May 13th, 11:30 AM - 1:30 PM

Electrical Stimulation of the Medial Pin after Insertion is Safe and Effective in Preventing Iatrogenic Ulnar Nerve Neuropraxias in Type III Supracondylar Fractures. A Case Series of 128 Consecutive Patients.

Lucas Georger B.A.
University of Missouri - Kansas City School of Medicine

McKenna Noe B.S.
Children's Mercy Kansas City

Richard M. Schwend M.D.
Children's Mercy Kansas City

Electrical Stimulation of the Medial Pin After Insertion is Safe and Effective in Preventing Iatrogenic Ulnar Nerve Neuropraxias in Type III Supracondylar Fractures: A Case Series of 128 Consecutive Patients

Lucas Georger, B.A., McKenna Noe, M.D., Richard Schwend, M.D.

Children's Mercy Kansas City

Background

Cross-pinning of both medial and lateral columns has been reported to increase the mechanical stability of Gartland type III supracondylar humerus fracture fixation constructs compared to lateral pinning alone. However, it carries an increased risk of iatrogenic ulnar nerve injury, with a reported incidence of 2% to 12%. A prior publication revealed that direct stimulation of the ulnar nerve with a portable nerve stimulator consistently elicited a reliable positive response which included the twitching of the fingers. The purpose of this study was to evaluate safe and effective use of intraoperative stimulation of pins to assess and reassure against irritation or injury of the ulnar nerve.

Methods

This was an IRB approved retrospective case series. Electronic medical records of 128 consecutive patients who sustained Gartland type III supracondylar humerus fractures between the ages of 2 and 14 and who were treated by one surgeon at our institution between January 1, 2007, and July 24, 2023, were queried. All type III supracondylar humerus fractures received fracture reduction under general anesthesia with lateral and medial pin fixation. All pins were stimulated with an economic (<$100) disposable nerve stimulator intraoperatively. Finger motion upon stimulation was considered a positive response. Stimulation of the pins took less than one minute to complete. Outcomes of interest included iatrogenic postoperative ulnar nerve injury, loss of fixation, and pin site infection.

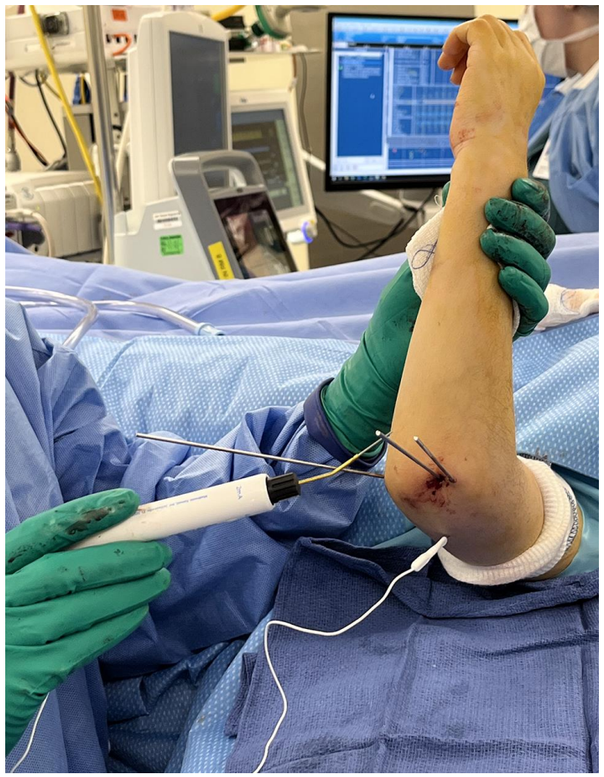

Figure 1: Application of the Disposable Nerve Stimulator

Results

A total of 128 consecutive operative cases are reported. Median age was 6 years and 58.6% were male. Each patient underwent intraoperative nerve stimulation of all pins. There were no patients with positive finger motion upon pin stimulation, indicating that no pin was piercing or touching the ulnar nerve. There were no postoperative iatrogenic ulnar nerve symptoms or deficits. One patient (0.8%) developed loss of fixation and six (4.7%) had pin site infection treated with pin removal in clinic and PO antibiotics.

Conclusions

Use of a simple, inexpensive nerve stimulator on medial and lateral pins during pediatric supracondylar humerus fracture fixation demonstrated no intraoperative ulnar nerve stimulation responses or postoperative iatrogenic ulnar nerve injury. This method allows for a stable fracture fixation and affords surgeons assurance that pins have not compromised the ulnar nerve.