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Research article

Dextrose Prolotherapy Treatment in De Quervain Tenosynovitis: Case Reports

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Abstract

De Quervain tenosynovitis is a condition commonly found in patients presenting with wrist pain. The initial treatment typically involves rest, splinting, medication, and physical modalities. However, some patients do not show a favorable response to these treatments. In this report, we present two patients with chronic tenosynovitis of the first dorsal compartment whose condition did not improve with initial treatment. Both patients received ultrasound-guided injection with 1.5-2 ml 25% dextrose therapy (50% dextrose 0.75-1 ml + 1% lidocaine 0.75-1 ml) as their treatment. Their condition significantly improved, eliminating their symptoms to the point of almost complete resolution, allowing them to be able to return to their daily activities. Therefore, dextrose prolotherapy could be considered as a treatment option for de Quervain tenosynovitis.

Keywords: De Quervain disease, tenosynovitis, prolotherapy, dextrose, case reports

Introduction

De Quervain tenosynovitis is a stenosing tenosynovitis affecting the first dorsal compartment of the wrist.[1] It causes patients to experience pain on the radial side of their wrist and is often exacerbated during grasping and ulnar deviation of the wrist. De Quervain tenosynovitis is a common condition with a prevalence ranging from 0.49-3.7% in the general population, most frequently affecting women than men.[2-4] Various treatment options can be used in de Quervain tenosynovitis, with conservative management being the primary approach. This involves advising patients to limit wrist usage, prescribing non-steroidal anti-inflammatory drugs (NSAIDs), applying thumb splints[1] and, using physical modalities.[5-6] However, not all patient's symptoms improve with conservative management and may need injection therapy as their treatment. Steroids are the predominant injectable treatment, although there are side effects in some cases.[7]

Over the past few years, there has been an increasing use of dextrose prolotherapy for treating chronic musculoskeletal pain. Dextrose prolotherapy induces inflammatory response at the injection site to promote natural healing and regeneration of connective tissue. The concentration of dextrose use in clinical practice typically ranges from 12.5% to 25%, with higher concentrations associated with enhanced tissue healing but also provoking greater inflammation. Several studies support the use of dextrose prolotherapy in the treatment of tendinopathy, such as lateral epicondylitis, rotator cuff injury, achilles tendinosis, and

patellar tendinopathy. However, evidence regarding its effect on de Quervain tenosynovitis remains limited.[8] This report aims to propose the use of dextrose prolotherapy in patients with de Quervain tenosynovitis.

Method

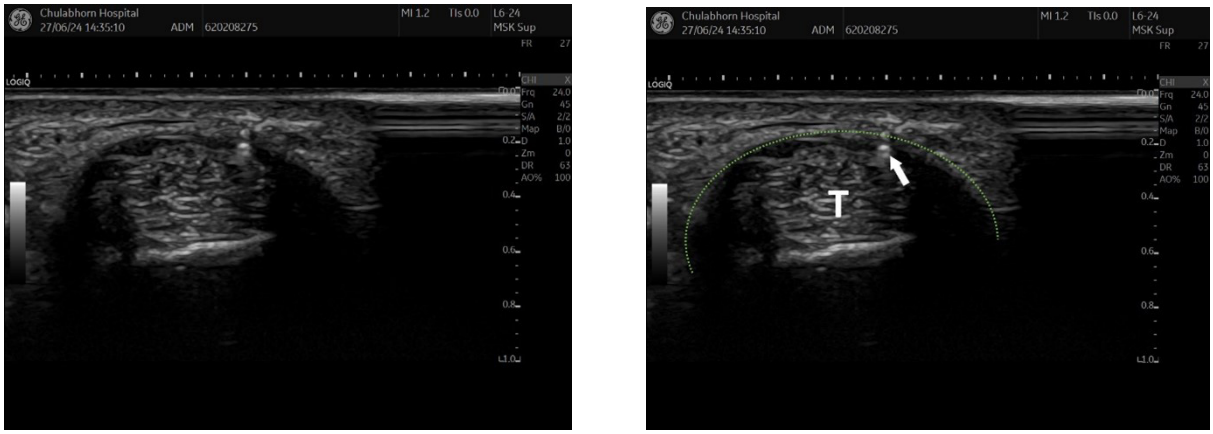
This case report follows the Case Reports (CARE) guidelines.[9] The study has been granted exemption from ethical review by the Institutional Research Ethics Board.

Case presentation 1

A 57-year-old female patient with a medical history of thyroid cancer, which has been in remission since undergoing surgery five years ago, presented with right wrist pain for the past 1 year and 3 months. Her symptoms began after a fall when she landed on her wrist. She was diagnosed with de Quervain tenosynovitis and received physical therapy with laser, shockwave, and exercise therapy as part of her treatment regimen. She was also prescribed NSAIDs and pregabalin 75 mg/day. Additionally, she underwent two steroid injections with 10 mg triamcinolone acetonide into the first dorsal compartment twice, 6 months and 10 months ago. However, her symptoms only improved for a period of 2-3 months after the injection. She continued to experience persistent wrist pain with use. Physical examination revealed marked tenderness over the radial styloid and a positive Finkelstein test. Further magnetic resonance imaging findings showed no evidence of flexor or extensor ligament tear in the wrist.

The patient underwent treatment with ultrasound-guided injection of 1.5 ml 25% dextrose therapy (50% dextrose 0.75 ml + 1% lidocaine 0.75 ml). The skin was then sterilized with an antiseptic agent, and a linear array transducer probe was used to scan the marked area in the short axis (Figure. 1). We used an out-of-plane approach injection by injecting a 25-gauge needle into the first extensor compartment, with the needle tip positioned between the tendon and the sheath (Figure. 2). Four injections were administered with a one-month interval between each injection. She experienced minimal discomfort at the injection site for a few days following each injection and no other side effect was reported. Her symptoms gradually improved to the point that she experienced minimal pain and was able to discontinue NSAIDs and pregabalin. A one-year follow-up examination post-injection revealed no recurrence of pain.

Figure 1. Transverse probe position over the 1st dorsal compartment of wrist with the out of plane injection technique.



(A) (B)

Figure 2. (A) Axial view of the 1st dorsal compartment of wrist (B) Tendon slip (T) which abductor pollicis tendon and extensor pollicis brevis tendon slips could not be individually identified, tendon sheath (green line), and needle tip (white arrow).

Case presentation 2

A 57-year-old female patient with no significant medical history presented with left wrist pain that had persisted for the past 1 year and 3 months. The pain gradually worsened over time with no history of trauma. She was diagnosed with de Quervain tenosynovitis and received treatment of physical therapy with laser and NSAIDs consistently. Moreover, she received steroid injection with 10 mg triamcinolone acetonide into the first dorsal compartment 5 months ago, but the effect only lasted for 3 months. Physical examination showed marked tenderness over the radial styloid and a positive Finkelstein test. Further ultrasound findings were unremarkable with no tendon abnormalities.

The patient declined further corticosteroid injections and was not yet willing to undergo surgery. As an alternative, she received an ultrasound-guided injection consisting of 2 ml of 25% dextrose solution, prepared by combining 1 ml of 50% dextrose with 1 ml of 1% lidocaine. Following the initial dextrose injection, the patient reported a 50% reduction in pain and subsequently decided to continue with dextrose prolotherapy. She received a total of 3 injections of dextrose therapy with an interval of 1-2 months apart. The patient reported minimal discomfort at the injection site for a few days following each injection and no other side effect was noted. Four-month after the final injection, at a follow-up visit, her symptoms had significantly improved to the point that she was able to return to her daily activities without disruption from pain.

Discussion

The standard treatment for de Quervain tenosynovitis typically begins with conservative treatment, involving rest, splinting, and use of NSAIDs.[1] Physical modalities such as ultrasound, laser[5] and shockwave[6] are also used to alleviate patient discomfort. For patients who do not respond to conservative treatment, physicians often turn to use steroids as their next step management by injecting them into the first dorsal compartment of the wrist. Studies have shown that steroid injections are effective in reducing pain; nonetheless there are some patients who experience side effects from the use of steroids such as flare reaction, skin hypopigmentation, superficial thrombophlebitis,[7] fat atrophy and tendon rupture.[10]

Over the past two decades, there has been an increasing trend of using dextrose prolotherapy to treat chronic musculoskeletal pain. Previous research has shown that dextrose prolotherapy is effective in treating various painful conditions including tendinopathies, knee and finger joint osteoarthritis and spinal or pelvic pain resulting from ligament dysfunction.[8]

However, the use of dextrose prolotherapy in treating de Quervain tenosynovitis is still limited. Chen and Yuan[11] have reported a case of a 62-year-old female patient presenting with right wrist pain and was

diagnosed with de Quervain tenosynovitis with intersection syndrome. Despite receiving steroid injections initially, her pain improved for only 2 months, therefore she subsequently received an injection of 4 ml mixture of 1% lidocaine and 12.5% dextrose. Following the injection, her pain score reduced for approximately 2 months, thus she repeated the injection every 2-3 months. Siampa and Tan[12] have reported a case of a 49-year-old female patient with right wrist pain for the past 1.5 years. She was diagnosed with de Quervain tenosynovitis and has underwent dextrose prolotherapy as part of her treatment. This study concluded that the use of dextrose prolotherapy provides a favorable prognosis for relieving symptoms. Both cases have not reported any serious adverse effects from the use of dextrose prolotherapy. In 2024, Zora and Bayrak[13] have conducted a retrospective study comparing the injection of 4 ml of 12.5% dextrose prolotherapy with steroid injection in patients with de Quervain's tenosynovitis. The results showed that dextrose prolotherapy was effective in reducing pain and improving functional scores at both 2 and 6 weeks after injection. However, steroid injection resulted in significantly greater pain reduction and functional improvement compared to prolotherapy at both time points.

The outcome of this case report corresponds with three previous ones, indicating that dextrose prolotherapy effectively reduces pain in de Quervain tenosynovitis. The discrepancy between this report and the previous ones lies in the concentration and volume of dextrose used and follow-up period. These two cases use 25% dextrose at 1.5-2 ml and a longer follow-up period up to a year post-injection, allowing for a more comprehensive assessment of the treatment. This ensures that dextrose prolotherapy may have a long-term effect in treating de Quervain tenosynovitis. Regarding the side effects of dextrose prolotherapy, they are consistent with earlier studies.[11-13] Only post-injection soreness lasting 2-3 days has been reported, with no other serious adverse events.[8]

The cause of de Quervain tenosynovitis can arise from various causes such as trauma, increased frictional forces, anatomical abnormalities, biomechanical compression, repetitive microtrauma and inflammatory diseases. These factors lead to thickening of the extensor retinaculum in the first dorsal compartment of the wrist, resulting in an increased frictional force on the abductor pollicis longus and extensor pollicis brevis tendons during movement. This eventually results in degenerative changes causing subsequent pain.[1]

Even though the mechanism of dextrose prolotherapy still remains controversial, several studies have found that hyperosmolar dextrose stimulates tissue repair by triggering an inflammatory cascade that promotes connective tissue healing.[8,14] In vitro studies have demonstrated that increasing extracellular dextrose concentration stimulates the secretion of multiple growth factors, including platelet-derived growth factor, transforming growth factor β, epidermal growth factor, basic fibroblast growth factor, insulin-like growth factor, and connective tissue growth factor. These growth factors contribute to the repair and strengthening of connective tissues. Additionally, studies indicate that dextrose injections promote ligament enlargement, tendon hypertrophy, extracellular matrix production, fibroblast proliferation, and repair of articular cartilage defects.[8] It may be possible that the reduction of pain experienced by patients in this report could be resulted from enhancing tendon healing through the mechanism of dextrose prolotherapy.

Conclusion

Dextrose prolotherapy may be considered as an option for treating de Quervain tenosynovitis. However, there are limited reports of its use in de Quervain's disease. Further research, ideally through randomized controlled trials or cohort studies is needed to establish stronger evidence on the use of dextrose prolotherapy in de Quervain tenosynovitis patients.

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