DISCUSSION:

The sural nerve is a sensory nerve of lower limb that supplies posterolateral surface of leg and lateral part of dorsum of foot and heel. It is formed by communication of medial sural cutaneous nerve (MSCN) and peroneal communicating nerve (PCN). MSCN arise from tibial nerve in popliteal fossa. PCN is a branch directly from common peroneal nerve or from lateral sural cutaneous nerve. Sural nerve can be just a continuation of MSCN when there is no communication between MSCN and PCN.[2,3,4]

Sural nerve may get affected as a result of compression, direct trauma, inversion ankle sprain or adverse neurodynamics. Compression of the nerve can be due to thickening of crural fascia; various mass lesions such as a Bakers Cyst, ganglion, lipomas or myositis ossificans at the level of gastrocnemius aponeurosis; scar tissue beneath the deep fascia of the gastrocnemius, peroneal nerve sheath degeneration or Achilles paratendinitis; and extrinsic causes such as ski boots, heel straps, casts and tightly laced boots. Direct trauma responsible for sural nerve neuropathy may include fibular fracture, fracture of the fifth metatarsal, gastrocnemius muscle injury, achilles tendon rupture or surgical induced damage.

The sural nerve can become entrapped anywhere along its course in the lower extremity. Entrapment involving the sural nerve typically occurs at the musculotendinous junction of the gastrocnemius muscle and the Achilles tendon within the calf, as the nerve travels through a fibrous arcade (which has been termed the superficial sural aponeurosis), at the ankle or in the lateral foot near the base of the fifth metatarsal.[6] The tension is worsened during passive forcible plantar flexion and inversion of the foot increases tension in the sural nerve as the nerve is tightly adherent to the surrounding fascia.[7] Entrapment of the sural nerve can also be due to post-traumatic scar tissue beneath the deep fascia of gastrocnemius, peroneal nerve sheath degeneration, calcaneocubiod joint capsule degeneration and Achilles tendonitis.[8]

Figure 4 - Sites of entrapment of the sural nerve. A- junction of the gastrocnemius muscle and Achilles tendon, B- lateral ankle, C- lateral foot

The treatment of sural nerve neuropathy can be conservative, interventional or surgical. Surgical treatment is required when the removal of space-occupying masses (ganglion/lipoma) is necessary. Conservative treatments include physiotherapy, non-steroidal anti-inflammatory drugs, vitamin B6 & B12, tricyclic antidepressants, antiepileptics, or topical anesthetics. Interventional

treatments include radiofrequency ablation of the nerve, plasma rich platelet (PRP) infiltration and percutaneous ultrasound guided hydrodissection.[5,9-14]

Sural nerve hydrodissection is one of the least studied interventional techniques but it is considered to be a useful technique to treat neuropathic pain caused by nerve entrapment. In nerve hydrodissection ultrasound-guided fluid is injected to separate nerve from the surrounding structure, usually the fascia, which is believed to constrict or irritate the nerve either during movement or at rest.[15,16] The advantage of nerve hydrodissection is separation of nerves from the surrounding soft tissue with fluid (hydro) and with the fluid flushing and the release of pressure on the nervi nervorum outside the epineurium.[16] These nervi nervorum are the free nerves supplying the main nerve and regulate the function and discharge of the main nerve.[14] Real time ultrasonography is usually the choice of imaging technique in nerve hydrodissection to guide needles and fluid injection. Traditionally, the fluid used for hydrodissection is a large volume of 0.9% normal saline or 5% dextrose. Along with that a small volume of steroid and local anesthetic solution is also injected to reduce the pain.[16] We performed hydrodissection using 0.9% normal saline 10 mL, methylprednisolone 40 mg and 1% lidocaine at the

entrapment site, which was behind the lateral malleolus due to fasicular hypertrophy of the peroneal retinaculam. The outcome was excellent during follow-up up to 3 months.

CONCLUSION:

Sural nerve entrapment behind the lateral malleolus should be considered as a potential etiology in patient presenting with sensory disturbances along the lateral aspect of foot or ankle. Ultrasound imaging adds in formation of the diagnosis in entrapment. Moreover real time ultrasound is useful for treatment by hydrodissection technique. Hydrodissection is an interventional procedure that is efficacious and cost effective with good outcome and hence is an attractive option treatment option for sural entrapment neuropathy. However, sporadic studies for hydrodissection of entrapped sural nerve mandate additional studies to elucidate effectiveness and safety profile of this technique.