Venous Thromboembolism Risk and Prophylaxis in the Acute Hospital Care Setting: The Irish Results of the ENDORSE Study

Abstract:

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guidelines mortality and morbidity. Despite the existence of effective and relatively safe VTE prophylaxis and published due to chronic pulmonary thromboembolic disease; and the risk of thrombophlebitic limbs all contribute to patient post-CVA VTE observed within hospitals occur on the medical service patients in post-mortem studies Venous thromboembolism is a common and frequently fatal complication of hospitalisation. Approximately … of VTE cases demonstrate a high prevalence of risk for VTE and a low rate of prophylaxis use, particularly in medical patients.

Introduction

Venous thromboembolism is a common and frequently fatal complication of hospitalisation. Approximately … of VTE cases occur within the hospital setting, with pulpyng embolism (PE) associated with up to 10% of deaths in hospitalised patients in post-mortem studies. While VTE often occurs as a post-surgical complication, the majority of cases of VTE observed within hospitals occur on the medical service. For example, PE accounts for a quarter of early deaths post-CVA 1-9. In addition to mortality, long-term risks such as those posed by anticoagulation; pulmonary hypertension due to chronic pulmonary thromboembolic disease; and the risk of thrombophlebitic limbs all contribute to patient mortality and morbidity. Despite the existence of effective and relatively safe VTE prophylaxis and published guidelines, existing data suggest that VTE prophylaxis is under-utilised. Hence, a multinational, observational, cross-sectional survey of VTE risk prevalence, and effective prophylaxis in the acute hospital setting, was performed across 32 countries - the ENDORSE study. The global findings have been published previously 10-12. In this paper, we present and analyse the Irish data from the study.

Methods

The protocol for this study was written by an independent scientific committee, with revisions after discussion with the study sponsor. All members of the steering committee had full access to the data. The detailed methodology has been outlined previously 11. Briefly, 10 hospitals were randomly selected from acute care hospitals with greater than 50 beds for acute medical illness and elective major surgery in Ireland. Ethical approval was obtained from the ethics committee at Cork University Hospital and then efforts were made to confirm approval from all ten hospitals. However, due to time constraints the study proceeded between November 11, 2006 and January 3, 2007 when 3 hospitals had been approved: Beaumont Hospital, Dublin; Portlaoise General Hospital and Tralee General Hospital (1 tertiary & 2 secondary referral centres). All hospital wards were included in the study except: psychiatric, paediatric, palliative care, obstetric, neonatal, burns units, ENT units, ophthalmology wards, rehabilitation units, emergency departments and long-term care facilities. Medical patients of e40 years of age and surgical patients of e18 years of age were included. However, patients with VTE treatment or who were not evaluable due to missing data were excluded. Data were obtained through a review of the hospital medical charts by clinical trial nurse specialists with experience in data extraction. Enrolled patients were assessed for VTE risk using ACCP guidelines and stratified by VTE risk profile. The patient demographics, age, VTE risk, diagnosis or surgical procedure, length of stay, VTE prophylaxis usage and potential contra-indications to VTE prophylaxis were recorded. Contra-indications for VTE prophylaxis were deemed to include: hypersensitivity to low molecular weight heparin (LMWH) or heparin, heparin-induced thrombocytopenia, coagulopathy, lumbar puncture or epidural within 12 hours, haemorrhagic CVA, uncontrolled hypertension, significant renal failure, hepatic impairment, active gastro-intestinal ulcer or known bleeding disorder. Collected data was analysed by the Centre for Outcomes Research (University of Massachusetts Medical School, Worcester, MA, USA), with statistical analyses performed using SAS version 9.1. Data is presented in a standard format, with quantitative data expressed as median [interquartile range (IQR)] and categorical data expressed in terms of whole numbers and percentages.

Figure 1: Selection of the study population and reasons for patient exclusion.

VTE=Venous thromboembolism. Surgical wards include general surgical units, neurosurgical units, surgical intensive care units, gynaecology and orthopaedic wards.

Results

The ENDORSE study enrolled patients from 358 hospitals across 32 countries. In Ireland, a total of 1,055 hospital beds in 3 hospitals were assessed, yielding 552 evaluable study patients. The selection of the study population and reasons for patient exclusion are illustrated in Figure 1. Of the 665 patients in eligible wards, 113 were excluded- over half due to a missing chart or key information, while 35% were too young and 9% were receiving treatment for VTE. Of the 552 enrolled patients, 297 (54%) were classified as surgical and 255 (46%) as medical. Of these, 284 (51%) were deemed at risk for VTE based on ACCP criteria (175 (59%) of surgical and 109 (43%) of medical patients). Of the surgical at-risk group, 51% were male and 49% female. The median age was 63 [IQR=47-75] years, median weight of 72 [IQR=56-80] kg and median time from admission to hospital to VTE prophylaxis was 10 [IQR=4-22] days. Within the medical at-risk group, 53% were male. The median age was 75 [IQR=64-82] years, median weight 64 [IQR=58-70] kg and median time from hospital admission to hospital prophylaxis was 7.5 [IQR=3.5-20] days.

Table 1. Patient demographics at baseline.

<table>
<thead>
<tr>
<th></th>
<th>Surgical</th>
<th>Medical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>63 [47-75]</td>
<td>75 [64-82]</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>72 [56-80]</td>
<td>64 [58-70]</td>
</tr>
<tr>
<td>Male (%)</td>
<td>51%</td>
<td>53%</td>
</tr>
<tr>
<td>Exclusion (%)</td>
<td>49%</td>
<td>47%</td>
</tr>
<tr>
<td>Risk criteria (%)</td>
<td>59%</td>
<td>43%</td>
</tr>
</tbody>
</table>

Risk factors present prior to admission and other conditions present during the patients hospital stay are shown in Table 1. At baseline 7.3% of the medical patients had pulmonary disease in contrast to 1.1% of the surgical patients, and 46% of medical patients developed pulmonary infection as opposed to 2.3% of the surgical patients. Over 40% of the medical patients had some form of cardiovascular problem. Additional risk factors for VTE arising during hospital stay are shown in Table 2. Of those receiving prophylaxis, 96% received LMWH; 2% unfractionated heparin and 2% a vitamin K antagonist. Risk factors for bleeding and absolute contraindications to pharmacological VTE prophylaxis are listed in Table 3. In the surgical group, 11% had a contraindication, compared to 7% in the medical group.
GI=gastrointestinal, NYHA=New York Heart Association class

Of at-risk patients, overall 57% received ACCP recommended VTE prophylaxis, with 64% surgical and 47% medical patients, receiving the recommended prophylaxis, respectively. Of the 175 surgical patients at risk, 91/175 received LMWH, 94/175 were placed in TED stockings, 1/175 received unfractionated heparin and 2/175 received a vitamin K antagonist. In the medical at risk group, 48/109 received LMWH, 17/109 were placed in TED stockings, 2/109 received unfractionated heparin and 1/109 received a vitamin K antagonist.

ITU=Intensive Therapy Unit, CCU=Coronary Care Unit.

*Considered absolute contraindications to anticoagulation. Data shown as absolute values and percentages.

**Discussion**

The data presented in this study, suggest that over half of patients admitted to Irish hospitals are at risk for VTE and that of these, only 57% are receiving recommended prophylaxis. While proportionately more surgical patients were determined at risk, a higher percentage of these received prophylaxis (64%) compared to medical at-risk patients (47%). These figures are slightly better than the overall figures observed in the world-wide study, where 52% of patients were deemed at risk for VTE, with 50% receiving recommended prophylactic treatment, 59% in the surgical group and 40% in the medical cohort.

Benefits of VTE prophylaxis in at-risk surgical and medical patients have been repeatedly demonstrated. Non-pharmacological therapies such as graduated compression stockings (TED) are effective in decreasing risk of post-operative VTE by approximately half, and are a useful adjunct to pharmacological therapy, or a reasonable alternative to anticoagulation where there is a high risk of bleeding. Anticoagulant prophylaxis has been shown to be of benefit to a wide range of at-risk patients, including surgical and medical groups and has therefore been recommended by evidence-based guidelines, including those published by the ACCP. Despite this, the overall prescription of VTE prophylaxis in our study would appear to be low. However, this is in keeping with results of other publications including the IMPROVE study which demonstrated a 60% VTE prophylaxis rate for at-risk patients, a recent
Irish study demonstrating prophylaxis rates of 48% in at risk medical patients and a Canadian audit which showed that 16% of at risk cohort received recommended prophylaxis.

While initial studies demonstrating the benefits of VTE prophylaxis were predominantly in surgical patients, the benefits of this practice have also been shown in at risk medical patients. While patient bleeding risk is a real concern for clinicians, a contradiction to anticoagulants was seen in only 11% of the surgical population and 7% of the medical population. This haemorrhagic risk was seen in 0.6% of surgical and 1.8% of medical patients, suggesting additional factors in the failure to prescribe. Of the medical population, 5.3% had an ischaemic stroke at admission, while 6.4% had an ischaemic stroke during their hospital stay. It was obvious in these instances regarding the results of a CT brain scan. While some patients may have fallen into this category due to the cross-sectional nature of the study, it would seem unlikely that all stroke patients were aware of the findings of this study. Additionally, it is reasonable to assume that other factors such as TED stockings may have been employed in the interim. In further cases, anticoagulation may justifiably have been held pending test results and this may not have been fully appreciated during data collection.

There are several limitations to the study. Firstly, the small number of participating hospitals (n=3) makes defining characteristics of patient populations may have been over or underrepresented as a result. For example, the relatively high number of intracranial haemorrhages seen on the surgical side (7.4%) may be accounted for by the fact that one of the hospitals included in the study, is the national neurosurgical centre. In most instances, this hospital would be admitted to the care of the medical service. Secondly, certain high risk groups such as the obstetric, burns and ENT populations have been excluded. While, beyond the remit of the current study, this method is used to assess VTE prophylaxis in these patient groups, the cross-sectional nature of the study means that certain risk factors for VTE may have arisen later during the hospital course and may not be captured by this study. In fact, in certain instances the final VTE diagnosis may not have actually been reached, or the working diagnosis may not have been fully captured, pending further test results. The study was dependant on the accuracy of clinician recording in the patients medical charts with no allowances made for the number of experienced clinicians who had the notes during the diagnosis. Extraction of data from these charts rather than through a clinician interview raises the possibility that the most up to date patient information may not have been fully captured.

Despite these limitations, we believe our data is important in illustrating under prescribing of a safe, effective and recommended means of VTE prevention in our acute care hospitals. There would appear to be a need for the Health Service Executive (HSE) to introduce guidelines to reduce the incidence of this potentially preventable disease. The current, overall prescription figure of 57% in at risk patients would appear to be unacceptable and not in keeping with best clinical practice. Whilst formal thromboprophylaxis policies did not exist in any of the hospitals in our study, there are a number of successful strategies reported in the literature to improve rates of thromboprophylaxis in at risk populations. These strategies include development and standardisation of hospital policies on VTE prophylaxis, re-designing hospital admission and prescription charts to prompt admitting personnel to assess VTE risk, regular auditing of VTE rates and re-education of healthcare professionals on indications and benefits of appropriate VTE prophylaxis. The implementation of these strategies to improve prescribing of VTE prophylaxis would have benefits to the health service in terms of both patient care as well as long term economic benefits.

Acknowledgements

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References