

# 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  $\geq 2$ -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 } From therapeutic anticoagulation
  - 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

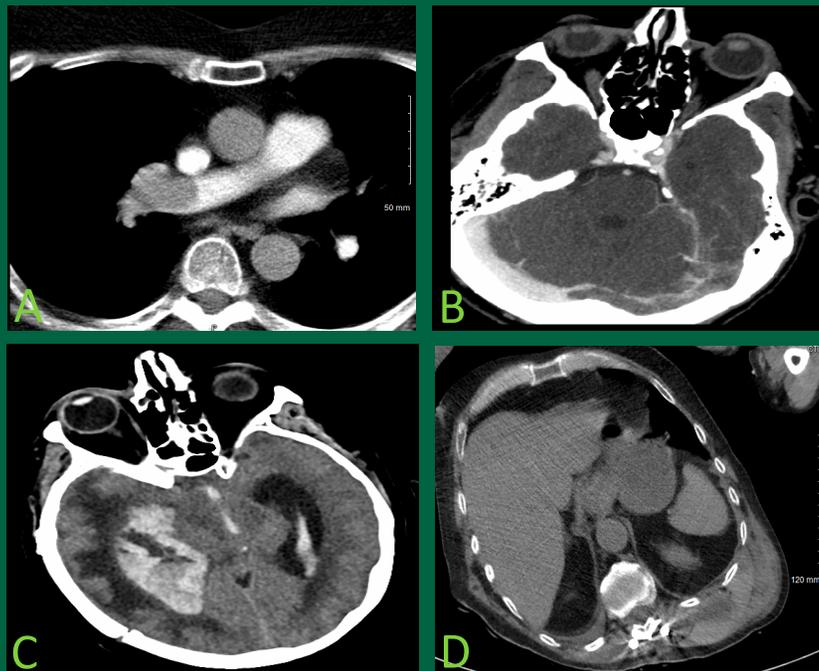
- Retrospective chart review: University of Vermont Medical center from 2009 – 2016
- Inclusion:
  - Age  $\geq 18$
  - Histology: MG, WHO grade III-IV
- 31 patients included
- Data collected:
  - # of office visits
  - # of emergency room visits
  - # of inpatient hospital days
  - VTE treatments
  - 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.
- 50% of patients had a bleeding complication (Figure 1C/D)

Treatment		Complications	
Therapeutic anticoagulation	N=10 (100%)	Any bleeding complication	N=5 (50%)
IVC Filter	N=1 (10%)	Gastrointestinal bleed	N=2
		Intracranial hemorrhage	N=2
		Retroperitoneal hemorrhage	N=1

Figure 1: Thrombotic & Hemorrhagic Events



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

## COST ANALYSIS

Hospital utilization	VTE	No VTE	Statistics
Inpatient days	21.3	10	p=0.044
Emergency room visits	5.1	2.80	P=0.244

- Treatment cost: 10/10 patients received therapeutic anticoagulation
  - Drug choice: 1 enoxaparin
  - Total drug costs: **\$84,355**
  - Cost per patient: **\$8,435**
- A full cost analysis of healthcare management and impact of VTE development in this patient population is currently underway.

## 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