

Increasing Post-Thrombotic Syndrome Screening in Pediatrics Patients with Extremity Associated Deep Vein Thrombosis

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BACKGROUND

- Recurrent deep vein thrombosis (DVT) and post-thrombotic syndrome (PTS) are well known complications of DVT.
- DVT has been increasingly occurring in children.
- The etiology of PTS is caused by occlusion of venous flow, valvular reflux, or both, ultimately causing venous hypertension.
- Symptoms of PTS may include pain, edema, heaviness, dilated superficial collateral vessels, itching, and cramping of the extremity previously affected by DVT.
- Children can be expected to live for several decades following a DVT, therefore it has been hypothesized that the physical and psychosocial ramifications and medical costs of PTS in this population would be disproportionately high.
- A systematic review and meta-analysis of the literature by determined the weighted mean frequency of PTS to be 26% among pediatric patients with extremity related DVT.

PURPOSE

- PTS is a clinical diagnosis that is confirmed via validated screening instruments and is commonly screened for in the adult population using the Villalta Scale.
- The current PTS screening tools recommended by International Society for Thrombosis and Hemostasis (ISTH) to be used for PTS screening in children are the Manco Johnson Instrument (MJI) and the Modified Villalta Scale (MVS).
- This hematology center had no standardized PTS screening process in place, and the past queried incidence of PTS patients was reported to be nine patients per year. Though more recently, an electronic query reported zero patients diagnosed with PTS during a 6-week period in November – December 2021 prior to project implementation.
- A standardized process for PTS screening was implemented using the MVS (Figure 1) to increase the number of patients identified with PTS.

METHODS

- The electronic health record (EPIC) was reviewed to identify patients with history of extremity related DVT who would present for new or follow-up office visit between January 17, 2022-February 25, 2022.
- Medical records were reviewed to identify eligible patients with history of extremity related DVT that was diagnosed at least 6 months prior to their office.
- PTS education and PTS departmental clinical practice guideline was created for providers and staff.
- To standardize the documentation of PTS screening, an electronic version of the MVS was created in the hospital's electronic medical record.
- This study was approved by Vanderbilt University Institutional Review Board.

Figure 1

Example Modified Villalta Scale

Components/Classification	Scoring
Symptoms	Each scored 0 or 1 (present/absent)
Pain or abnormal use	
Swelling	
Signs	Each scored 0 or 1 (present/absent)
Change in skin color	
Increase in limb circumference	
Pitting edema	
Collateral vessels	
Pigmentation	
Tenderness on palpation	
Edema of the head	
Varicosities	
Venous ulcer	0 or 8 (if present)
PTS classification	
No PTS	0 points
Mild PTS	1-3 points
Moderate PTS	4-8 points
Severe PTS	> 8 points

PTS indicates postthrombotic syndrome.

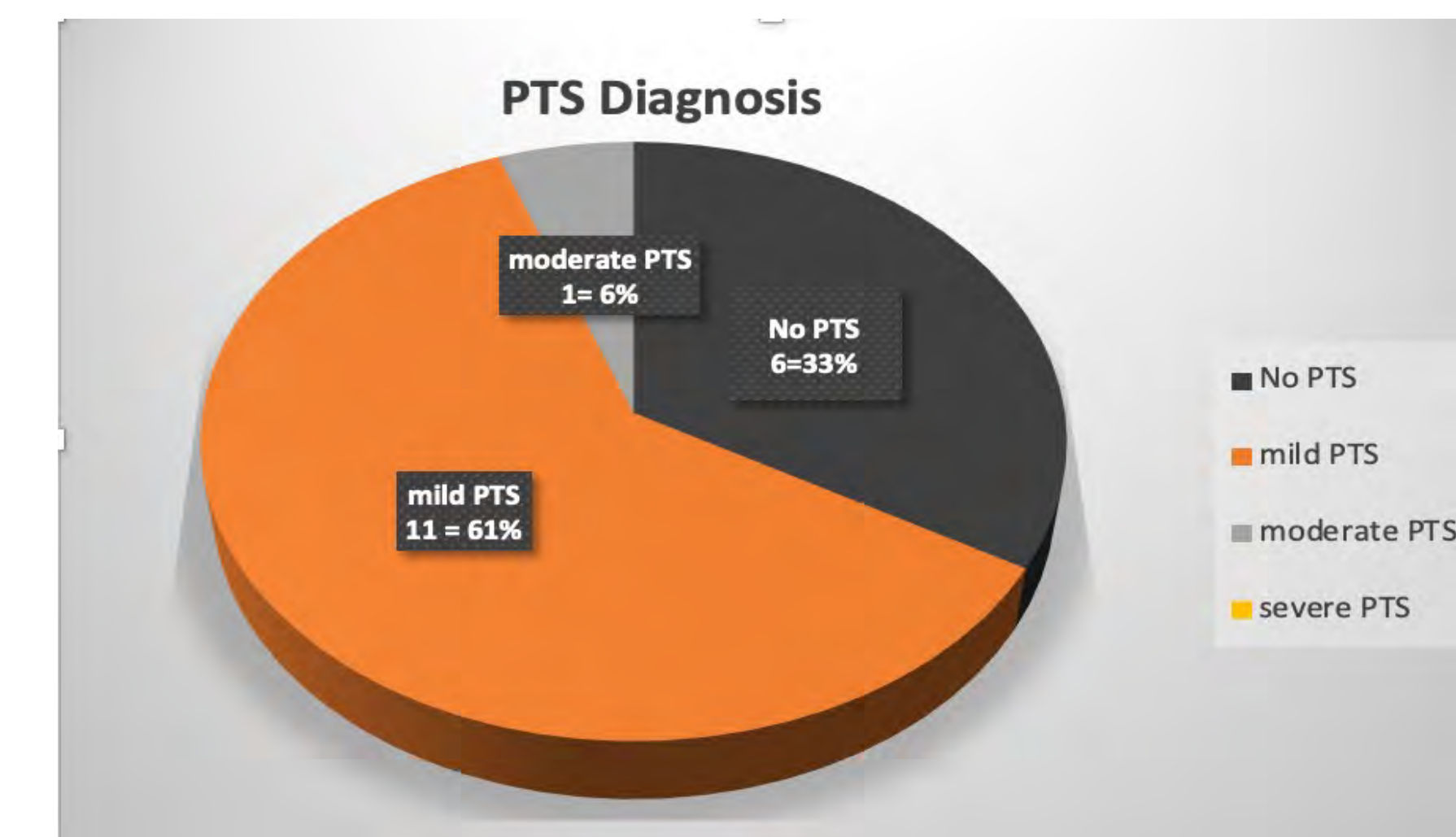
Table 1

Weekly PTS Tracker			
Week	Patients with extremity related DVT	Patients due for PTS screening	PTS screening done
1	13	10	2
2	16	9	5
3	10	8	2
4	12	6	3
5	15	8	4
6	9	4	2
Total	75	45	18

RESULTS

- 75 patients with extremity related DVT were scheduled for follow up visit during a 6-week period.
- 45 (60%) patients were due for PTS screening.
- 16 patients did not show to their clinic visit.
- Of the 29 patients due for PTS screening and present for their clinic visit, 62% (18/29) were screened for PTS.
- Mild to moderate PTS was detected in 67% (12/18) patients screened.

Figure 2



CONCLUSIONS

- A missed PTS diagnosis or delayed treatment can lead to severe symptoms, worsening quality of life and invasive interventions that may otherwise be prevented with early recognition.
- Implementation of the MVS increased the number of pediatric patients identified with PTS, a step toward improving outcomes of patients with DVT.