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Hematoma Block Use in Management of Distal Forearm Fractures in a Pediatric Emergency Department

Eric Nau

Quality Improvement Abstract Title

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IRB Number (if applicable): 00000778

Describe role of Submitting/Presenting Trainee in this project (limit 150 words):

Involved in the initial project discussion and planning phase. Effectively lead a multidisciplinary team including emergency medicine physicians, orthopedic surgeons and nursing staff. Learned and implemented quality improvement methodology – learning from front line clinicians, regularly educating others, updating the team, and promoting the project. Also collaborated with the department of informatics to optimize the computerized orders for the use of hematoma blocks. Diligently worked to collect and analyze data and systematically performed the chart review where needed.

Problem Statement/Question, Background/Project Intent (Aim Statement), Methods (include PDSA cycles), Results, Conclusions limited to 500 words

Problem Statement/Question:

Increasing Hematoma Block Use in Management of Distal Forearm Fractures in a Pediatric Emergency Department

Background/Project Intent (Aim Statement):

Distal forearm fractures (DFF) account for 75% of all forearm fractures in children and are often reduced in the emergency department (ED) using parenteral procedural sedation (PS). However, PS is associated with longer length of stay (LOS), higher costs, and potential complications. Several small studies have shown hematoma block (HB) to be an effective alternative to PS for simple DFF reduction. However, HBs are not widely used in pediatric EDs in the treatment of DFF.

To increase HB use from 0 to 20% of DFFs in 1 year. Outcome measures: ED LOS and charges comparing HB and PS. Process measures: percentage of clinicians trained in HB. Balance measures: need to convert to PS.

Methods (include PDSA cycles):
This project was completed at 2 academic pediatric EDs (125,000 visits/year) starting in February 2019. The team included providers in pediatric emergency medicine (PEM) physicians and orthopedic surgery. Our interventions included the following: 1) staff teaching modules with a questionnaire for knowledge assessment, 2) procedure standardization and implementation, and 3) electronic documentation changes to streamline orders and identify learning points. PDSA cycles utilized observation, chart review and feedback. Monthly data were analyzed using control charts and two sample t-test.

Results:
The use of HB for DFF increased from 0% to 14% by November 2019 (n= 67, median age 12 years, 79% Male). ED visit charge was lower in HB-only cases ($1895/case, detailed analyses pending). Cases receiving HB had a significantly shorter ED LOS (HB 206 minutes, CI 188-226; PS 234 minutes, CI 227-240; p=0.006). 60% of providers successfully completed HB training (PEM physicians: 78%, pediatricians: 21%). No HB patients required conversion to PS. No significant adverse effects were reported. For adjunctive anxiolysis, nitrous oxide and midazolam were used with 64% and 25% HBs, respectively. One patient with unstable DFF received HB and then managed operatively. Four patients who would have been poor candidates for PS in the ED were successfully managed with HB, thereby avoiding the operating room.

Conclusions:
Using QI methodology, HB use increased from 0 to 14%. There was a significant difference in charges and reduction of ED LOS. There were no adverse outcomes. Limitations include selection bias for eligibility. Local next steps are analyses for difference in cost. Local factors including patient selection and team composition would need to be considered before generalizing.