One Umbrella: Evaluating Healthcare Efficiency At Eastern Health’s Adult Outpatient Thrombosis Service

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Memorial University of Newfoundland
Cross appointment, Eastern Health
Clinical Pharmacist and Coordinator, Eastern Health Thrombosis Service
Presentation Overview

• Introduction
• Need for a Thrombosis Service
• Aim of the Service
• Current Thrombosis Service
• Evaluating the Service
• Maximizing Efficiency
• Current Challenges / Forward Direction
• Questions and Discussion
Introduction

• There are 3 main patient groups with thrombotic disorders requiring Anticoagulation Therapy
  - Venous thromboembolism (VTE) comprised of deep vein thrombosis (DVT) and pulmonary embolism (PE)
  - Atrial Fibrillation
  - Mechanical Prosthetic Heart Valves
Need for a Thrombosis Service

- **Venous Thromboembolism**
  - 1-2 per 1000 people per year (~500+ in NL) will develop VTE
  - ~25% of patients with new PE die before reaching the hospital
  - Average cost per patient of managing DVT in Canada was $5180.00 in 2011
  - Estimated cost of managing DVT in Newfoundland & Labrador each year is ~ $2,590,000.00
  - The main treatment of VTE is blood thinning medication, which is the leading drug class linked to related adverse events
  - Costs may increase significantly in the presence of complications
  - Management costs may be reduced when patients have access to a specialized thrombosis centre

Need for a Thrombosis Service

• Patients at risk of stroke

Atrial fibrillation (AF)
• Affects 1-2% of the Canadian population (~5000 people in NL living with Atrial fibrillation)
• Carries an average stroke risk of 5%, which increases with increasing age and diseases to almost 20%
• AF strokes are more severe, disabling and fatal relative to non-AF strokes
• Therapy with anticoagulation is very effective at reducing the risk of stroke

Mechanical prosthetic heart valves
• Risk of stroke without anticoagulation is high
• Drug of choice for anticoagulation is warfarin, which is challenging to manage

Need for a Thrombosis Service

• Stroke
  • The average cost of managing stroke per patient in Canada (with or without disability) was noted to be $74,353.00
  • The estimated cost of managing stroke (disabling or non-disabling) due to AF in Newfoundland & Labrador each year would be ~$18,600,000.00
  • Complications can occur due to difficulties in the management of anticoagulation therapy
  • Management costs may be significantly reduced when patients have access to a specialized anticoagulation management centre with a focus on prevention of strokes

Aim of the Service

• Mission:
  • The Thrombosis Service is a comprehensive clinical service committed to excellence in patient care, education, and leadership in the area of thromboembolism and anticoagulant management

• Goal of the service is to maximize efficiency and quality of care through the use of standardized, evidenced based processes and practices
Aim of the Service

Overall plan

- Initial funding received in 2015 to start a 3 year Pilot project
- Thrombosis Service officially opened October 2017
- Operates as an adult outpatient service
- An evaluation process is in place to assess the impact of the Thrombosis Service on:
  - Patient care
  - Costs
- Should improved outcomes be confirmed, request will be for Eastern Health to assume the cost of running the service
Current Thrombosis Service: Team

- Thrombosis Service Team
  - Thrombosis physician/Hematologist(s) (1 Medical Director)
  - Clinical Pharmacist (Coordinator of the Service)
  - 3 FTE Clinical Pharmacist positions
  - Manager (Regional Medicine Program)
  - Clerk
# Current Thrombosis Service: Clinics

<table>
<thead>
<tr>
<th>Clinic</th>
<th>Target Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Thrombosis Clinic (ETC)</td>
<td>People with acute VTE events (seen in Thrombosis Service within 24-72 hours)</td>
</tr>
<tr>
<td>Perioperative Anticoagulation Management Clinic</td>
<td>People on anticoagulants who require procedure or surgery</td>
</tr>
<tr>
<td>Thrombosis Clinic</td>
<td>Complex patients, as well as follow up from ETC /discharge</td>
</tr>
<tr>
<td>Anticoagulation Management Clinics (oral (DOAC) and injectable agents (LMWH)) <em>(Pharmacists Led)</em></td>
<td>People on long term anticoagulants – follow up</td>
</tr>
<tr>
<td>Point of care clinic for warfarin management <em>(Pharmacists Led)</em></td>
<td>People (especially newly initiated) on warfarin</td>
</tr>
</tbody>
</table>

**Key:** DOACs = Direct oral anticoagulants; LMWH = Low-molecular-weight heparin
# Current Thrombosis Service – Weekly Schedule

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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</thead>
<tbody>
<tr>
<td><strong>MORNING</strong></td>
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</tr>
<tr>
<td>Clinic:</td>
<td>Emergency Thrombosis Clinic</td>
<td>Emergency Thrombosis Clinic</td>
<td>Emergency Thrombosis Clinic</td>
<td>Emergency Thrombosis Clinic</td>
<td>Emergency Thrombosis Clinic</td>
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<tr>
<td><strong>AFTERNOON</strong></td>
<td>- DOAC/LMWH</td>
<td>Thrombosis Clinic</td>
<td>Thrombosis Clinic</td>
<td>- WIFU (MP)</td>
<td></td>
</tr>
<tr>
<td>Clinic:</td>
<td>- Outpatient Follow up Clinic (Thrombosis Physician)</td>
<td></td>
<td></td>
<td>- Thrombosis follow up Clinics</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>- Urgent Thrombosis Clinic</td>
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</tr>
</tbody>
</table>

**Key:**
- DOAC – Direct oral anticoagulant
- PAM - Perioperative Anticoagulation Management Clinic
- HSC – Health Sciences Centre
- LMWH - Low molecular weight heparin
- MP - Major’s Path
- WIFU - Warfarin Intake and Follow up
Current Thrombosis Service: Multidisciplinary Approach

- Hematologists and Pharmacists work together to provide patient care
- Support for the Service is provided by the Managers and Director of the Medicine Program, as well as the full time clerk
- Allowing Pharmacists to practice to their scope allows the service to operate efficiently and maximize the Hematologists time
Current Thrombosis Service: Multidisciplinary Approach

• Clinical Pharmacists:
  • Responsible for day to day operations; work with Thrombosis Physician/ Hematologist to deliver service
  • Interview /assessment of patients and medical records
  • Document assessments (draft letters, forms)
  • Present to Thrombosis physician/Hematologist
  • Deliver pharmacist led follow up clinics
  • Medication teaching and ensure medication access
  • Answer follow up questions with discussion/deferral to Thrombosis Physician/ Hematologist

• Thrombosis Physician/Hematologist:
  • Chart and Patient assessment
  • Discussion with patient
  • Sign off documentation

• All pharmacists complete a pre-defined training program to enhance skills and knowledge in Thrombosis and Anticoagulation
Evaluation of Thrombosis Service

• Comprehensive, multi-faceted evaluation underway

• Research Team:
  • Dr. Rufaro Chitsike
  • Dr. Stephanie Young
  • Dr. Hai Nguyen
  • Dr. Kwadwo Bonsu
  • Research Assistants (students/pharmacy residents)
Evaluation of Thrombosis Service: 
Outcomes being Assessed

1) **Patient Quality**
   • *Clinical outcomes* – thromboembolic events, bleeding, mortality and other complications e.g. post thrombotic syndrome/chronic thromboembolic pulmonary hypertension for patients in Thrombosis Service vs usual care*
   • *Process outcomes* e.g. unnecessary investigations, cancelled surgeries, access to medications, access to specialist, wait times for appointments, volume of patients assessed, patient satisfaction for patients in Thrombosis Service vs usual care*

2) **Costs**
   • *Cost effectiveness/savings* with each of the outcomes in Thrombosis Service vs usual care

* Where possible as there may not be a feasible control group for various outcomes
Evaluation of Thrombosis Service: Outcomes

Preliminary impact/potential impact of the Thrombosis Service:
• Overall improvement in patient quality of care
• Reduction in the cost of management of VTE
• Reduction in the number of strokes per year
• Less admissions to the Hospital
• Less visits to the Emergency Room
Evaluation of Thrombosis Service: Outcomes

Preliminary impact/potential impact of the Thrombosis Service:
• Less unnecessary investigations completed (e.g. CT scans)
• Less adverse events related to surgery
• Less expensive and unnecessary laboratory testing
• Determine appropriate duration of anticoagulation
  • Appropriate follow up of patients remaining on long term therapy
• Decreased wait times for appointments
Evaluation of Thrombosis Service: Patient Quality - Overall Service Utilization

- Over 20 months - 10 October, 2017 – April 30, 2019
- Total number of patient visits = 1697

*Numbers counted between Jun 1/18 – April 30/19 are approximate*
Evaluation of Thrombosis Service: Patient Quality - New Patients Seen

<table>
<thead>
<tr>
<th>Clinic</th>
<th>Oct. 10, 2017 – April 30, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total New Consults n=1317* (%)</td>
</tr>
<tr>
<td>Thrombosis Clinic</td>
<td>585 (44.6)</td>
</tr>
<tr>
<td>Emergency Thrombosis Clinic</td>
<td>358 (27.2)</td>
</tr>
<tr>
<td>Perioperative Management Clinic</td>
<td>369 (28.0)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (0.003)</td>
</tr>
</tbody>
</table>

- Current output of Thrombosis Service is ~100 new patients seen per month

*Numbers counted between Jun 1/18 – April 30/19 are approximate*
Evaluation of Thrombosis Service:
Patient Quality - Pathways of a patient with New VTE

Non-Thrombosis Service
- To ER
  - Diagnostic testing – confirm VTE
  - Treatment
  - Choice of medication
    - Optimal
    - Not optimal
      - No access
        - Increased risk of bleeding/recurrence
    - No follow up
      - Return to ER
      - Refer to specialist
      - Wait time to specialist (avg 6-9 mo)

Thrombosis Service
- To ER
  - Diagnostic testing – confirm VTE
  - Emergency Thrombosis Clinic (within 24-72 hours)
  - Treatment optimized by specialist team
  - Optimal choice medication
  - Medication access issues sorted
  - Patient education completed
  - Automatic 3 month follow up
  - Additional investigations as needed
  - Access for questions
  - Access to other clinics in the Service

FD Follow up
- Return to ER

Optimal
- Medication access issues sorted
- Patient education completed
- Automatic 3 month follow up
- Additional investigations as needed
- Access for questions
- Access to other clinics in the Service
Evaluation of Thrombosis Service: Patient Quality Indicators

Emergency Thrombosis clinic
- Time from consult received to appointment:
  - Median 1 day (IQR 0-3)
  - Therapy changed from pre visit: 53%

PAM clinic
- Time from consult received to appointment
  - Median 15 days (IQR 7-24)
Evaluation of Thrombosis Service: Patient Quality Indicators

Thrombosis Clinic

• Time from consult received to appointment:
  • Pre-service average 5 months or greater
  • Post-service average 2.8 months (maximum 6 months)
• Therapy discontinued in 18%, changed in 28%

Anticoagulation Management Clinic

• Same therapy continued – 84%, recommendation to discontinue (3%) or change (13%) therapy after discussion with Thrombosis physician/Hematologist
• Physician appointment required post visit- 5%
Evaluation of Thrombosis Service: Patient Quality Indicators

- Thrombosis Service office operates Mon-Fri 8am to 4pm
- Average number of calls to service per month ~ 70
- Most calls are clinical queries (patients and health professionals) versus administrative calls

![Graph showing trends in telephone calls to Thrombosis Service]
Maximizing Efficiency

Efficiency of a Local Service

- Improved Efficiency of Health Care Authority
- Improved Efficiency of Hospital

Improved Patient Experience
Maximizing Efficiency in the Thrombosis Service

• Minimize entropy and maximize enthalpy or minimize wastage and maximize consolidation of tasks

• Each person does what essentially only they can do
  - Thrombosis Physician/Hematologist
  - Pharmacist
  - Clerk

• Provide all thrombosis/anticoagulation specialty services under one roof

• We understand that committing time to a particular task means removing time from other tasks – the trade off should be worth it

• We do not work on the same job more times than is necessary
Maximizing Efficiency in the Thrombosis Service

• We employ efficient paperwork management systems
  ➢ For repetitive documentation we use templates and modify each to the patient
  ➢ We use a real time dictation system

• Aim to leave no strings at the end of clinic

• We streamline communication within the Service – increase use of written messages rather than oral

• Keep a leaner focused unit
  • Less time wasted trying to communicate
  • Decisions get made quicker

• We aim to keep a sustainable pace
Maximizing Efficiency in the Thrombosis Service

- End result of enhanced efficiency in the Thrombosis Service is the management of higher volumes of patients without reducing the quality of the Service and at a low cost
Current Challenges / Forward Direction

• Challenges / Future
  • Meeting the demand
  • Optimizing the Emergency Thrombosis Clinic
  • Establishing an Inpatient Thrombosis Service
  • Expanding the reach within and beyond Eastern Health
  • Securing a permanent space
Questions & Discussion
Emergency Thrombosis Clinic Assessment Form
Anticoagulation Management Clinic Assessment Forms
# Internal Referral Form

**Eastern Health Thrombosis Service**

**Internal Referral Form**

**FOR THROMBOSIS SERVICE USE ONLY**

Internal referral logged in referral tracking: initials  

**Name:**

**Date of Birth:**

## DIAGNOSIS

<table>
<thead>
<tr>
<th>Timing of exam is before next visit unless</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• First Episode DVT</td>
<td></td>
</tr>
<tr>
<td>• Upper Extremity DVT</td>
<td></td>
</tr>
<tr>
<td>• Splenomegaly Ven Thromboembolus</td>
<td></td>
</tr>
<tr>
<td>• Distal DVT Protocol No Rx</td>
<td></td>
</tr>
<tr>
<td>• First Episode PE</td>
<td></td>
</tr>
<tr>
<td>• ISLE Protocol No IV</td>
<td></td>
</tr>
<tr>
<td>• Rule Out CTEPH Protocol</td>
<td></td>
</tr>
<tr>
<td>• Recurrent DVT</td>
<td></td>
</tr>
<tr>
<td>• Recurrent PE</td>
<td></td>
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</tbody>
</table>

## BLOODWORK

<table>
<thead>
<tr>
<th></th>
<th>CBC</th>
<th>Creatinine</th>
<th>Timing: Before next visit unless</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>Thromb</td>
<td></td>
<td></td>
<td>Weekly x 4, then monthly for</td>
<td></td>
</tr>
<tr>
<td>PAM Clinic</td>
<td></td>
<td></td>
<td>months for months</td>
<td></td>
</tr>
<tr>
<td>Anticoagulant Management Clinic</td>
<td>CBC + Creatinine</td>
<td>Monthly for months</td>
<td></td>
<td></td>
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<tr>
<td>LAC Screen</td>
<td></td>
<td></td>
<td>Every</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

## CLINIC

<table>
<thead>
<tr>
<th>Referring FROM</th>
<th>Referring TO</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Thrombosis Clinic (ETC)</td>
<td>Discharged from Service</td>
<td>1 week</td>
</tr>
<tr>
<td>Thrombosis Clinic Tues/Wed PM</td>
<td>Emergency Thrombosis Clinic</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Thrombosis Follow Up Clinic Wed PM</td>
<td>Thrombosis Clinic Tues/Wed PM</td>
<td>3 months</td>
</tr>
<tr>
<td>DOAC/LMWH Clinic Mon PM</td>
<td>Discharge Clinic</td>
<td>6 months</td>
</tr>
<tr>
<td>Warfarin POC Clinic Thurs AM</td>
<td>Thrombosis Follow Up Clinic (ETC patients)</td>
<td>1 year</td>
</tr>
<tr>
<td>WAfu (Warfarin IntakeFU)</td>
<td>WAfu (Warfarin IntakeFU)</td>
<td>15 months</td>
</tr>
<tr>
<td>Clinic Thurs PM</td>
<td>Monitor (AFib)</td>
<td>2 years</td>
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<tr>
<td>PAM Clinic Thurs AM</td>
<td>Warfarin POC Clinic Thurs AM</td>
<td>Other</td>
</tr>
<tr>
<td>Monday afternoon Clinic 2</td>
<td>Monitor (AFib)</td>
<td></td>
</tr>
<tr>
<td>Inpatient Consult Service</td>
<td>PAM Consult Service</td>
<td>Remote</td>
</tr>
<tr>
<td>Monday afternoon Clinic 2</td>
<td>A Fib / LMWH</td>
<td></td>
</tr>
<tr>
<td>A Fib / LMWH</td>
<td>Warfarin</td>
<td></td>
</tr>
<tr>
<td>Warfarin</td>
<td>Discharged from Service</td>
<td></td>
</tr>
</tbody>
</table>

Fax letter to: Family Physician or Other

***URGENT FAX***

Followed up by: Thrombosis Service OR Dr.

Referral completed by: Signature: Date: DD/MM/YYYY

Appointment: Date: DD/MM/YYYY Time: HH/MM

Appointment Information Mailed: Yes No Appointment Given Verbally: Yes No

Memorial University
**PAM Clinic Protocol Template**

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**Name:**

**HON:**

**Date of Birth:**

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**PAM Clinic Protocol**

*Postoperative Anticoagulation Management Clinic*

**Original Indication for Warfarin:** Choose an indication.

**Procedure:**

**Overall Bleeding Risk:**

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<table>
<thead>
<tr>
<th>Day</th>
<th>Action: Warfarin</th>
<th>Action: Lowmox (Enoxaparin)</th>
<th>Action: Check INR</th>
</tr>
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<tbody>
<tr>
<td>-1</td>
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<td>4</td>
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</table>

**DAY OF SURGERY**

- Restart: Choose a dose, on the evening of procedure.
- No Lowmox

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This protocol is designed only for this patient and procedure at this point in time. Alterations may be required for future procedures. This is not a prescription.

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Pharmacist’s Name:  
Pharmacist’s Signature:  

Prescriber’s Name:  
Prescriber’s Signature:  

Date (DD/MM/YYYY):  

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Eastern Health Thrombosis Service  
Phone: 709 777-1340  
Fax: 709 777-1074