CT Scan Guided Interscalene Brachial Plexus Neurolysisusing 95% Alcoholina Patient with Neurogenic Thoracic Outlet Syndrome: A Case Report*

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ABSTRACT

A number of patients with thoracic outlet syndrome experience intractable pain unresponsive to pharmacologic treatment. In this case, a brachial plexus neurolysis was performed to address the patient's pain secondary to an enlarging left supraclavicular node. Guided under CT scan, 3 ml of 95% alcohol was injected in between the anterior and middle scalene muscles onto the trunks of the left brachial plexus, affording immediate pain relief. Particular concerns of motor blockade, phrenic nerve palsy, stellate ganglion blockade, and bleeding did not occur. Therefore, brachial plexus neurolysis can be safely done at a lower volume, without the above debilitating complications. It can be an option in relieving intractable upper extremity pain.

Keywords: Alcohol Neurolysis, Brachial Plexus, Thoracic Outlet Syndrome

INTRODUCTION

Neurogenic thoracic outlet syndrome may cause pain in the neck, shoulder and arms secondary to compression of the neurovascular structures1. In most cases, depending on the etiology, it may become severe rendering conventional analgesic regimens ineffective. In such cases, more invasive options may be offered. Chemical neurolysis is a commonly used tool by interventional pain specialists for severe intractable pain2. Although popular and common, literature on its application on the brachial plexus is scant. Only a few successful documented cases have been published.

In this case report, we present a successful chemical neurolysis of the brachial plexus via interscalene approach in a patient with an enlarging left supraclavicular lymph node.

PRESENTING CONCERNS

This is a 51-year-old female diagnosed with Stage IVA (T2A, N3, M1) Squamous Cell Carcinoma of the lungs last November 2019. The patient received 6 cycles of chemotherapy, 6 cycles of immunotherapy, underwent left partial mastectomy due to a benign mass, and is a known hypertensive and asthmatic. Patient was first seen by a pain specialist 2 months prior to admission due to constant pain of the left shoulder and upper extremity radiating to the back and left anterior chest wall, 4/10 on numeric pain scale (NRS). This resulted to difficulty in performing activities of daily living (ADLs).

CLINICAL FEATURES

Previous admission CT scan revealed a 2.92 x 2.58 cm mass at the left supraclavicular area as well as pulmonary and mediastinal nodes. The following pain medications were started: (1) Oxycodone 10mg tablet every 6 hours, (2) Oxycodone 5 mg capsule as needed every 4 hours for severe pain, (3) Paracetamol 900 mg intravenous every 8 hours, and (4) Pregabalin 50mg tablet once daily reducing pain score to 2/10. Patient was discharged improved with same opioid and gabapentinoid agents as home medications. Outpatient Radiotherapy and immunotherapy were then carried out. In the interim, there was progressive enlargement of the mass associated with increasing severity of pain. An ultrasound guided brachial plexus block using a local anesthetic was attempted by a regionalist but was aborted due to non visualization of the targeted structures secondary to a distorted anatomy. Instead, an ultrasound guided left superficial cervical plexus block using Ropivacaine 0.2% 5ml was performed which afforded a 3-hour relief. Patient was referred to interventional pain medicine for evaluation wherein an option to do neurolysis was discussed.

*1st Place, 2020 Philippine Society of Anesthesiologists Inc. Interesting Case Presentation

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DIAGNOSTIC APPROACHES

Patient was readmitted due to radiation induced gastritis. Physical exam showed a swelling and erythema of the left supraclavicular area and a3 x 2 cm, smooth, movable and tender mass. Pain then was continuous 8-9/10 and unrelieved by current oral analgesics. Repeat CT Scan revealed an increase in size of the mass to 3.8 x 4.5 cm. Diagnostic exam revealed multiple electrolyte imbalances secondary to vomiting and poor intake. ECOG Performance Status was 3/5 or symptomatic with less than 50% in bed during the day and Karnofsky score of 30-40.

THERAPEUTIC APPOACHES

Further up titration of current pain medications to Oxycodone 80 mg tablet once daily with rescue dose of Oxycodone 10mg capsule every 1-hour interval did not improve pain control. Hence was shifted to Oxycodone 40mg with Naloxone 20mg tablet every 8 hours with rescue doses of Oxycodone 10mg intravenous. Pregabalin 50 mg was increased to every 8 hours, Ketamine at 10 mg/hour IV drip and an intravenous NSAID enantiomer Dexketoprofen 50 mg every 8 hours were started. Pain control improved to 3/10 for 3 days until patient developed orthopnea, dyspnea, visual hallucinations and hypotension. Round the clock nebulization and an antiarrhythmic drip were started by pulmonology and cardiology services respectively. With patient on NPO, opioid rotation was started by pain medicine service with IV Fentanyl drip at 25mcg/hour with rescue doses of Fentanyl 50 mcg at 1-hour interval as needed. Optimal pain relief was attained at 150 mcg/hour hence after 24 hours, was shifted to a transdermal delivery system at the said dose every 72 hours. With the primary objective to reduce opioid dose, minimize toxicity and optimize pain control, brachial plexus neurolysis was carried out.

On the 4th hospital day, the patient was placed comfortably in a supine position with the head slightly turned to the right. A pre-procedural CT scan was taken to locate the brachial plexus and and confirm tumor location. Lidocaine 2% 3 mL was used to infiltrate the skin using a gauge 25 hypodermic needle and later used as a marker. A 9 cm gauge 20 Quincke needle was inserted at the level of C6-C7, at a 50-degree angle, traversing the supraclavicular mass, until approximately 6 cm from the skin. Contrast medium Iopamidol 612mg/ml 1:1 dilution with PNSS at 1.5 ml was injected and established the correct placement of the spinal needle. 3 ml of 95% alcoholl was slowly administered. Patient complained of severe pain during the injection of alcohol.

The patient tolerated the procedure very well without dyspnea, bleeding, paralysis of the left upper extremity or Horner's Syndrome. There was immediate pain relief from 8/10 to 2/10 and further drop to 1/10 a few hours after the procedure. With significant pain relief, patient was able to perform ADls such as feeding, change of clothing and was able to sleep without interruptions. Fentanyl patch and Gabapentinoid doses were reduced by 50%, ketamine intravenous drip down to 2mg/hour from 10mg/hour and NSAID subsequently discontinued. Unfortunately, after 2 weeks, patient succumbed to complications of pneumonia and sepsis.

DISCUSSION

Neurogenic thoracic outlet syndrome is the most common form of thoracic outlet syndrome. Its etiologies include compression of the neurovascular structures secondary to scalene hypertrophy, enlarging mass in the area or the presence of a cervical rib. This could result to neck, shoulder and arm pain1. In this case, compression of the brachial plexus resulted to excruciating pain, unresponsive to the WHO's analgesic ladder. Considering the location of the pain, an interscalene brachial plexus neurolysis was identified as the most appropriate modality. However, with the very limited literature about this procedure, there is no consensus with regard to the volume of neurolytic agent to be injected. An inappropriate volume could spread to adjacent structures such as the phrenic nerve causing palsy or a motor block. A case report of a successful brachial plexus neurolysis for

cancer pain secondary to a right supraclavicular mass using 11 ml of 90% dehydrated ethanol has been reported. However, undesired motor block was observed after the procedure[2]. Another successful report of infraclavicular approach brachial plexus neurolysis using 5% Phenol has been documented[3]. Patient amenable for brachial plexus neurolysis have to be carefully selected. Indications include severe intractable pain, advanced malignancies, terminally ill, and well localized pain. Procedural adverse events include infection, metastatic cancer spread to the region and bleeding secondary to chemotherapy induced thrombocytopenia. In most instances, a brachial plexus block is done prior to a neurolysis[4]. However, its was not done in this patient as the volume of local anesthetic agent could dilute the neurolytic agent or cause further spread to adjacent structures.

The first problem encountered in this case was the volume of neurolytic agent to be used that would be sufficient enough to cause neurolysis and safe enough not to cause the untoward side effects considering that the anatomy was distorted from the enlarging mass. This would mean a smaller working area for the neurolytic agent. The problem was resolved by injecting and documenting the degree of spread of a specific volume of contrast medium, identified at 3 ml. This entails that at such volume, its degree of spread would most likely cover the area of the contrast medium. Another problem encountered was gaining access to the brachial plexus. The mass was obscuring an interscalene approach to the brachial plexus thus; the decision of traversing the mass was done.

CONCLUSION

The patient presented in this case gives us an insight into other alternatives other than pharmacologic treatment that would improve the quality of life of these patients who are mostly in the terminal stages of their disease. Specifically, this case is an anecdote that at such volume, desired sensory block of brachial plexus with the same neurolytic agents could be achieved.

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Fig. 1 – Supraclavicular Mass

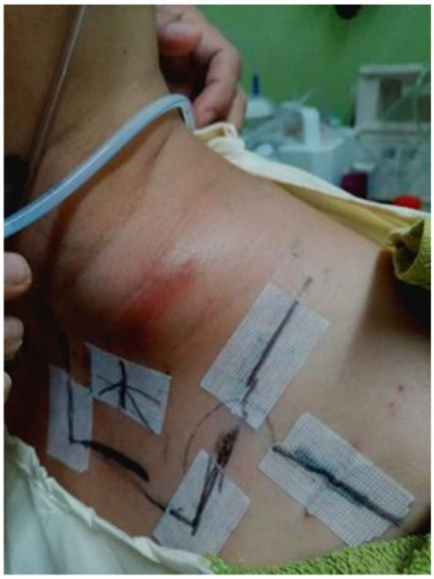

Fig. 2 – Procedural CT Scan. Yellow arrow: Tip of needle with dye. Red arrows: Mass

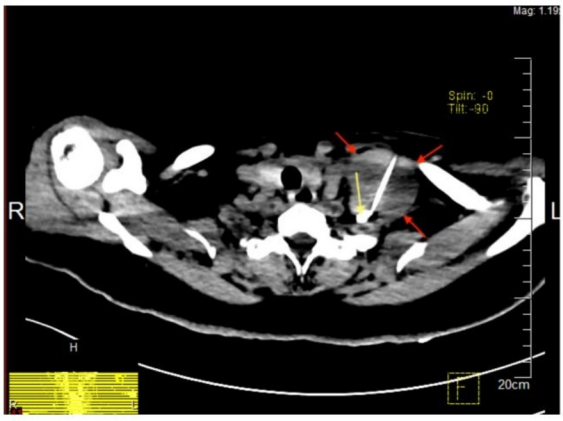

Fig. 3- CT Guided Brachial Plexus Neurolysis