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CASE SERIES

GLUCOPUNCTURE IN TREATING FASCIA REFERRED ANTERIOR ANKLE PAIN: A BINATIONAL CLINICAL CASE SERIES

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Abstract. *Chronic anterior ankle pain can be referred from trigger points in the fascia of the ipsilateral tibia. One of the new emerging therapeutic options is treating these trigger points with superficial injections of dextrose 5% water (D5W) or glucopuncture. In this article, we present two cases of chronic fascia referred anterior ankle pain from two different countries treated successfully with D5W injections during several sessions. It is worth noting that the pain region itself has not been injected. Glucopuncture may serve as a potential treatment option since it is a safe, simple, and low-cost procedure to be performed by clinicians globally, including those residing in low-income countries. This finding might trigger for further large, multinational clinical studies to confirm its efficacy in chronic fascia pain.*

Key words: *glucopuncture, D5W injection, fascia pain, referred pain, fascia system*

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INTRODUCTION

The fascial system (FS) is a three-dimensional continuum of soft, collagen-containing connective tissue which permeates the entire body and surrounds all muscles, bones, nerve fibers, and organs. The fascia surrounding the muscles are typically described as a part of the myofascial system. It is also present subcutaneously in the entire body, where there is both a superficial and deep layer [1]. Increasing evidence suggests that FS is not a passive structure, but it rather transmits and receives mechano-metabolic information, thus influencing proprioception and movement perception. These properties explain its importance when it comes to body posture and musculoskeletal (MSK) tensegrity [2]. Nevertheless, its role is often overlooked, referred to as the "forgotten tissue" when it comes to treat vague pain patterns and referred pain [3, 4]. There are many treatment options, ranging from physical exercise program to interventional pain therapy, with heterogeneous results [5]. Regional injection techniques are one of the treatment modalities, commonly using local anesthetic with or without steroid [5, 6]. Recently, injection of dextrose 5% water (D5W) solution is widely gaining attention due to its low cost and safety profile. There are mounting evidences of D5W injection, also popularly described as glucopuncture, in treating musculoskeletal cases such as carpal tunnel syndrome, shoulder pain, low back pain, hip joint pain, and fascia pain [7-14]. However, there is still no report of glucopuncture in treating fascia referred pain.

We aimed to report binational case series of glucopuncture in treating chronic unilateral anterior ankle pain referred from fascial trigger points.

CLINICAL CASE PRESENTATION

Clinical case 1

A 62-year-old Belgian man suffered a continuous pain in the front side of his left ankle for 5 years. The pain region size of about 10 cm by 2.5 cm (4 x 1 in) was reported (Fig. 1). The pain was always reduced with walking and worsened with sitting still. The patient's occupation was window cleaner. He also practiced mountain climbing and indoor climbing for several decades. His ankle pain started gradually around his 18 years without a specific reason or cause. The pain intensity varied between 0/10 and 3/10 on a numerical rating scale (NRS), depending on stress and body position. There was no history of overuse, accident or fall preceding the ankle pain. The patient consulted several clinicians in different hospitals over the years, but they never attained a positive outcome. For the last 5 years, the pain persisted continuously.

On his first visit the pain intensity was 3/10. The pain region was located on the anterior side of the ankle. It was rather vague and sometimes relocated a few centimeters around, suggesting a typical sign for referred pain. No pain points were found in that particular pain region in the ankle during physical examination. As a result of these findings, it was hypothesized that the patient's pain could be referred from a trigger point at a distance. Examination of the ankle, knee and hip was unremarkable and did not indicate any abnormalities. Further examination revealed several fascial trigger points (FTPs) in the tibial area. Only a very light pressure was required to evoke the pain, which means that only shallow injections would be required. The patient received 6 injections with D5W (6 x 1 mL) in these FTPs. The angle of injection was the tangential approach, at an angle of about 10 to 30 degrees to avoid injecting into the underlying deeper structures. Since it was a chronic lesion, the patient was explained that there could be a temporary worsening on the next day. The patient was advised to present for a second session one week later. On the second visit, he reported pain reduction from 3/10 to 1/10, a few days after the first session. It was the first time he ever experienced such an improvement in the last 5 years. On the third visit, the patient reported reduction in pain from 1/10 to 0/10, a few days after the second session. Follow-up after one month revealed no relapse of complaints.

Clinical case 2

A 60-year-old Indonesian woman presented to internal medicine clinic with recurrent unilateral ankle pain, which started 4 years prior. It was a vague regional pain around the anterior side of left ankle, with no specific tender points at that area (Fig. 3). The pain ranged from 3/10 to 5/10 on NRS, depending on daily activities. No numbness or burning sensation was reported. She was a housewife and was not engaged in any physical sport. There was no history

Fig. 1. The patient showing the pain region

Fig. 2. Six spots of injection

of physical trauma or accident. She was consulted for her pain at other clinics previously; however, no significant improvement was achieved after taking several oral pain medications and physiotherapy. Her medical comorbidities were type 2 diabetes mellitus (A1c was 7.3% during her last check up in the end of 2023) and hypertension with moderate level of adherence in taking the medications. Her body mass index was 19.83 kg/m^2. Physical examination showed no deformities and no significant limitation in range of movement at the ankle joint was perceived. Bedside ultrasound examination showed no pathologic finding at her left ankle. Further examination revealed several FTPs at her left tibial area. After obtaining the patient's informed consent, D5W was injected using 26G needle in 5 FTPs with a volume of 1 mL in each point without additional local anesthetic or steroid (Fig. 4). The patient reported reduction in pain after the injection. No oral analgesia was prescribed. In the same visit, her oral antidiabetic and antihypertensive drugs were also well arranged and she was educated to achieve good compliance in taking the medications. In her second visit two weeks apart, her pain was around 1/10 to 2/10 and she received similar D5W injection. The pain was alleviated; hence, no subsequent pain treatment control was scheduled, except in the case of recurrence of pain. She visited the clinic 2 months with no recurrence of pain. She kept taking her antidiabetic and antihypertensive drugs routinely since the first visit, resulting in normal blood pressure and optimal blood glucose control (repeated A1C examination was 6.3%).

DISCUSSION

The FS is a very well innervated multidirectional network, which runs throughout the whole human body, playing an essential role in posture, balance, and biotensegrity. The FS consists of two layers of connective tissues, namely the superficial and deep fascia. The lack of specific clinical symptoms, laboratory, and radiology examination might result in physician unawareness of its existence in daily practice, especially when manifesting as vague referred pain [13, 14]. This phenomenon gave rise to the term "fasciatome", which indicates the region of referred pain according to the organization of the fascial anatomy and differentiates it from dermatomal pain distribution [16].

Our case series interestingly reported the success of glucopuncture in treating superficial fascia in somatic referred pain (SRP) in 2 patients residing in different countries. The superficial fascia is an essential network layer interconnecting different areas of human body; therefore, any injuries might induce regional and referred pain as shown in our cases [2, 12]. It is also worth noting that the pain region itself was not injected. The D5W injection was introduced by Kim et al. in Korea. They found that D5W injections were superior to local anesthetics or normal saline injection for treatment of myofascial pain [17]. Later on, the use of D5W solution has received rapid increasing popularity over the last years due to low cost and morbidity associated with the technique [18]. Glucopuncture exerts its effect through stabilization

Fig. 3. The patient showing the pain region

Fig. 4. Five spots of injection

effects on neural activity, inhibition of transient receptor potential vanilloid receptor-1 (TRPV1), blocking secretion of substance P and calcitonin gene related peptide (CGRP) [19]. It also downregulates the expression of pro-inflammatory cytokines such as IL-6, IL-1β [20]. The injection technique may be performed under ultrasound guidance or landmark-guided palpation. The latter is suitable in treating superficial fascia and relevant when ultrasound is not accessible such as in low-income countries. It is quite a simple technique, usually using 25G, 26G, or 27G needle injected tangentially under the skin to reach the superficial fascia. The volume can be tailored according to each patient's need [13]. The use of 5% concentration has almost similar osmolality with normal saline; hence, it is less painful than hyperosmolar glucose injection, which is used in prolotherapy. Moreover, it has no toxic effect to the tissue, and no major adverse effects were reported to date [20]. Apart from a randomized controlled trial (RCT) of D5W in treating carpal tunnel syndrome by Wu [21], there are no large RCTs yet comparing superiority of glucopuncture with platelet-rich plasma or steroid injections. Our patients reported no harmful side effects of glucopuncture, even for diabetic and hypertensive patients. Nonetheless, large RCTs are required to confirm these findings.

CONCLUSION

Pain referred from fascial trigger points is commonly underestimated in daily clinical practice. Glucopuncture might offer a safe, clinical and cost-effective potential treatment modality in FS pain. Further multinational, large scale studies are needed to confirm the efficacy of glucopuncture globally in treating musculoskeletal pain, including FS pain.

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Ethical statement: *This study has been performed in accordance with the ethical standards as laid down in the Declaration of Helsinki*

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