Background

- Observation of nursing and medical staff in the Morgan Stanley Children’s Hospital (MSCH) operating room (OR) revealed inconsistent practice of current recommendations for mechanical DVT prophylaxis.
- There is no current policy in the MSCH OR regarding use of sequential compression devices (SCDs) and no existing screening process for venous thromboembolism (VTE) risk for pediatric patients.

Goals

- Identify risk factors and create a risk stratification system for VTE.
- Identify contraindications to mechanical DVT prophylaxis.
- Implement and monitor standardized guidelines for mechanical DVT prophylaxis.

Methods

- Physicians in the MSCH OR were surveyed and 55% were aware of current recommendations for VTE prevention.
- A review of the literature was performed.

Literature Review (Risk)

- Cairo et al. (2018) found that the odds of DVT increased with age > 15 years, septic shock, pre-existing renal failure, ASA class > 2, and anesthetic time lasting > 2 hours.
- The Solutions for Patient Safety (SPS) guidelines for VTE prevention identify altered mobility, presence of a central line, history of thrombosis, thrombophilia, intensive care unit status, active cancer/malignancy, recent surgery, estrogen therapy, trauma, obesity, burns, dehydration, protein-losing disorder (nephrotic syndrome), and cyanotic or low-flow heart disease as risk factors for VTE/DVT development in pediatric patients.
- Cincinnati Children’s Hospital’s (CCHMC) 2014 Best Evidence Statement (BEST) identified additional risk factors to be orthopedic surgeries (hip and knee), existing blood stream infections, and systemic inflammatory diseases.
- Risks of using SCDs are lower extremity discomfort and skin irritation.

Contraindications to mechanical DVT prophylaxis include trauma to the lower extremities (LEs), IV access in LEs, existing DVT, LE fracture, proposed surgical intervention on either LE, and inability to achieve correct SCD fit due to size (<12 years old).

Literature Review (Interventions)

- Cairo et. al. (2018) recommend a pre-operative predictive risk model to identify at-risk patients and determine treatment.
- SPS guidelines recommend mechanical DVT prophylaxis for all patients >12 years old undergoing general anesthesia for > 1 hour.
- CCHMC’s BEST recommends that mechanical DVT prophylaxis be used for all patients 10 – 17 years old undergoing a surgical procedure lasting > 1 hour.

Proposed MSCH OR Guidelines

<table>
<thead>
<tr>
<th>Pre-operative</th>
<th>General anesthetic time &lt; 60 minutes, no additional risk factors, age ≤ 12 years</th>
<th>General anesthetic time &lt; 60 minutes, age 12-17 years, additional risk factors present</th>
<th>General anesthetic time ≥ 60 minutes, age ≥ 12 years</th>
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<tbody>
<tr>
<td>Pediatric patient (born to 17 years)</td>
<td>Encourage mobility and hydration pre-operatively. No additional interventions required.</td>
<td>Place SCDs prior to induction of anesthesia if high-risk for VTE, discuss pharmacologic prophylaxis.</td>
<td>Place SCDs prior to induction of anesthesia if high-risk for VTE, discuss pharmacologic prophylaxis.</td>
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Recommendations

- Although the risk of DVT development in the average pediatric surgical patient is low, mechanical DVT prophylaxis is a non-invasive measure that can decrease the risk of DVT.
- Development and implementation of guidelines enables standardization of physician and nursing practice, ensuring optimal care.

Future Steps

- A multidisciplinary team will move forward to create standardized guidelines for mechanical DVT prophylaxis in the pediatric surgical population.
- An algorithm for pharmacological intervention for high-risk patients will be developed.
- We recommend a prospective randomized study, specifically in the pediatric population, to determine the efficacy of SCDs.

References