Case Presentation:
Left-sided Percutaneous Cordotomy in a Patient with Intractable Right Upper Extremity Cancer Pain

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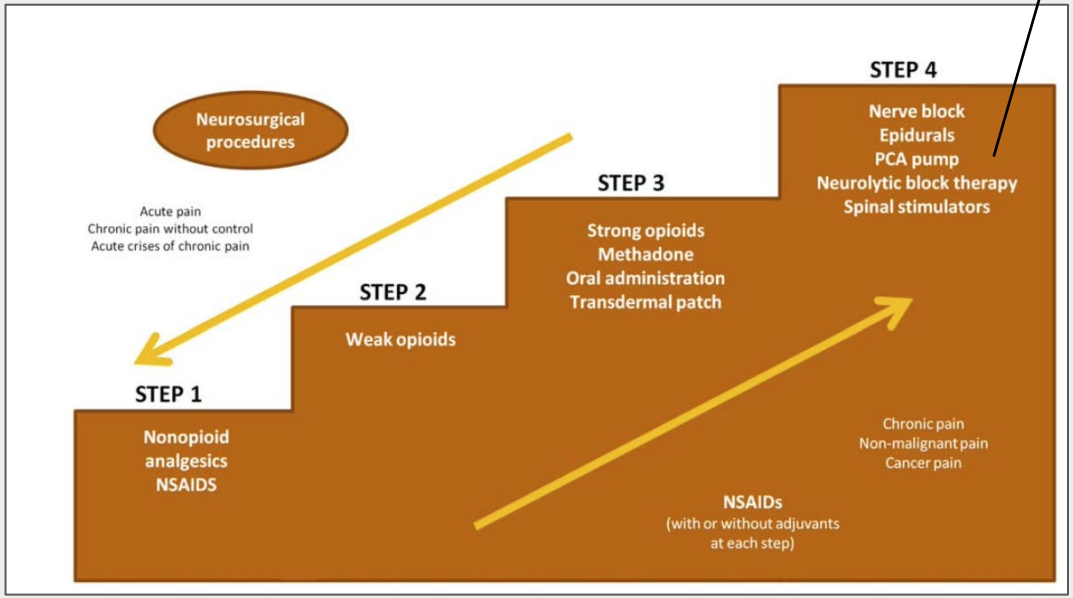
Introduction:

- Percutaneous cordotomy is a minimally-invasive surgical approach for intractable cancer pain.
- Pain is unresponsive to traditional analgesics (i.e. opioids), peripheral interventions (i.e nerve blocks), or more centrally targeted procedures (i.e. spinal cord stimulation or intrathecal pumps).
- Cordotomy involves lesioning nociceptive pathways of the lateral spinothalamic tract in the anterolateral spinal cord, which controls pain and temperature (Kanpolat Y., et al., 2006).
- Here we describe a patient suffering from metastatic squamous cell carcinoma (SCC) of the tongue with recurrence of disease to the right shoulder and severe pain, who underwent a left-sided percutaneous cordotomy after failing conventional modes of treatment for pain.

Step 5 ?



Scarborough B., et al. (2018)

Case Description:

- A young patient with metastatic SCC of the tongue s/p partial glossectomy at outside hospital s/p radiation to mouth and neck.
- One year later, the patient presented to MSKCC after noticing right shoulder pain.
- Imaging was SCC positive for right shoulder lesion
- Needle biopsy of palpable supraclavicular lymph node was SCC positive.
- Underwent radiation and radical excision of right clavicle, lymph node dissection of right axilla and chest wall, neuroplasty of right brachial plexus, total right rotator cuff reconstruction.
- Restaging showed progression of disease with severe right shoulder pain and limited right upper extremity mobility. Pain service was consulted for management of pain.
- Home meds: Fentanyl patch 100 mcg/hr, Oxycodone 30 mg q3hrs prn, Gabapentin 300 mg q8hrs, and Methadone 30 mg q8hrs.
- Pain was previously controlled on this regimen, but over the last few weeks he developed breakthrough pain.
- As inpatient, APS started patient on IV Ketamine, IV dilaudid PCA, increase in Fentanyl patch to 200 mcg/hr. Patient was not a candidate for more surgery or radiation.
- On NRS scale, pain was 10/10 in the right shoulder pain, right neck, right upper back.
- Underwent a right-sided stellate ganglion block under ultrasound with minimal benefit.
- Given location of tumor burden and pain, best option was to undergo cordotomy.
- Patient consented to to a left-sided percutaneous cordotomy under CT-intraoperative and fluoroscopic guidance with Neurosurgery.

Methodology Part 1:

- Pre-cordotomy myelogram with Interventional Radiology, where intrathecal contrast was given.
- Anesthesia was administered.
- A lateral fluoroscopic view was taken of the needle trajectory site, approximately 1 cm inferior and 1 cm anterior to the left mastoid tip.
- After the subcutaneous skin was anesthetized, a 20 gauge spinal needle was inserted into the skin of the left neck and advanced to 2 cm.
- Another lateral fluoroscopic view was obtained to confirm the trajectory heading towards the foramen of C2 nerve root, between C1 and C2 at anterior superior aspect of foramen (Figure 1).
- After confirmation, the needle was advanced to 4-5 cm.
- Intraoperative CT scanner was utilized to confirm needle heading towards anterolateral portion of spinal cord (Figure 2).
- Then, inner stylet was removed and spontaneous CSF was visualized.
- RF ablation probe was placed into the inner stylet of the spinal needle.
- At this point, APS provider connected RF generator.
- Additional CT imaging was obtained (Figure 3).
- Next, increases in resistance (Ohms) displayed by the RF generator signaled probe was in spinal cord parenchyma.
- Anesthesia was lightened for intraoperative testing.
- First, sensory testing was performed and patient felt paresthesias around the right arm (baseline pain generator).
- Second, motor stimulation was performed, the left arm and left leg moved equally and fully.

Methodology Part 2:

- APS was instructed to increase temperature to 80 degrees C for 60 seconds on the RF generator.
- During lesioning, left arm and left leg motor testing was unchanged.
- Needle was withdrawn 1 mm and repeat testing demonstrated same results.
- Second lesion was performed with temperature to 80 degrees C for 60 seconds.
- After lesioning, surgical team had removed RF probe and spinal needle. Patient was taken to recovery.

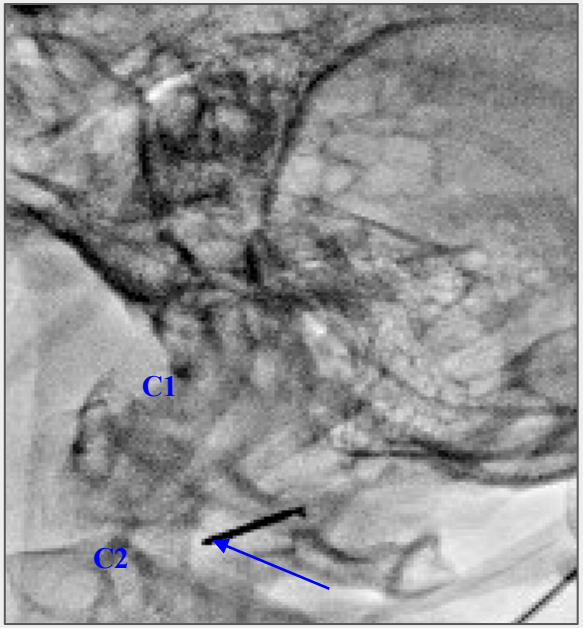


Figure 1. Lateral Fluoroscopic View of Needle (arrow) Between C1-C2 vertebrae

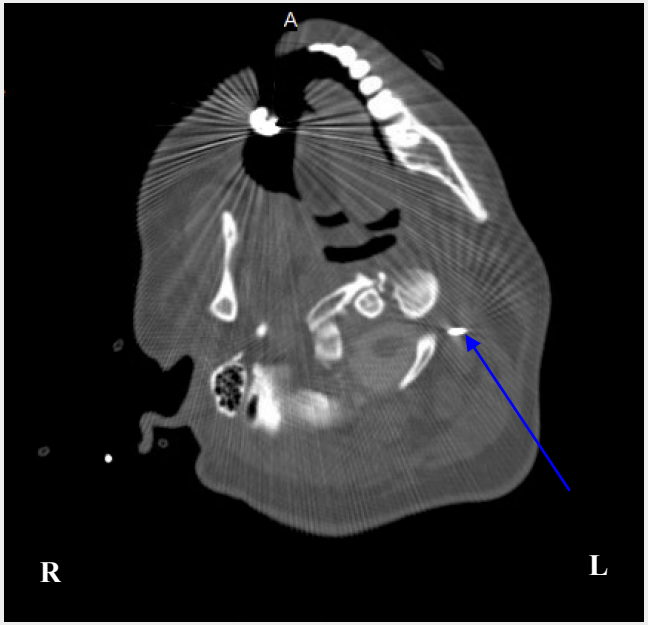


Figure 2. CT image of C1-C3: spinal needle trajectory towards left spinothalamic tract (arrow) of spinal cord.

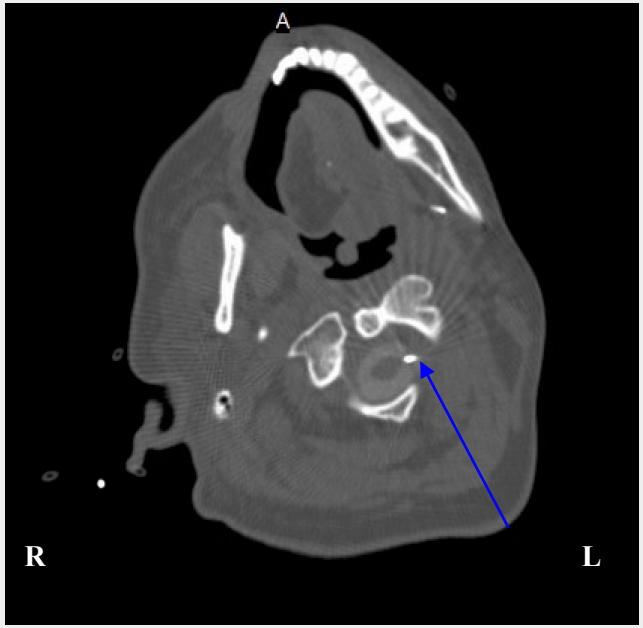


Figure 3. CT image of C1-C3: Final needle placement with RF probe (arrow) around left spinothalamic tract.

Results:

- Patient was evaluated at bedside post- operative day 1.
- Reported 100% pain relief in his right upper extremity and numbness.
- Following Cordotomy, patient reports new pain of his left arm/scapula, which was unmasked after the procedure.
- Patient underwent left suprascapular nerve block and cryoablation for left arm/scapula pain, receiving 80% pain relief and 30% pain relief, respectively.

Discussion Part 1:

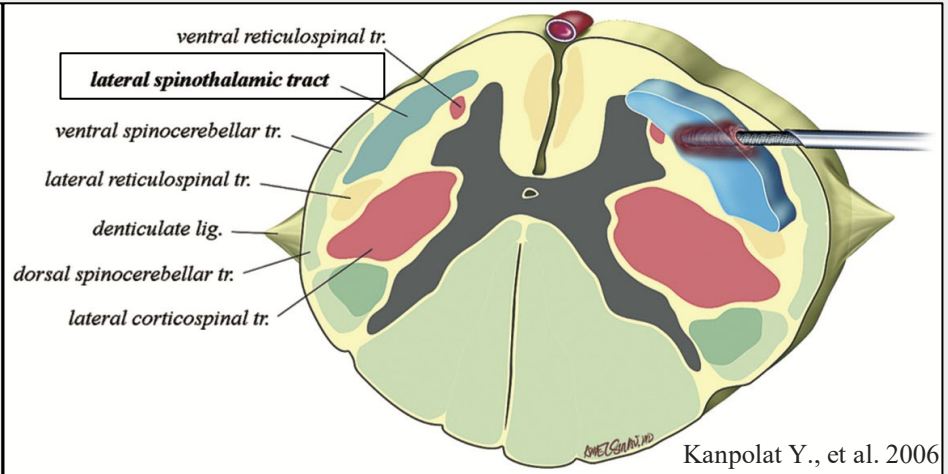
- Pain due to malignant disease can be refractory to many pharmacological and interventional pain procedures.
- Percutaneous cordotomy (PCC) can be a long-lasting method for treating intractable cancer pain.
- Mechanism includes lesioning to the fibers that innervate pain and temperature of the lateral spinothalamic tract.
- These pathways decussate in the spinal cord (Kanpolat Y., et al. 2006).
- The dorsal columns, which controls fine touch and proprioception, is spared (Javed S., et al. 2020).
- Patients with malignant cancer pain have benefited from this procedure when conventional modes of pain therapy have failed, providing not only substantial analgesia, but improved quality of life (Bellini M., et al. 2016).

Discussion Part 2:

- Preliminary success rates with CT-guided percutaneous cordotomy has been shown to be greater than 92.5% in the oncological population (Kanpolat Y., et al. 2006).
- PCC is mainly indicated for unilateral malignancies and when non-invasive treatments have failed.
- Recommended for patients with a life expectancy of less than six months (Bellini M., et al. 2016).
- Cordotomy can be performed via percutaneous, open, or endoscopic, with percutaneous being most well-studied and best for pain control in postoperative and short-term setting (Javed S., et al. 2020).

Conclusion:

Thus, we describe how a left-sided percutaneous cordotomy was 100% effective in providing pain relief for right upper extremity intractable pain due to malignant disease after failing alternative analgesic and peripheral nerve blocks. This case presentation outlines how treatment algorithms for cancer pain can include surgical interventions, such as cordotomy, when conventional techniques and pharmacology have failed.



Kanpolat Y., et al. 2006

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