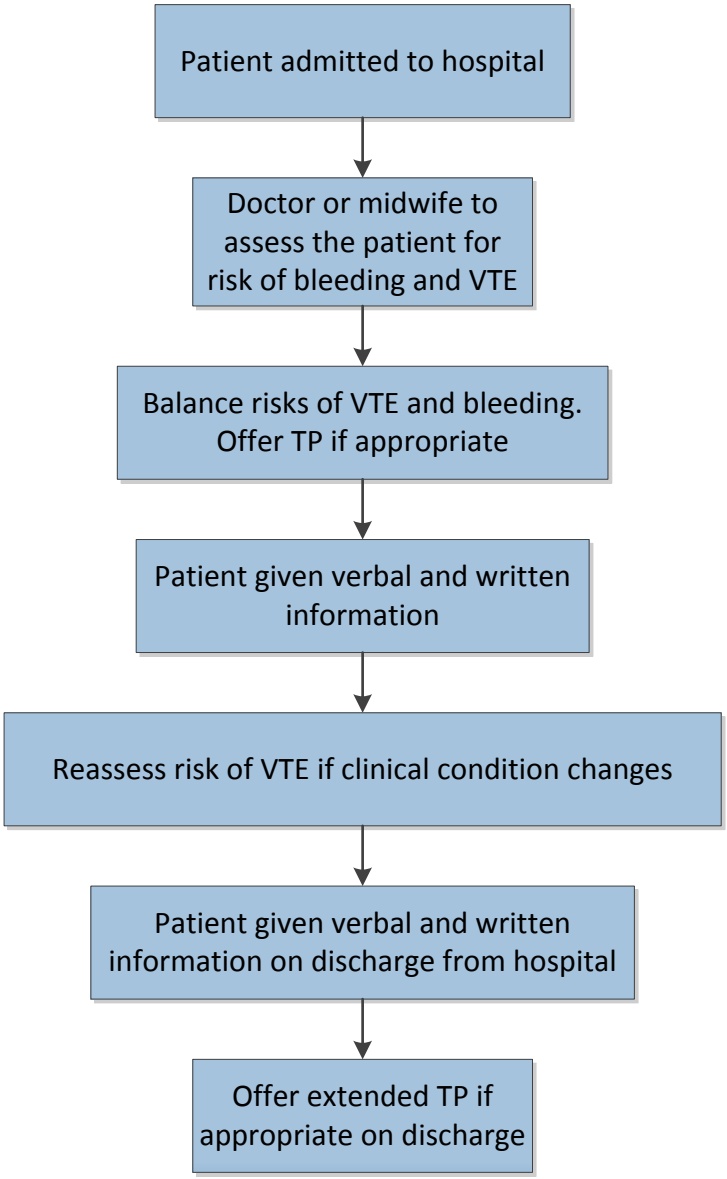
None.

REFERENCES

1. Department of Health. VTE prevention programmme. http://webarchive.nationalarchives. gov. uk/+/www.dh.gov.uk/en/Publichealth/Healthprotection/Bloodsafety/VenousThromboembolismVTE/DH_113359 (Accessed 02/12/2016)
2. House of Commons Health Committee. The prevention of venous thromboembolism in hospitalised patients. 2005. London: The Stationery Office Limited
3. National Institute for Health and Clinical Excellence. Venous thromboembolism: reducing the risk. Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital. NICE clinical guideline 92. 2010 London: NICE.
4. NHS England. Commissioning Services that deliver High Quality VTE Prevention. Guidance for Commissioners Including a practical guide to the Root Cause Analysis of Hospital Associated Thrombosis (In relation to the National VTE CQUIN 2013/14). https://www.england.nhs. uk/wp-content/ uploads/2013/08/vte-prev-guide-may2013-22.7.13.pdf [cited 2016 Dec 21]
5. Hawkes N. Admitting when mistakes are made. BMJ, 2015 Aug;(351):4474.
6. Roberts LN, Porter G, Barker RD, Yorke R, Bonner L, Patel RK, Arya R. Comprehensive VTE prevention program incorporating mandatory risk assessment reduces the incidence of hospital-associated thrombosis. Chest 2013 Oct;144 (4):1276-81.
7. APPTG. Annual Review, APPTG Annual Survey Results. 2016 All- Party Parliamentary Thrombosis Group.
8. Esmon CT. Basic Mechanisms and Pathogenesis of Venous Thrombosis. Blood Rev. 2009 Sep; 23 (5):225-9.
9. Heit JA, Spencer FA, White RH. The epidemiology of venous thromboembolism. J Thromb Thrombolysis 2016 Jan;41(1):3-14.
10. Cohen AT, Skinner JA, Warwick D, Brenkel I. The use of graduated compression stockings in

association with fondaparinux in surgery of the hip. A multicentre, randomised, open-label, parallel-group comparative study. J Bone Joint Surg Br. 2007 Jul;89(7):887-92.
11. Cohen AT, Tapson VF, Bergmann JF, Goldhaber SZ, Kakkar AK, Deslandes B, Huang W, Zayaruzny M, Emery L, Anderson Jr, FA, Venous thromboembolism risk and prophylaxis in the acute hospital care setting: a multinational cross-sectional study (ENDORSE study). Lancet 2008 Feb;96(10):387–94.
12. Otero P, Uresandi F, Cayuela A, Use of venous thromboembolism prophylaxis for surgical patients: a multicentre analysis of practice in Spain Eur J Surg. 2001, March 167(3); 163–167
13. Tapson VF, Decousus HM, Pini M. Venous thromboembolism prophylaxis in acutely ill hospitalized medical patients: findings from the international medical prevention registery on venous thromboembolism. Chest, 2007 132, pp. 936–45
14. Catterick D, Hunt B. Impact of the national venous thromboembolism risk assessment tool in secondary care in England: retrospective population- based database study. Blood Coagul Fibrinolysis. 2014 Sep;25(6):571-6.
15. Geerts WH, Pineo GF, Heit JA, Bergqvist D, Lassen MR, Cowell CW, Ray JG. Prevention of venous thomboembolism: The Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest, 2004 126(Suppl. 3), 338S–400S.
16. Kelly J, Rudd A, Lewis R, Hunt BJ. Venous thromboembolism after acute stroke. Stroke 2001 Jan;32(1):262-7.
17. Stein PD, Hull RD, Pineo G. Prevalence of acute pulmonary embolism among patients in a general hospital and at autopsy. Chest 1995;108:978–81.
18. Schellong SM, Beyer J, Kakkar AK, Halbritter K, Eriksson BI, Turpie AG, Misselwitz F, Kalebo P. Ultrasound screening for asymptomatic deep vein thrombosis after major orthopaedic surgery: the VENUS study. J Thromb Haemost. 2007 Jul;5(7):1431-7
19. NHS England. Clinical Audit. https:// www.england.nhs.uk/ourwork/qual-clin-lead/ clinaudit/ [cited 2016 Dec 08].
20. Corbett- Nolan A. Clinical audit: A simple guide for NHS Boards & partners. HQIP http://www.good-governance.org.uk/wp-content/ uploads/2014 /02/ clinical-audit-a-simple-guide-for-nhs-boards-and-partners.pdf [cited 2016 Dec 12].
21. Johnston G, Crombie IK, Alder EM, Davies HTO, Millard A. Reviewing audit: barriers and faci-litating factors for effective clinical audit. Qual Health Care. 2000 Mar;9(1):23-36.
22. Langley GL. The Improvement Guide: A Practical Approach to Enhancing Organizational Performance (2nd Edition). 2010 San Francisco, CA: Jossey-Bass Publishers.
23. Powell AE, Rushmer RK, Davies HTO. A systematic narrative review of quality improvement models in health care: NHS Quality Improvement Scotland. 2009. Report No. 1844045242
24. National Institute of Clinical Excellence. Principles for best practice in clinical audit 2002, Radcliffe Medical Press, Oxford.
25. Sale D. Quality Assurance for Nurses. 1996, London, MacMillan.
26. General Medical Council. Good Medical Practice. 2001 London: General Medical Council.
27. National Quality Board. Quality Governance in the NHS National Quality Board – A guide for provider boards. Https://www.gov.uk/ gover-ment/uploads/system/upload/ attachment_data/ file/216321/dh_125239.pdf [cited 2016 Dec 21].
28. NHS Health Research Authority. Defining Research. Research Ethics Service guidance to help you decide if your project requires review by a Research Ethics Committee. http:// www. hra.nhs.uk/documents/2016/06/defining-resea-rch.pdf [cited 2016 Dec 21].
29. Data Protection Act 1998. http://www. Legisla-tion.gov. uk/ukpga/1998/29/contents [cited 2016 Dec 21].
30. Department of Health. Confidentiality. NHS Code of Practice https://www.gov.uk/ gover-nment/ uploads/system/uploads/ attachm-ent_data/ file/ 200146/Confidentiality_-_NHS_ Code_of_ Practice.pdf [cited 2016 Dec 21].
31. NHS England. NHS Standard Contract 2015/16 Particulars.https://www.england.nhs.uk/nhs-stan-dard-contract/15-16 [cited 2017 Jan 09]
32. McFarland L, Murray E, Harrison S, Heneghan C, Ward A, Fitzmaurice D, Greenfield S. Current practice of venous thromboembolism prevention in acute trusts: a qualitative study. BMJ Open; 2014 May;4(6):e005074.
33. Nelson RE, Grosse SD, Waitzman NJ, Lin J, DuVall SL, Patterson O, Tsai J, Reyes N. Using multiple sources of data for surveillance of postoperative venous thromboembolism among surgical patients treated in Department of Veterans Affairs hospitals. Thromb Res. 2015 Apr;135(4):636-42.
34. Geerts WH, Bergqvist D, Pineo GF, Heit JA, Samama CM, Lassen MR Prevention of venous thromboembolism: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th edition). Chest 2008;133(6): Suppl:381S-453S.
35. Michota FA. Bridging the Gap Between Evidence and Practice in Venous Thromboembolism Prophylaxis: The Quality Improvement Process. J Gen Intern Med. 2007 Dec;22(12):1762-70.

Appendix 1



Key:
VTE - Venous Thromboembolism
TP – Thromboprophylaxis