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Predictors and safety of venous thromboembolism prophylaxis among hospitalized inflammatory bowel disease patients

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Abstract

Introduction: Inflammatory bowel disease (IBD) patients are at increased risk of venous thromboembolism (VTE) especially during hospitalization. We assessed the safety and predictors of VTE prophylaxis in this population.
Methods: We conducted a retrospective study of 974 IBD admissions between February 2010 and May 2012. We abstracted data on clinical characteristics, VTE prophylaxis and bleeding events, and conducted multivariate analysis to determine predictors of prophylaxis.
Results: Pharmacological VTE prophylaxis was administered to 80% of admissions; 63% were within 24 h of admission. Patients on the surgical service (adjusted OR [aOR], 3.82; 95% CI: 2.00–7.29) and general medicine (aOR, 2.40; 95% CI: 1.39–4.12) were more likely to receive VTE prophylaxis compared to those on the gastroenterology service. Rectal bleeding on admission was associated with lower prophylaxis (aOR, 0.58; 95% CI: 0.35–0.97). The VTE prophylaxis rate increased from 47% to 73% ($P < 0.001$) on non-surgical services with the introduction of a pharmacist advocate. The rates of major and minor bleeding were similar between patients who did and did not receive VTE prophylaxis (0.26 vs. 0 per 1000 person-days, P = 0.7; 4.18 vs. 2.53 per 1000 person-days, P = 0.4 respectively), and the major bleeding events (n = 2) were post-operative. VTE prophylaxis was not associated with major postoperative bleeding (0.4% vs. 0%, P = 0.96).
Conclusions: VTE prophylaxis was more frequent on the surgical service, where standardized protocols exist. The introduction of a pharmacist advocate greatly increased VTE prophylaxis on the non-surgical services. Prophylactic anticoagulation is safe in IBD despite the presence of rectal bleeding on admission.

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1. Introduction

Patients with inflammatory bowel disease (IBD), comprising of ulcerative colitis (UC), Crohn's disease (CD), or indeterminate colitis (IC), have a well-established, increased risk of sustaining venous thromboembolic events (VTE), compared to the general population.[1–6] Individuals with IBD have a more than threefold risk for developing VTE compared to the general population. Among occurrences of VTE, deep venous thrombosis (DVT) and pulmonary embolism (PE) represent significant morbidity and mortality. The incidence of DVT and PE was 30 per 10,000 person-years and 10–20 per 10,000 person-years, respectively, in a population-based study.[5]

There is a higher risk of VTE in hospitalized IBD patients, which may in part reflect periods of increased inflammation.[7] This increased risk is nearly 6 times higher than the absolute risk in an ambulatory IBD flare (37.5/1000 p-y vs. 6.4/1000 p-y).[8] The mortality associated with IBD-related VTE ranges from 8% to 25%.[1,2,9–11] Furthermore, a VTE event during hospitalization has been associated with a greater than 2 fold increased in mortality, compared to VTE-related mortality in the general population.[7] A population based study showed that the rates of VTE are rising with time in both UC and CD — possibly reflecting a greater recognition of VTE in the IBD patients.

Despite the increasing evidence regarding the risks of VTE rates in the IBD population, there may be some reservations regarding initiating VTE prophylaxis. This uncertainty can occur when disease is quiescent, or in the presence of rectal bleeding, which is a common presentation during a flare.[12] Anticoagulation has been frequently used in the treatment of UC — with heparin playing a role in the reversal of endothelial dysfunction.[13–17] A meta-analysis which included clinical trials comparing heparin formulations to conventional therapy for the treatment of ulcerative colitis showed few serious adverse events in treatment arms with or without heparin administration.[18] While this relatively small meta-analysis of 268 patients indirectly suggest that heparin is safe during an IBD flare, the carefully selected study populations and conditions of clinical trials do not necessarily reflect the safety of anticoagulation in real-world settings.

The primary aim of this study was to characterize the safety profile of prophylactic anticoagulation among IBD patients outside the context of clinical trials. Moreover, we sought to determine predictors and barriers to VTE prophylaxis in the IBD population. We also assessed whether the introduction of a pharmacist advocate for VTE prophylaxis resulted in improved VTE prophylaxis rates.

2. Methods

2.1. Data source

A retrospective chart review was conducted, looking at all admissions for IBD at the Mount Sinai Hospital Centre for Inflammatory Bowel Disease, Toronto, Ontario between February 1, 2010 and May 31, 2012. Data was extracted from electronic charts, with access to clinical information, laboratory investigations, endoscopic evaluations, pharmacological records, and discharge summaries.

2.2. Eligibility criteria

We identified admissions with a most responsible diagnosis for IBD using ICD-9 and ICD-10 codes for UC (556.x and K51, respectively) and CD (555.x and K50 respectively). The charts were electronically reviewed to confirm diagnosis. Patients with a non-IBD diagnosis were excluded – such as self-limited infectious colitis, or ischemic colitis – without underlying IBD.

2.3. Data collection

Data were collected from the hospital electronic medical record. Patient characteristics were collected and included: age at admission, sex, type of IBD, and concomitant comorbidities, using the Charlson Index.[19] Risk factors for VTE were collected including any previous history of VTE and IBD-related surgery during admission. Phenotype data was also abstracted and included disease extent for UC and disease location and behavior for CD. We additionally captured data on potential predictors of VTE prophylaxis including: primary service under which the patient was admitted (Gastroenterology, Other Medicine, or Surgery); and presence of rectal bleeding, anemia, thrombocytosis, and coagulopathy on admission. We queried the electronic medical administration record to determine whether VTE prophylaxis was ordered and when it was administered. Among those who did receive pharmacological prophylaxis, we collected data on type of VTE prophylaxis used and duration of therapy. Complications such as major or minor bleeding and whether they occurred in the context of the post-operative setting were recorded from the medical chart. We defined major bleeding as: intracranial, intraspinal, or retroperitoneal bleeding; bleeding into any major organ; or bleeding that led to re-operation. We also documented heparin-induced thrombocytopenia and in-hospital death.

2.4. Implementation of pharmacist advocate

Mount Sinai Hospital introduced the role of a pharmacist advocate for VTE prophylaxis as a part of a quality improvement initiative on November 1, 2011. As part of routine protocol, pharmacists review the medication orders of all newly admitted patients and reconcile them with pre-admission medications. The new protocol involved a real-time audit of medication orders to determine whether VTE prophylaxis was ordered among eligible patients, including those with an IBD diagnosis. The service caring for the patient was notified by the pharmacist if an eligible patient was not written for VTE prophylaxis within 24 h (on non-weekend days) and requested an order for prophylaxis or a reason for not ordering it.

2.5. Statistical analysis

We performed statistical analysis using Stata 10MP (StataCorp LP, College Station, Texas). Descriptive analysis was conducted to compare demographic and clinical characteristics between those who did and did not receive VTE prophylaxis. The chi-square and Fisher exact test were used to compare categorical variables while the Student's *t*-test was used to compare continuous variables. Multivariate logistic regression