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Review Article of Corticosteroid Injections Use in Acute and Chronic Lateral Epicondylgia. An Update of the Currently Available Literature

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Abstract

Purpose: The aim of this study is to assess the effectiveness of corticosteroid injections (CSI) in treatment of acute and chronic Lateral Epicondylgia (LE) by summarising all recent updates related to this injection in LE.
Conclusion: Corticosteroid injections have a long record of use in LE, and are frequently requested by patients. However, this review could present a strong argument against the use of CSI, particularly for chronic LE, since no long term benefits were found. This concurs with other reviews. While CSI have a well-documented short-term benefit, they appear to have a detrimental effect with longer follow up, such as an increase in recurrence rate.

Keywords: Lateral epicondylaligia; Tennis elbow; Steroid injection; Corticosteroid; Management

Introduction

Tennis Elbow or LE is a commonly made diagnosis for orthopaedic surgeons [1]. It has a prevalence of at least 1.7 % [2]. People between 30 to 60 years of age are the most commonly affected [3,4].

Pathogenesis, nomenclature, and treatment options of LE are linked to much controversy [5]. However, the diagnosis of LE is an easy one to make [6].

There has been no consensus on the best way of management with over 40 different treatment options have been described, with CSI being the most predominantly injected material to treat LE particularly when initial activity modification, NSAIDs and physiotherapy do not work [6,7]. Fortunately, LE is largely a self-limiting condition, and symptoms seem to resolve between 6 months to 2 years in most patients [8]. However, 5 to 10% of patients develop chronic symptoms and eventually might undergo invasive management such as surgery [5].

Methods and Databases Utilised

Different databases including The Cochrane Library, MEDLINE, Web of Science, Science Direct and PubMed were utilised to retrieve the relevant resources. When "lateral epicondylitis", "tennis elbow" and "steroid injection" "management" terms used in the different search engine mentioned above, thousands of articles have been revealed which were narrowed down by combining these terms together. The articles, preferably Randomised Controlled Trials (RCT) or Systematic reviews which have studied CSI as a treatment in acute and chronic LE cases in the last ten years have been critically evaluated and summarized to obtain the most recent updates about CSI use in acute/chronic LE.

Discussion

Mechanism of action

How CSI work in LE cases is still a controversial issue [9]. Steroids exhibit anti-inflammatory action. They inhibit fibroblast proliferation, angiogenesis, and formation of granulation tissue. They also interfere with collagen precursor ground substance sulfation and collagen repair [10]. Signs of inflammation such as hyperaemia (vascularity by US), and tendon thickness have reported to be minimised by CSI use [11]. However, the lack of inflammatory markers in LE by histopathological studies makes the concept of inflammation less acceptable [11,12]. The degenerative picture is increasingly accepted because researchers demonstrated aniofibroblastic changes in the examined specimens obtained from LE patients at surgery time [13]. Nevertheless, it could plausibly be argued that because histopathological studies involve recalcitrant cases of LE, the documented histological features represent the end stage of a process that commences with an early phase of inflammation, and samples could pathologically be dominated by chronic degenerative changes [14,15]. Others explain the analgesic actions of CSI by the effects on the calcitonin gene-related peptide, neuropeptides, and substance P, which are increased in tendinopathy [16]. In addition, some argue that, CSI is associated with strong placebo effects [9]. Future studies using the new different bio techniques are warranted to investigate the actual mechanism of action of CSI in the treatment of LE.

In summary, the precise mechanism of action of CSI in LE is still undefined, and research is ongoing.

Formulations and injection techniques

Different formulations that differ in their half-life, water solubility, and their propensity to form particulate aggregates [17]. Nevertheless, the clinical outcomes are usually the same, despite the theoretical differences between different formulations [18]. Theoretically speaking, steroids that have a long-duration of action and less soluble

formulations, such as Dexamethasone, could lead to increasing risk of complications such as skin atrophy, particularly with repeated injections [17].

Local Anaesthetics (LA) have been utilised with CSI in different concentrations and forms, but lidocaine (1-2 %, without epinephrine) is utilised most commonly [19]. Nevertheless, researchers have not noticed any considerable difference in outcomes based on the concentration or type of local anaesthetic used [19]. In addition, lidocaine has been shown to have inhibitory effects on the proliferation of tenocytes in an in vitro study [20]. Furthermore, LA use could confound outcomes achieved by CSI, and improvements could be attributed to LA use [20].

A peppering technique is a commonly performed with CSI, in which a clinician perform a single skin entry with 5 to 7 peppering penetrations [21]. A study comparing the single-injection with the peppering technique was conducted [22]. They concluded that the single-injection technique has a better outcome than the peppering technique. However, participants of this study were not blinded to the technique received and there was a high loss of follow up. This is weighed against other RCTs that demonstrated improvements in pain scores, Disabilities of the Arm, Shoulder and Hand (DASH), and clinical findings in patients treated with the peppering technique [23]. It has been suggested that the peppering technique will lead to bleeding and create channels in the degenerative myxoid tissue of LE which could stimulate healing [23].

The steroid is usually given either at the ECRB tendon or the muscle itself, with no significant difference between the two sites [18]. US-guided or empirical injections could be given as there is no strong evidence in the literature to recommend one technique over the other, and further studies are required to investigate this issue [19].

The number of CSI treatments to be given to an LE patient is another topic debated in the literature. Most researchers allow the use of 2 to 3 injections at two week intervals. However, up to 20 injections have been reported, obviously with increasing side effects such as skin atrophy and depigmentation [10].

Post-injection policies are different among different researchers and clinicians, it could consist of different physiotherapy programmes, different use of medications, and temporary avoidance of strenuous activities [19]. These variables might confound the results achieved by some researchers. No studies have been conducted to compare explicitly post-injection protocols [24].

Effectiveness of csi against other common treatment options

csi vs. placebo

A study [5] conducted a level 1 study with a total of 66 patients randomized to an injection of dexamethasone with lidocaine vs. lidocaine alone. They concluded that, there were no significant differences between the groups in the grip strength, pain, or the DASH at 1 and 6 month follow up. Nevertheless, the high-attrition rate limited the statistical power of the trial.

Corticosteroids vs. physical therapy vs. “wait and see”

198 patients with LE symptoms were randomised into one of three treatment approaches, consisting of a single CSI, physical therapy, or a “wait and see” approach [13]. At the 6-week interval, injections were superior to “wait and see” and physical therapy in pain-free grip strength with 78% treatment success rate in the injection group. However, at 1 year, the CSI group was significantly worse than physical therapy by all of the measured outcomes. Furthermore, there was a high recurrence rate in the CSI group, with 72%, compared to only 8% and 9% to physical therapy and wait and see groups respectively. These results were also obtained in other trials [24].

These results confirm the short-term benefits of CSI in comparison to physical therapy or wait and see policies. However, these two policies demonstrated increasingly better results at long-term [19,25].

CSI vs. autologous blood injections (ABI)

A trial in 2010 was conducted to compare CSI and ABI using different outcome measures [4]. They concluded that, ABI demonstrated improved outcomes at both 4 and 8 weeks in comparison to CSI. However, only pain levels were decreased at 8 weeks in CSI group.

This could confirm the short-term benefits of CSI, and support the notion that blood-derived growth factors could be the reason behind the progressive improvements noticed in ABI group.

CSI vs. platelets rich plasma (PRP) injections

100 patients randomized to either a PRP or a CSI injection using a peppering technique [26]. After 2 years, both groups demonstrated significant improvement over baseline in both VAS and DASH scores. However, patients treated with PRP had significantly better DASH and VAS scores than the CSI group at the 2-year follow up. It could be convincingly argued that, LE has a favourable natural history, with more than 80% can improve in the first year from the start of their symptoms [27].

Cost analysis

A PRP treatment costs approximately twice as much as CSI, and surgery for LE is twice the cost of a PRP treatment and thus 4 times as expensive as CSI. However, this cost analysis did not include the cost of re-interventions, which are higher after CSI in comparison to PRP and surgery [26].

This cost analysis does not also include all the socioeconomic costs of a recurrence, such as time off work, and the extra efforts in re-interventions required from the patient and doctor [26].

Complications

Overall, CSI is a safe injection and no serious events such as hospitalization were reported. Temporary pain at the injection site was the most common side effect reported. Skin atrophy, tendon rupture, skin discolouration, and depigmentation were also reported, but these are rare complications.

Future recommendations

Studies that employ recent bio techniques to ascertain the pathological picture of LE. Furthermore, large and long term studies that compare different injection modalities such as PRP, CSI and autologous bloods in the treatment of both acute and chronic LE. In addition, the potential benefits of combining different treatment modalities.

Conclusion

Lateral epicondylitis of the elbow is an enthesopathy of the common extensor origin. It is a very common diagnosis made by health practitioners and has favourable national history. Surprisingly though, this minor self-limiting ailment is linked too much controversy with respect to nomenclature, pathophysiology, and management.

Although, the pathogenesis of lateral epicondylitis has not been determined with any certainty. There is a spectrum from inflammation to necrotic tissue. With this in mind, success of treatment likely correlates with the type and the extent of a disease process in addition to treatment modality applied. Corticosteroid injection has proven to be effective particularly in short term, however long term effects are lacking. This needed to be thoroughly discussed with patients taken into account the possibility that the recurrence of symptoms could occur when adopting this treatment. Furthermore, peppering could bring superior result and can be utilised. Nevertheless, the routine use of corticosteroid injections should be discouraged, and the injections should be limited only to those cases when short-term pain relief is desirable in order to increase patient compliance with a long-term rehabilitation process.

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