

# Guideline Driven Therapy and Resolution of Upper Extremity Vein Thrombosis in Hospitalized Pediatric Patients

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Disclosures &  
Conflicts of Interest: None

# What we know about pediatric upper extremity venous thromboses (PUEVT)

- **Primarily affects seriously ill children and those with central venous access devices (CVAD) such as PICC or central lines**
- **Current guidelines**
  - **Therapeutic anticoagulation<sup>1,2,3</sup>**
  - **CVAD removal when possible<sup>1,2</sup>**

1. American Heart Association
2. American College of Cardiology
3. American Society of Hematology

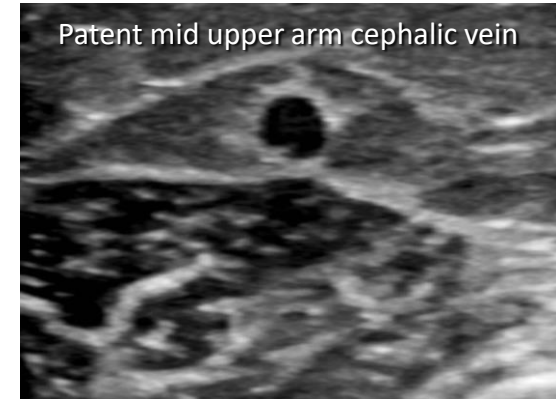


# Objectives

- Characterize pediatric upper extremity VTE in terms of:
    - Demographic
    - Anatomic distribution
    - Resolution rates
    - Variables affecting resolution
    - Associated mortality
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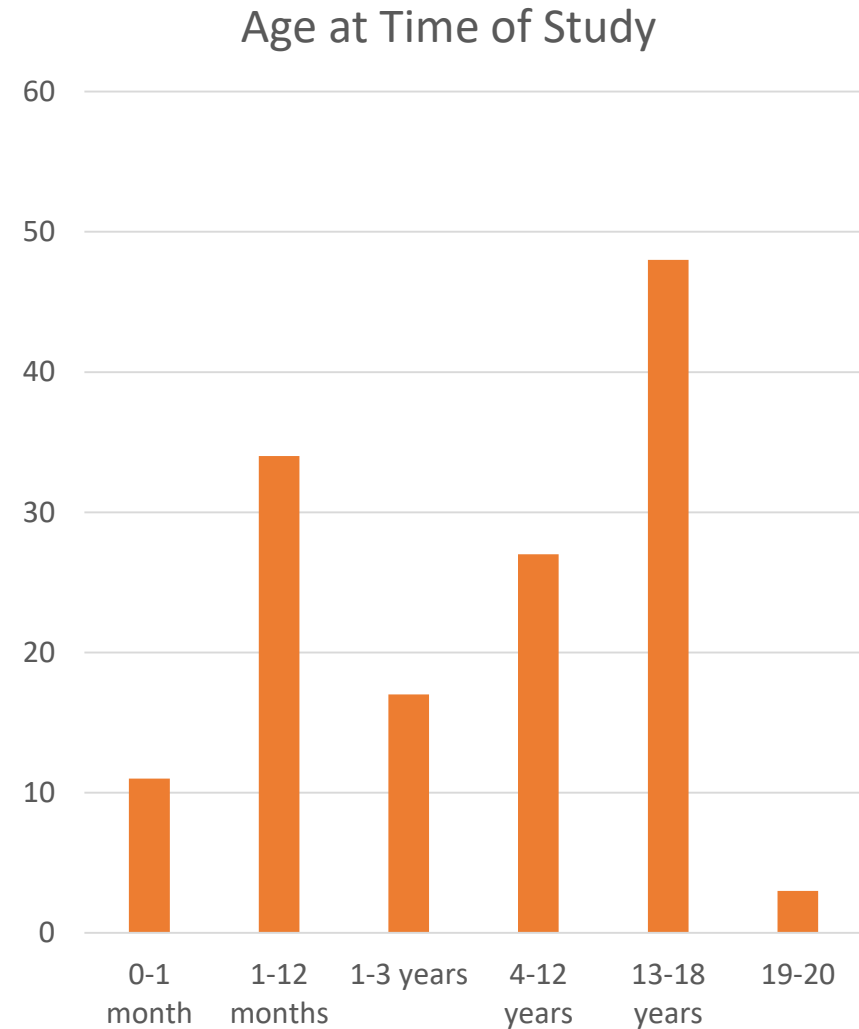
# Methods

- Children with PUEVT identified from a prospectively collected and updated daily vascular laboratory database from 2017-2020
  - Ages 1 day to 20 years
  - Single tertiary pediatric center  
(Doernbecher Children's Hospital)
- Reviewed for:
  - Demographics
  - Management
  - Thrombus resolution
- Data analysis performed using descriptive statistics, Chi Square analyses, and t-tests



# Results

- 275 upper extremity duplex scans identified from 140 unique patients
  - 59 females (42%)
  - 81 males (58%)
  - 100 (36%) positive for PUEVT
    - 61 UEDVT
    - 39 UESVT
- Mean age was 9.4 years
- Mortality of 15% (21/140)



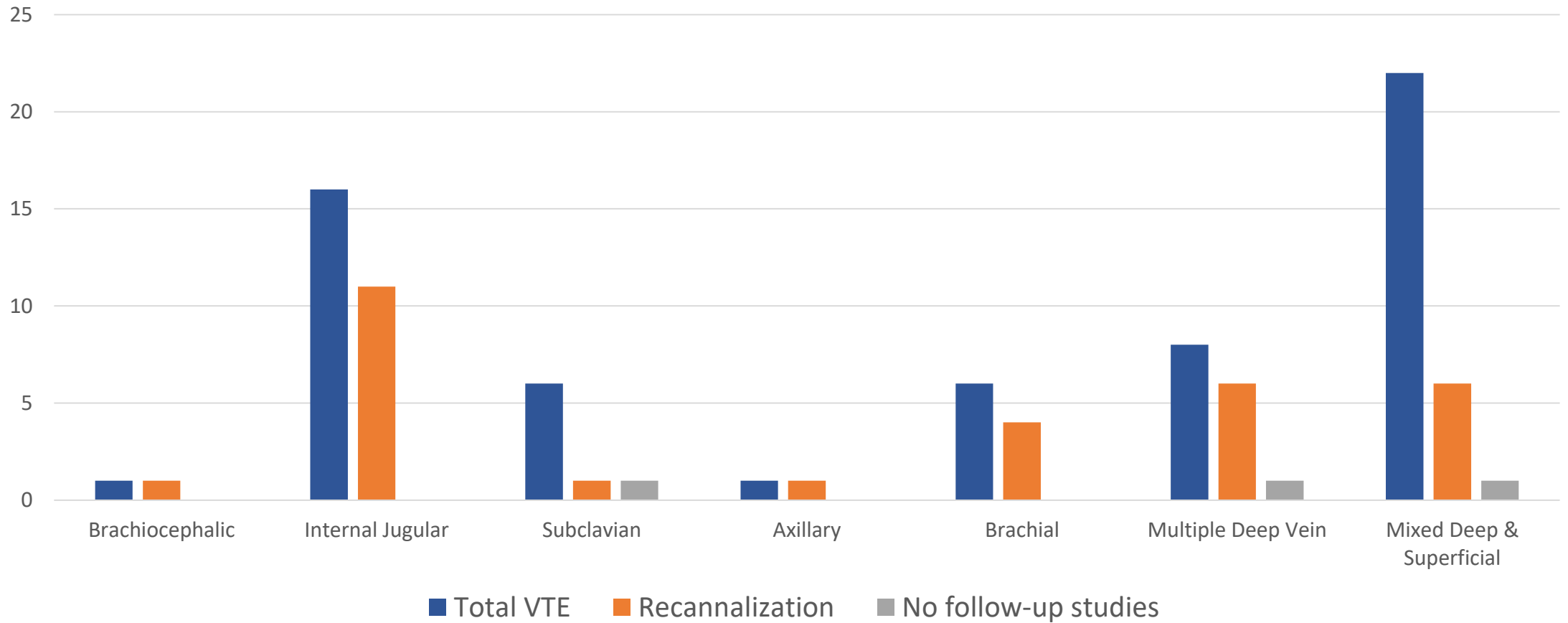


# Results

- CVAD was associated with PUEVT in 72 studies
  - Treatment with anticoagulation more likely in DVT than SVT ( $p < 0.01$ )
    - 70% UEDVT
    - 18% UESVT
  - Treatment with line removal only for CVAD associated thromboses more likely in SVT than DVT ( $p < 0.01$ )
    - 10% UEDVT
    - 46% UESVT
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# Results

VTE Distribution

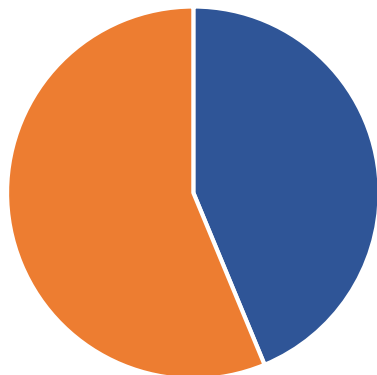




# Results

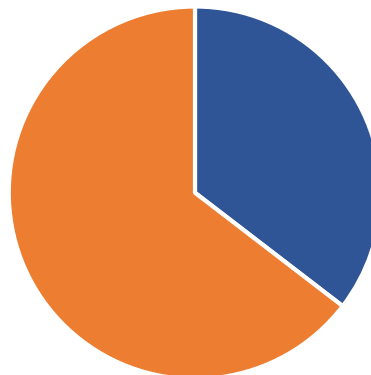
- Resolution on follow-up duplex
  - 56% SVTs (9/16)
    - Average time to resolution: 71 days
  - 65% DVTs (31/48)
    - Average time to resolution: 71 days
  - 68% for CVAD associated DVT (23/34)
    - Average time to resolution: 67 days

SVT



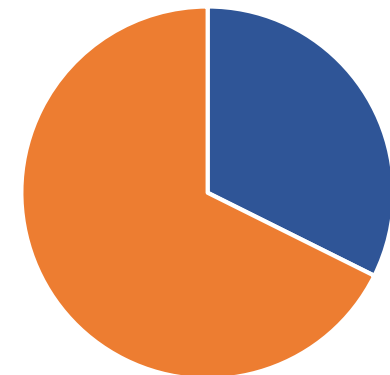
■ Unresolved ■ Resolved

DVT



■ Unresolved ■ Resolved

CVAD DVT



■ Unresolved ■ Resolved

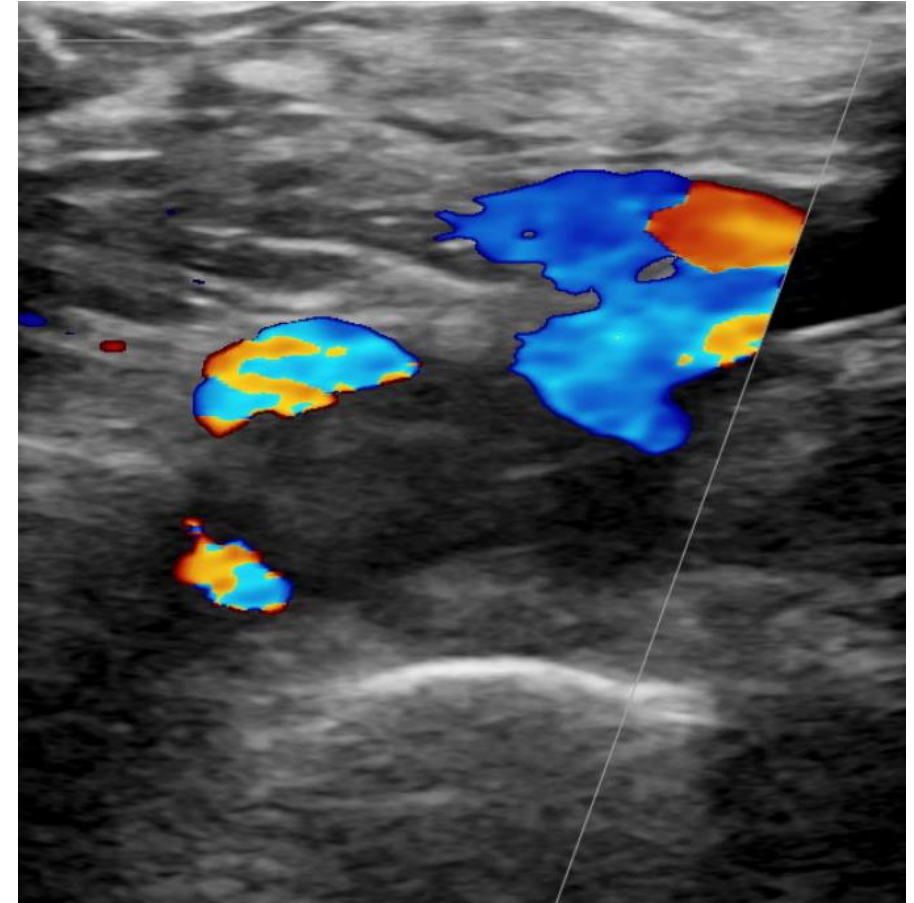


# Results

- There were more males than females with UEDVT (P= 0.03)
    - Males with UEDVT: 78%
    - Females with UEDVT: 47%
  - Males more likely than females to have resolution of PUEVT ( P < 0.01)
    - Males with resolution: 77%
    - Females with resolution: 36%
  - No statistical difference in resolution based on underlying reason for admission
  - No statistical difference in age of patients with resolution vs no resolution
-

# Results

- For CVAD-associated PUEVTs:
  - Resolution of DVTs
    - 8% with line removal alone
    - 63% anticoagulation alone
    - 100% with line removal and anticoagulation
  - Resolution of SVTs
    - 39% with line removal alone



# Conclusions

- Prognostic data on the resolution of PUEVTs supports the use of current management guidelines for management of PUEVT
  - Therapeutic anticoagulation
  - CVAD removal where possible
- Neither age nor underlying co-morbidities are associated with resolution
- Anticoagulation and gender are associated with resolution
- Additional investigation and analysis should be performed to explore gender specific differences

Thank You



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