A Case of Horner's Syndrome Following an Infraclavicular Nerve Block and Catheter Placement in a Two-year Old Female

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Introduction

Horner's Syndrome:

- Clinically characterized by ipsilateral ptosis, miosis, and anhydrosis
- Results from paralysis of the ipsilateral cervical chain (stellate ganglion)
- Common causes: local compression (i.e. tumor or hematoma), trauma, inadequate perioperative positioning, and local anesthetics [1]
- Occurs in nearly 100% of patients following an interscalene block of the brachial plexus [1]
- Occurs rarely in patients following supraclavicular blocks
- It is a potential, yet rare, feature of continuous infraclavicular brachial plexus local anesthetic infusion [2]
- Although no dangerous clinical consequence is associated with the syndrome, the unpleasant side effect may lead to patient discomfort
- Only three case reports of Horner's syndrome exist following infraclavicular blocks in adults, but it has never been described in the pediatric literature [1,2]

The following is a case of a 2 y/o old female with a PMH of bilateral hand deformities, who was scheduled for a left hand reconstruction, first web space release with free-flap, first MCP osteotomy, and flexor digitorum superficial opponensplasty.

Case Report

After an uneventful induction of general anesthesia and endotracheal intubation, an ultrasound-guided infraclavicular nerve block was performed in sterile fashion. Under direct visualization, an 18G insulate needle was advanced, and forearm contractions using nerve stimulation were lost at 0.6 mA—4.5 cm from the skin. A peripheral nerve catheter was left in place 7.5 cm from the skin, and bolused with 3 mLs of 1% lidocaine, and 2.5 mLs of 0.15% ropivacaine. An infusion of ropivacaine 0.15% at 2.5 mLs/hr was continued throughout the case and post-operative period.

The case lasted approximately 15 hours, and immediately post-operatively it was noted that the patient had developed ipsilateral ptosis and miosis. On exam, the catheter did not appear to migrate, and the patient did not complain of any unpleasant side effects. Pain scores remained adequate throughout the patient's hospitalization, and the catheter was removed post-operative day number three, and resolution of the Horner's symptoms immediately resolved.

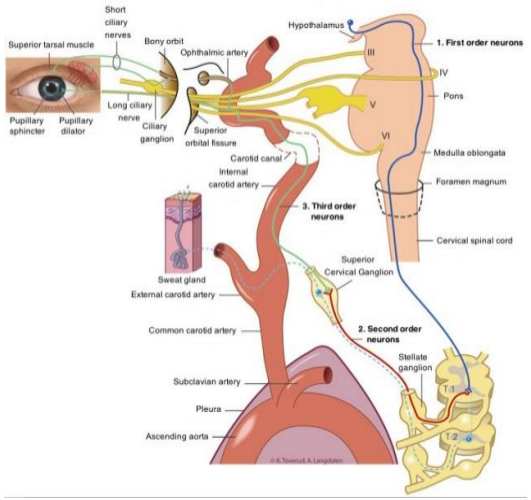

Image 1: Anatomic diagram showing the superior cervical ganglion, and how compression or paralysis can cause downstream affects leading to ptosis, miosis, and anhydrosis

Discussion

This case report is the first in the literature to describe an infraclavicular block causing Horner's syndrome in the pediatric population.

The mechanism of action causing Horner's syndrome following local anesthetic injection for a peripheral nerve block is related to the type of block, the amount of local anesthetic used, and the anatomy of the brachial plexus and surrounding sheaths. For example, when an interscalene block is performed, Horner's syndrome occurs nearly 100% of the time secondary to stellate ganglion proximity to the injectate. One study showed that local anesthetic spread remained mostly superior to the clavicle for supraclavicular and interscalene blocks, and below the clavicle for infraclavicular blocks [3].

Anatomic variations can possibly explain the development of Horner's syndrome after an infraclavicular block. Where one study suggested that the brachial plexus is completely encased in a continuous sheath from the interscalene grove to the axilla, another showed that the connective tissue could be divided into two compartments-- which could explain the local anesthetic spread from the infraclavicular to the supraclavicular space [4,5]. Prolonged infusions of local anesthetic have also been shown to cause a delayed Horner's syndrome after infraclavicular catheter placement [2].

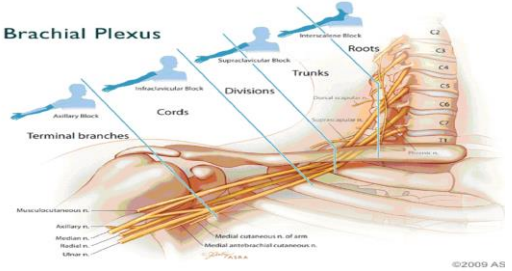

Image 2: Anatomic diagram of the brachial plexus, and locations where specific blocks are performed

Conclusions

Literature describing the mechanism of Horner's syndrome development in the pediatric population is limited. In regards to our patient, we hypothesize that the spread of local anesthetic and the development of a Horner's syndrome could have been secondary to an anatomic variation. There was also a prolonged tourniquet time for this operation, which could have led to a higher probability of Horner's syndrome perioperatively, but would not have explained the prolonged symptoms. Catheter migration is unlikely since the distance from the skin never changed on subsequent examinations, but is still a possibility.

References

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