

Hydro Dissection of the Sciatic Nerve for Chronic Phantom Limb Pain

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Abstract

Background: Phantom limb pain can occur after limb amputation (60% - 85%). It is a persistent pain after amputation. It is different to stump pain and phantom sensation. Hydro dissection is a minimally invasive technique involving injection of fluid to separate fascial layers and release entrapped nerves and tendons. Its use in chronic phantom limb pain has not been reported previously. **Case Presentation:** We present the case of an 81-year-old man who experienced chronic phantom limb pain twenty years after right lower limb amputation with hip disarticulation. Multiple analgesic options had been tried unsuccessfully. A theatre-based procedure using ultrasound guidance with a curvilinear 6 MHz ultrasound probe was undertaken. Markedly increased echolucency of the fascial plane around the sciatic nerve in the at the right gluteal region was noted. Following this identification, hydro dissection with 5% dextrose (15 mls) was performed to separate the fascial layers, and address perineural inflammation around the sciatic nerve. Following this targeted hydro dissection, the patient experienced substantial improvement in pain in the distribution of the chronic phantom limb pain. At two month follow up there was continued improvement with substantial reduction in pain. No complications were reported. **Conclusion:** This case supports the use of hydro dissection technique in phantom limb pain. Hydro dissection offers an alternative to more invasive interventions and warrants further investigation in the management of chronic phantom limb pain.

Keywords

Hydro Dissection, Phantom Limb Pain, Chronic Pain, Sciatic Nerve, Ultrasound Guided

1. Summary

We present the case of a man in his 80s, who experienced chronic phantom limb

pain for twenty years after right lower limb amputation. Multiple analgesic options over these twenty years proved unsuccessful in the management of the phantom limb pain. Hydro dissection has not been reported in literature as a previously explored treatment option for the management of chronic phantom limb pain.

The patient underwent a targeted hydro dissection with 5% dextrose (15 mls) under ultrasound guidance to his sciatic nerve. The patient experienced substantial improvement in pain in the distribution of the chronic phantom limb pain. At two month follow up there was continued improvement with substantial reduction in pain. No complications were reported.

This case supports the use of hydro dissection technique in phantom limb pain. Hydro dissection offers an alternative to more invasive interventions and warrants further investigation in the management of chronic phantom limb pain.

2. Introduction

Pain after amputation of a limb is common, phantom limb pain (PLP) is clinically defined as the perception of pain or discomfort in a limb that no longer exists. The literature reports PLP affecting 60% to 85% of amputee patients [1]. Although PLP most commonly presents as pathological sequelae in amputee patients, the underlying pathophysiology remains poorly understood. PLP presents along a wide clinical spectrum, with varying degrees of severity and symptoms [2] [3]. Phantom limb pain is difficult to treat and is often not adequately relieved with medical treatment alone [4]. Around 60 treatments for phantom limb pain have been described in literature, yet little data supports an optimal treatment or prevention [5]. Many modalities of treatment exist, including oral neuropathic pain agents, physical therapy, acupuncture, neuromodulation, etc. However, many patients report inadequate relief with these treatments alone [4].

In Ireland, public hospitals registered 3104 hospital admissions with lower extremity amputations during 2016-2019. Of these 32% (1005) were major amputations and most of these amputations were performed on patients with a diagnosis of diabetes [6].

Nerve hydro dissection (HD), is a technique involving the injection of an anaesthetic, saline, or 5% dextrose in water to separate the nerve from the surrounding tissue, fascia, or adjacent structures. The mechanical benefits of HD may relate to release of nervi nervorum or vasa nervorum compression.

Pathologic nerves can be identified by examination or ultrasound visualization. The in-plane ultrasound technique is the predominant and safest method for nerve HD. Five percent dextrose may be favoured as the preferred injectate based on preliminary comparative-injectate literature [7]. The use of hydro dissection in chronic phantom limb pain has not been reported.

3. Case Presentation

A man in his 80s underwent a right lower limb hind quarter amputation with hip disarticulation twenty years previously. Unfortunately, he had experienced chronic

phantom limb pain for twenty years. This has limited his mobility and ability to achieve activities of daily living. His level of pain has had a significant burden on his quality of life, leading to social isolation and depressive features over such an extensive period. Multiple analgesic options had been tried unsuccessfully; the patient was then referred to our pain management centre.

The patient underwent a theatre based, ultrasound guided hydro-dissection of his sciatic nerve with 5% dextrose. Following this targeted hydro dissection, the patient experienced substantial improvement in pain in the distribution of the chronic phantom limb pain. At two month follow up there was continued improvement with substantial reduction in pain and improvement in functioning. No complications were reported.

4. Treatment

A theatre-based procedure using ultrasound guidance with a curvilinear 6 MHz ultrasound probe was undertaken with the patient in a prone position. Markedly increased echolucency of the fascial plane around the sciatic nerve in the right gluteal region was noted. Following this identification, an in-plane ultrasound guided hydro dissection using a pajunk (80 mm, 22 g) echogenic peripheral nerve block needle with 5% dextrose (15 mls) was performed to separate the fascial layers, and address perineural inflammation around the right sciatic nerve in the gluteal region (see [Figure 1](#) & [Figure 2](#)).

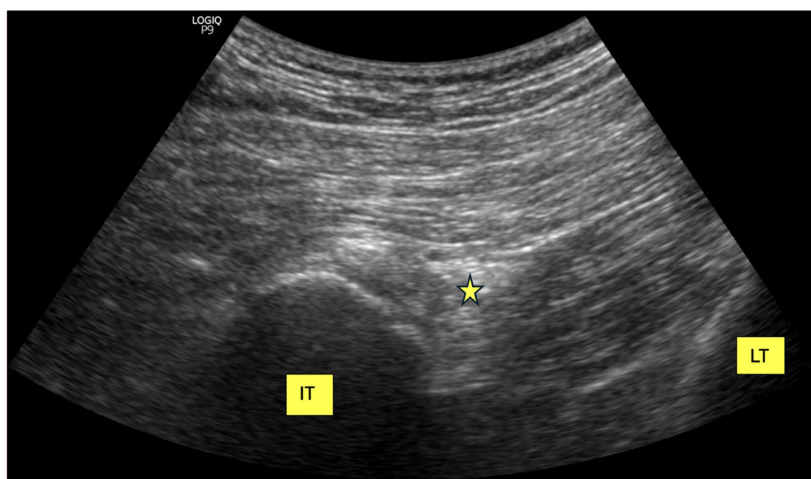


Figure 1. Star represents sciatic nerve. IT is Ischial tuberosity. LT is lesser trochanter.

5. Outcome and Follow-Up

Following this targeted hydro dissection, the patient experienced substantial improvement in pain in the distribution of the chronic phantom limb pain. At two month follow up there was continued improvement with substantial reduction in pain (greater than 50% reduction). Analgesic requirements were decreased. The Quality of Life scale score provides a meaningful way to determine the impact of health care on persons suffering with chronic illness [8]. The patient reported

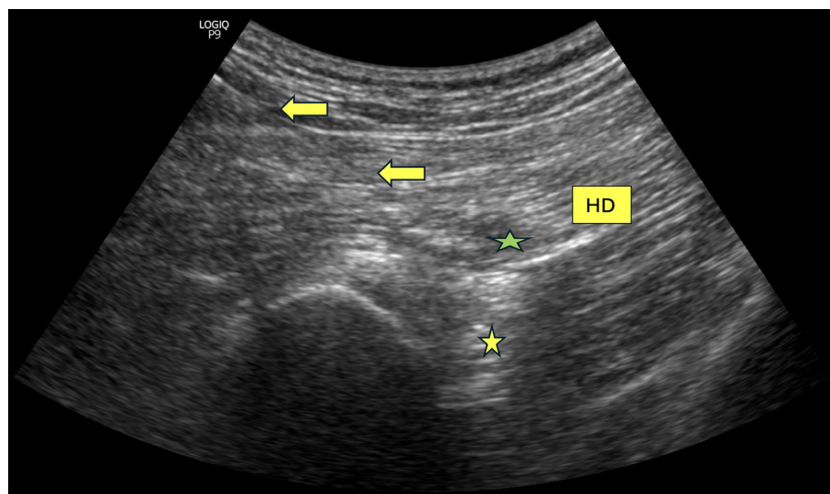


Figure 2. Arrows demonstrate needle insertion from medial to lateral. Hydrodissection of sciatic nerve represented by green coloured star.

improved quality of life scores Quality of Life scale score 25 pre and 85 at two months. The patient reported less impact of pain on daily activities. No complications were reported. Further review was scheduled.

This case supports the use of hydro dissection technique in phantom limb pain. Hydro dissection offers an alternative to more invasive interventions and warrants further investigation in the management of chronic phantom limb pain.

6. Discussion

This case supports the potential role of dextrose hydro dissection as a safe, minimally invasive treatment option for chronic phantom limb pain. Previously Hydro dissection has not been described in literature for the management of phantom limb pain. This case suggests that hydro dissection could be utilised as a viable option in the complex cases where medical management has failed.

With this novel management in a single case, one cannot out rule the placebo effect. Its use is previously unreported and further case series and investigation are needed. Patient follow up is limited and should be expanded to include more comprehensive outcome measures pre and post procedure with further emphasis on long term benefits and follow-up.

Interestingly, recent research did not show a statistically significant benefit for the use of hydro dissection at the time of amputation as a means of reducing the incidence and severity of acute phantom limb pain post amputation [9].

In this case, however, the patient had suffered 20 years of chronic pain and obtained a self-reported improvement in pain and quality of life at 2 month follow up post procedure.

7. Conclusion

This case supports the use of hydro dissection technique in phantom limb pain. Hydro dissection may offer an alternative to more invasive interventions. This is

a single case report and cannot establish efficacy, it warrants further investigation in the management of chronic phantom limb pain.

Author Contributions

Conceptualization, D.H. and A.OD.; methodology, DH.; resources, A.OD, J.D, D.H.; data curation, D.H.; writing—original draft preparation, A.OD; writing—review and editing, All authors. visualization, DH; supervision, D.H.

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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