Continuous Stellate Ganglion Blockade to the Rescue

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Introduction

The stellate ganglion is a sympathetic ganglion formed from the fusion of the inferior cervical and superior thoracic ganglia, providing most of the sympathetic innervation to the upper extremity including the head and neck. Blockade of the stellate ganglion can be used for a variety of diagnostic, therapeutic and prognostic purposes including the diagnosis and management of various sympathetically mediated pain states such as CRPS and phantom limb pain. Its blockade has also been shown to be beneficial in cases of refractory angina and prevention of vasospasm.

Case Presentation

Our case presents the use of a continuous stellate ganglion blockade as a method to increase viability of a replanted first digit by increasing perfusion to the upper limb.

HPI: 34-year-old homeless male who presented to our institution's emergency department after suffering a dog bite to his left thumb resulting in a traumatic amputation at the level of the MCP joint.
Past Medical History: Polysubstance abuse
Past Surgical History: Denies
Medications: Denies
Allergies: NKDA
Social History: daily crack cocaine, tobacco, and alcohol use.
Family History: unknown

Fig 1.: X-ray depicting traumatic amputation of first digit at metacarpophalangeal joint

Patient was taken to the operating room emergently to replant the severed left first digit at the MCP joint.

- General Anesthesia was induced, and airway was secured utilizing an RSI technique.
- Lengthy operative repair complicated by arterial vasospasm limiting perfusion to anastomosed digit.
- Large amounts of Intraoperative papaverine administered by surgical team with little change in perfusion.
- TPA injected intra-arterially to proximal anastomosis
  - Good return of blood flow through arterial graft with appreciable doppler signals
  - Return of pinkish color to thumb.
    - Doppler signals to thumb remained absent
- Regional anesthesia team consulted intraoperatively to perform a sympathectomy with the aim of restoring distal perfusion and prevent necrosis of the replanted digit.

Stellate Ganglion Blockade

- Left stellate ganglion blockade was performed intraoperatively under general anesthesia utilizing ultrasound guidance.
- Stellate ganglion was identified just inferior to the carotid artery.
- 2-inch Touhy needle was inserted and directed to the stellate ganglion under direct ultrasound guidance lateral to medial through the longus capitis and longus coli muscles, while avoiding any surrounding vessels.
- 8cc of 1% lidocaine was injected upon confirmation of negative aspiration of blood and CSF.

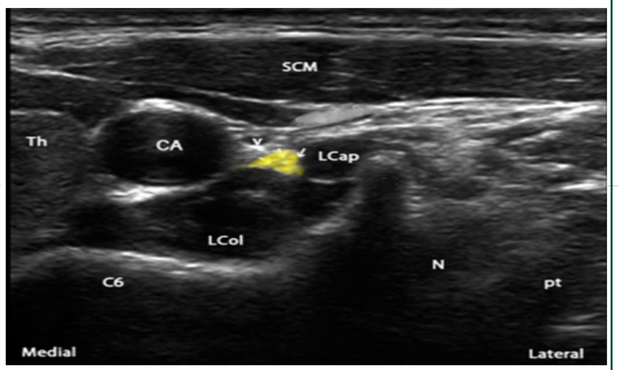

Fig 2: Ultrasound image highlight location of stellate ganglion with surrounding structures.
CA: Carotid Artery. LCAP: longus capitis, Lcol: longus Coli
Image adapted from: Narouze S, Souzdalnitski D. Ultrasound-Guided Percutaneous Cervical and Upper Thoracic Sympathetic

- Peripheral nerve catheter threaded utilizing sterile technique to provide an extended period of sympathectomy and enhanced perfusion to replanted digit.
- Catheter was secured and attached to pump infusing ropivacaine 0.2% at 7cc/hr.
- POD 1: Thumb remained viable with intact sensation, capillary refill of 3 seconds, and postoperative pain well controlled.

Discussion

Blockade of the stellate ganglion produces a sympathectomy, resulting in relaxation of the upper extremity arteries, increasing blood flow to distal capillaries and limiting ischemia. In the literature, cases have been described, where serial blockade of the stellate ganglion have been used to restore perfusion and save ischemic extremities that have been refractory to other treatment modalities. The use of a continuous stellate ganglion blockade, however, has seldom been described in the literature and warrants further investigation. In the case above, a continuous stellate ganglion blockade was utilized with the replanted digit remaining viable for at least 24 hours after re-anastomosis.

Conclusion

- In conclusion, our case represents the potential application of continuous stellate ganglion blockade to provide an extended period of vasodilation in the setting of a sympathectomy to enhance perfusion and prevent necrosis of a re-anastomosed digit.

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