VENOUS THROMBOEMBOLISM INCREASES THE HEALTHCARE BURDEN IN PATIENTS WITH MALIGNANT GLIOMA

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INTRODUCTION

Impact of venous thromboembolism (VTE) in malignant glioma (MG):
- The incidence is estimated to be between 20-35%
- Second leading cause of death among ambulatory patients receiving cancer chemotherapy
- In those MG patients with VTE, there is a ≥ 2-fold increase in mortality
- There is a higher likelihood of death at 2-years (hazard ratio 1.3) in those with VTE
- Complications of VTE:
  - Pain
  - Bleeding/bruising
  - Increased risk of hospitalization
  - Delays in cancer treatment
- Economic burden: associated with a nearly 2-fold increase in cost
- Data is needed to characterize VTE burden in specific cancer types, particularly rare cancers.

SPECIFIC AIM

The aim of this study was to assess the healthcare burden associated with the development of VTE in MG patients.

METHODS

- Retrospective chart review: University of Vermont Medical center from 2009 – 2016
- Inclusion:
  - Age ≥18
  - Histology: MG, WHO grade III-IV
- 31 patients included
- Data collected:
  - # of office visits
  - # of emergency room visits
  - # of inpatient hospital days
  - VTE treatments
  - Cost of VTE treatment
- Statistics: standard descriptive statistics and linear regression models using SPSS

RESULTS

- 10 of 31 (32.2%) patients developed a VTE (Figure 1A/B)
- 100% of these patients were placed on therapeutic anticoagulation as part of VTE management.
- 55% of patients had a bleeding complication (Figure 1C/D)

<table>
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<th>Treatment</th>
<th>Complications</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapeutic anticoagulation</td>
<td>Any bleeding complication</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Gastrointestinal bleed</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Intracranial hemorrhage</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Retroperitoneal hemorrhage</td>
<td>1</td>
<td>10</td>
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Figure 1: Thrombotic & Hemorrhagic Events

A. CT chest PE protocol demonstrating a large pulmonary embolus
B. CT venogram, axial T1 post contrast image showing filling defect in left transverse sinus consistent with cerebral vein thrombosis
C. CT head with large intracranial hemorrhage
D. Axial CT chest showing large hyperdense collection in the left lattissimus dorsi with air-fluid level consistent with hematoma

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COST ANALYSIS

<table>
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<th>Hospital utilization</th>
<th>VTE</th>
<th>No VTE</th>
<th>Statistic</th>
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<td>Inpatient days</td>
<td>21.3</td>
<td>10</td>
<td>P=0.044</td>
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<tr>
<td>Emergency room visits</td>
<td>5.1</td>
<td>2.80</td>
<td>P=0.244</td>
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DISCUSSION

- VTE is associated with a significant healthcare burden in patients with MG, as demonstrated by:
  - Increased hospitalizations
  - Increased pharmaceutical costs
- Though the relationship between cancer and VTE has been well-established, there is a paucity of data with respect to this economic burden in cancer patients and specifically in MG patients.
- This is the first assessment of healthcare burden associated with VTE specific to this patient population.

CONCLUSION

The high incidence (32%) and high cost (morbidity, mortality, and economic burden) of VTE in MG warrants further study, with consideration of a preventative treatment strategy.