Evaluation of a Pharmacist-Led Anticoagulation Management Clinic

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Background

- Pharmacist managed anticoagulation clinics have been shown to reduce bleeding and thromboembolic events rates[1]
- Suboptimal anticoagulant management can increase adverse events and lead to increased emergency room visits, hospital readmissions and length of stays[2]
- Rate of venous thromboembolism (VTE) recurrence is highest during heparin therapy and the transition to warfarin[3]
- INR time in therapeutic range (TTR) is 60% with usual medical care; increasing to 73% when followed at pharmacist-led anticoagulation clinic[4]
- Within first three months of VTE treatment the absolute risk of major bleeding is estimated to be ~2% with warfarin, including heparin bridging[5]
- Risk of bleeding varies with type of anticoagulant, duration of therapy and risk factors for bleeding present[5]
- Patients diagnosed with VTE are referred to the Anticoagulation Management (ACM) clinic at Jim Pattison Outpatient Care and Surgery Centre (JPOCSC) within 24-48 hours of discharge from acute care if they do not have a primary care provider and/or have multiple comorbidities that increase risk of bleeding
- ACM clinical pharmacist works in collaboration with physician and patient to:
  - ❑ Assess and direct initial selection of anticoagulants
  - ❑ Conduct a comprehensive medication review to identify and resolve drug therapy problems (e.g. drug interactions)
  - ❑ Dose and administer low molecular weight heparin (LMWH) under delegated authority of an internist
  - ❑ Adjust oral anticoagulation doses
  - ❑ Provide education and longitudinal monitoring to patients on anticoagulants

Aim

- Target 80% or more of patients on warfarin achieve an INR TTR ≥ 60%
- To describe clinical outputs and outcomes of patients managed by ACM clinic

Methods

- All patients followed at the ACM clinic between October 2010 to March 2018 had data collected using a standardized form for continued quality assessments through Plan-Do-Study-Act cycles
  - ❑ Outcome measures – Annual clinic patient volume, total number of clinic visits
  - ❑ Process measures – Percentage of patient adherence to treatment during ACM clinic follow-up, percent of INR TTR ≥ 60% for patients on warfarin
  - ❑ Balancing Measures – Rates of bleeding secondary to anticoagulation

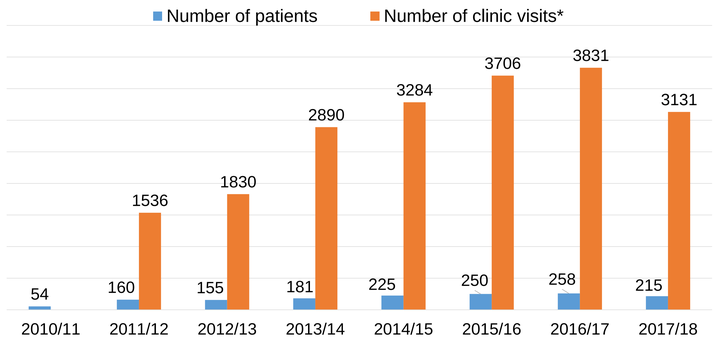
    Major bleeding[6] –
    - ✓ Any clinically overt sign of hemorrhage and requires treatment and/or
    - ✓ Bleeding in a critical area or organ such as intracranial, intraspinal, intraocular, retroperitoneal, etc., and/or
    - ✓ Bleeding causing a fall in hemoglobin level of ≥ 20 g/L or leading to transfusion of ≥ two units of blood

    Minor bleeding –
    - ✓ Any bleeding that does not cause the patient to seek treatment

Results

Table 1: Patient Characteristics	N= 1360
Mean age, years ± SD	58 ± 17
Male, n (%)	665 (49)
Median length of stay, days (IQR)	39 (69)
Diagnosis, n (%)	
○ Proximal or distal deep vein thrombosis (DVT)	640 (47)
○ Pulmonary embolism (PE)	346 (26)
○ Upper extremity DVT	115 (9)
○ Combined PE & DVT	93 (7)
○ Other[a]	148 (11)
Risk factors for thrombosis[b], n (%)	
○ No known risk factors	478 (35)
○ Obesity	361 (27)
○ Cancer	335 (25)
○ Smoking	203 (15)
○ Recent surgery	199 (15)
○ Varicose veins	160 (12)
○ Travel within last 2 months	149 (11)
○ Family history of VTE	139 (10)
○ Hormone therapy	78 (6)
○ Thrombophilia testing positive[c]	60 (4)
○ Pregnancy	32 (2)

[a] Atrial fibrillation, mechanical valve, left ventricular thrombus, heparin induced thrombocytopenia without evidence of thrombosis
[b] Patients may have 1 or more risk factors
[c] Factor V Leiden, Protein C and S deficiency, Prothrombin gene mutation



*Clinic visits included in-person, virtual and telephone appointments

Figure 1: ACM Patient Volume per Fiscal Year

Table 2: Patient outcomes, N= 1360	n (%)
Successful transfer to primary care provider	1183 (87)
Completed course of treatment at ACM clinic	100 (7.4)
Self discharged against medical advice	37 (2.7)
Transferred to acute care	21(1.5)
Discharged due to non-adherence	19 (1.4)

Table 3: INR Time in Therapeutic Range (TTR*)

Data Collection Period	Average TTR (%) ± SD	% of Patients with TTR ≥ 60%
2012/2013	79.9 ± 20.4	85.7
2016/2017	83.6 ± 16.9	94.3

*TTR calculated using Rosendaal Method[7]. International guidelines recommend maintaining a TTR of 60% or above in order to maximize the benefits of warfarin and to limit adverse events[8]

Table 4: Bleeding events, N= 1360	n (%)
Minor bleed	104 (7.6)
Major bleed	19 (1.4)

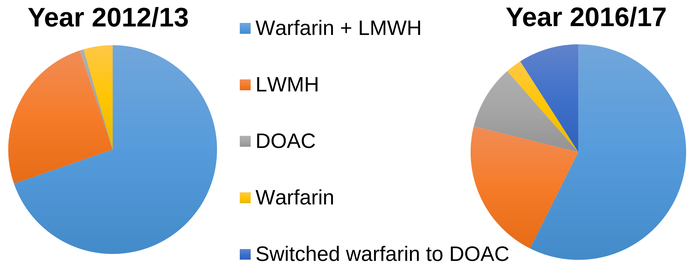


Figure 2: Trend in VTE treatment regimens

Discussion

- ACM patient volumes remain steady above 200 patients and 3000 patient encounters despite increased use of DOACs
- DOACs are not appropriate in all patient populations (e.g. obesity, reduced renal function, cancer associated thrombosis)
- Areas of further improvement identified are as follows:
  - ❑ Introduce a "validated" bleeding risk score at initial assessment
  - ❑ Introduce a standard assessment for modifiable risk factors for non-adherence
  - ❑ Introduce a patient-reported experience measures survey at ACM clinic
  - ❑ Continue to optimize usage of direct oral anticoagulants (DOACs) for VTE treatment as evidenced by Figure 2

Conclusions

- Pharmacists demonstrated the ability to safely administer LMWH for VTE
- Pharmacist-led anticoagulation management resulted in high treatment adherence and successful transition to primary care provider
- INR TTR ≥ 60% achieved in majority of patients managed by ACM clinic
- Rates of major bleeding are similar to those reported in literature

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