Tunneled Intravenous Catheters for Home Parenteral Nutrition have a Lower Rate of Deep Vein Thrombosis Than PICC Lines In Inflammatory Bowel Disease

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Background

• Prevalence of malnutrition in patients with Inflammatory Bowel Disease is high and they often require parenteral nutrition support.

• Commonly used central catheters for home PN are:
  
  • Peripherally Inserted Central Catheters (PICC) : 47 %
  or
  • Tunneled Central Catheters : 43 %

Background

- Patients with Inflammatory Bowel Disease are also at higher risk for Deep Vein Thrombosis\(^1\) (3-fold)

- Studies have shown that PICC lines are associated with a higher risk of DVT in patients with IBD:
  
  - **PICC associated DVT in patients with IBD:** \(6.8\%\)
  
  - **PICC associated DVT in patients without IBD:** \(1.9\%\) \(^2\)
  
  - **Adjusted Relative Risk:** 3.19

(Data from in-patient stays)

1. Purnak et al. IBD 2015: 1195-1203
Study Aims

• **Aim 1**: Assess the CA-DVT (Catheter-associated DVT) burden in IBD patients who are on long-term home PN

• **Aim 2**: Assess and compare the rates of CA-DVT between different catheter types and **identify catheter type with a relatively lower CA-DVT risk** for long-term infusions in patients with IBD.
Methods

• **Design**: Retrospective observational study

• **Cohort selection**: Adult patients with IBD who received home parenteral nutrition between 1/1/2013 to 6/30/2019

• **Cleveland Clinic Home PN Data & EMR**

  • Retrospective chart review of the EMR to find if patients had Ultrasound diagnosis of catheter associated Deep Vein Thrombosis during their catheter episode

• Catheter Episode = Catheter placed for n days
Methods

Study Variables & Collected Data:

• **Patient Demographics & clinical factors:**
  • Age, Gender, Race, BMI, Insurance status, Smoking status
  • IBD diagnosis (UC vs CD) & other comorbidities to generate Charlson comorbidity index score, patient’s medications

• **Catheter related information:** Date of catheter insertion, catheter type, number of lumen, placement method (guidewire vs percutaneous), tip location and exit site complication, date of catheter removal.

• Project approved by Cleveland Clinic Institutional Review Board (IRB)
### Results

#### Total Number of patients with IBD on Home PN
- N=407

#### Total catheter episodes
- N = 744
- Total catheter days (PN days)
  - N = 317,777 (890 Years)

#### Number of patients with Catheter Associated DVT
- N = 33

#### CA-DVT Rate
- 4.4 %
- 0.10 DVT per 1,000 catheter days

#### Characteristics of patients with DVT

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt; 60</td>
<td>7</td>
<td>21.2 %</td>
</tr>
<tr>
<td>Women</td>
<td>22</td>
<td>66.7 %</td>
</tr>
<tr>
<td>White</td>
<td>27</td>
<td>81.8 %</td>
</tr>
<tr>
<td>Active smoker</td>
<td>3</td>
<td>9.1  %</td>
</tr>
<tr>
<td>Former Smoker</td>
<td>11</td>
<td>33.3 %</td>
</tr>
<tr>
<td>BMI &gt; 30</td>
<td>7</td>
<td>21.2 %</td>
</tr>
<tr>
<td>Mean BMI (SD)</td>
<td>24.5 (6)</td>
<td>kg/m²</td>
</tr>
<tr>
<td>Charlson Score (SD)</td>
<td>6.45 (4.5)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33</td>
<td>100 %</td>
</tr>
</tbody>
</table>
Results

Total Catheter Episodes
N = 744
Days = 317,777

Tunneled catheters
N = 539 (72.4 %)
Days = 252,662

Number of DVT
N = 22

DVT rate = 4.1 % (22 / 539)

PICC
N = 205 (27.6 %)
Days = 65,115

Number of DVT
N = 11

DVT rate = 5.4 % (11 / 205)
Weighted Analysis Adjusted for Duration of catheter

DVT rate per 1,000 catheter days

Odds Ratio PICC associated DVT-risk = 3.665

95% CI 3.516 – 3.820  P-value < 0.05
Conclusions & Clinical Relevance

- Patients with IBD who are on parenteral nutrition support via **PICC** have **significantly higher risk of DVTs** compared to use of tunneled catheters.

- **Tunneled catheters** for home PN therapy **should be preferred** if the duration of parenteral nutrition infusion is greater than 4-6 weeks.

- **Questions?**
- **Thank You**