BOTULINUM TOXIN IN THE TREATMENT OF TENNIS ELBOW- A SYSTEMATIC REVIEW AND META-ANALYSIS: A PRELIMINARY STUDY.

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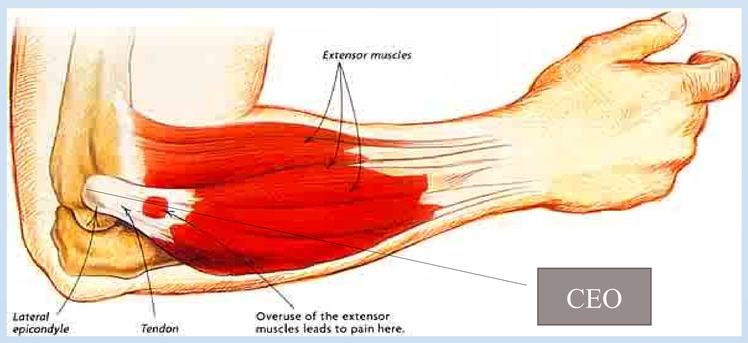
Background

Lateral epicondylitis (LE), commonly known as 'tennis elbow', is def ned as pain at the lateral epicondyle of the humerus and increased pain at this site on resisted wrist extension.[1] The primary histopathologic feature is a degenerative tendinopathy involving the common wrist extensor origin, particularly the origin of extensor carpi radialis [2]. Figure 1 displays the common extensor origin at the lateral epicondyle of the humerus.

LE affects up to 3% of the population with peak incidence occurring at 40-50 years of age.[3] In the UK, the Netherlands, and Scandinavia the incidence of lateral elbow pain in general practice is approximately 4-7/1000 people a year.[4,5,6]

Several treatments have been advocated in the management of LE and recently the use of botulinum toxin A has been examined. Botulinum toxin binds to specif c receptors at the presynaptic cholinergic end plate membrane and blocks acetylcholine release.[7] Therefore, for the treatment of tennis elbow an injection is given to provide temporary paralysis of the affected muscle, thereby removing the tensile forces acting on the common extensor origin (CEO). These effects are reversible after three to four months[8], which may provide adequate time for tissue healing of the lesion at the lateral epicondyle.[9]

Figure 1: Common Extensor Origin (CEO)



Aim of study

The aim of this study was to analyse research literature that has examined the eff cacy of botulinum toxin injection in comparison to placebo or other non-botulinum toxin interventions in the treatment of lateral epicondylitis.

Methods

Def nitions and inclusion criteria

The authors used methods based on the PRISMA guidelines for the reporting of systematic reviews and meta-analyses to conduct this review. Types of *study design* included were randomised controlled trials (RCTs). *Participants* in the studies included were those who presented with LE as def ned as 'pain at the lateral epicondyle of the humerus and increased pain at this site on resisted wrist extension' for greater than three months. The i*ntervention* under investigation was the effect of botulinum toxin on LE symptoms and the *comparison* used was a placebo control group or another control group receiving other non-botulinum toxin interventions. *Outcome* measures included were those that focused on impairments of the upper limb, activity and participation.

Literature search

A computerised literature search was completed using the following databases: Pubmed, Cinahl, EMBASE, MEDLINE and the Cochrane Library. The databases were searched using a combination of the following key words: "tennis elbow" OR "lateral epicondylitis" OR "epicondylitis, lateral humeral" [MeSH term] AND "botulinum toxin type A" OR "toxin, botulinum A" OR "botox" OR "dysport". The search was supplemented by hand searching the references of relevant articles.

Methodological quality

Two reviewers independently documented the methodological quality of the studies and extracted the relevant data. Studies were assessed in the following domains to eliminate bias: sequence generation; allocation concealment; blinding of participants, personnel and outcome assessors; incomplete outcome data; selective outcome reporting and any other sources of bias.[10] Any disagreements in the quality of the studies were resolved through discussion between the reviewers.

Data extraction and analysis

The following data was documented for each study: authors, number of participants in intervention and control groups, results of the study and the outcome measures used. For the purpose of the meta-analysis, scores (mean and standard deviation) on the relevant outcome measures were recorded at f rst assessment, or pre-injection, and again at the 12 week post-injection assessment point. Authors were contacted for clarif cation or to provide any further follow-up.

The meta-analysis was computed using RevMan. The impact of sample size was addressed by estimating a weighting factor for each study, and assigning larger effect-weights in studies with bigger samples. The random effect model was applied due to study heterogeneity.

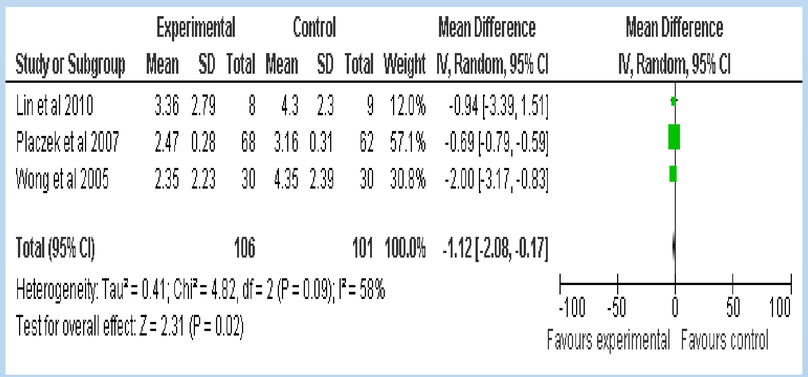
Preliminary Results

The literature search yielded a total of 65 articles, of which 31 were eliminated on the basis of title or abstract. Five of the remaining 34 papers met the inclusion criteria. Three studies compared the effects of botox injection to a placebo (saline solution), one study compared botox to a surgical intervention and one study compared botox to a corticosteroid injection.

Visual Analogue Scale

In the three studies that compared the effect of botox to a controlled saline solution, the primary outcome in all studies was self reported pain, as measured on the Visual Analogue Scale (VAS). However, data could not be retrieved from one of the studies. The VAS was also used in the study where botox was compared to the use of corticosteroid injections. Pooling the data from three studies (n=207) that reported a reduction in pain, as measured by the VAS, indicated that the point estimate for the difference in pain reduction between the groups was -1.12 points, in favour of the botox group, with a 95% CI (-0.17 – -2.08), p=0.02.

Table 1: VAS Scores at 12 weeks



Grip Strength

Grip strength was also measured at baseline or pre-injection and at 12 weeks post treatment using a Jamar dynamometer in four studies. It was not possible to do a pooled analysis with this data set due to the variability the format of results reported. However, the narrative f ndings from the studies suggest that the use of botox injections when compared to other non-botox interventions had no impact on grip strength at the 12 week assessment point.

Discussion

The results of the meta-analysis support the hypothesis that botox toxin injections reduce short term pain associated with LE when compared to control groups. While a meta-analysis was not possible for the secondary outcome measure, grip strength, the f ndings from the individual studies suggest that this intervention has no impact on grip strength of the affected hand. However, there are limitations to the studies included in the review. Firstly, the small number of participants (n=207) included in the pooled analysis limits the wider application of the f ndings. Furthermore, participants were not recruited from a General Practice setting and may not r=epresent those that present to their GP with the signs and symptoms of LE. The studies were conducted in tertiary settings where physicians may have different skills and experience in injecting elbows.

The narrative review points the way for future work in this area. There is a requirement for larger, multi-centre RCTs that examine the impact of botox injections on function and measures of participation. Furthermore, the long term impact of this treatment has not been examined in the majority of the studies and warrants further research.

Conclusions

Botulinum toxin injections appear to be clinically effective in reducing pain in the short-term in individuals with chronic tennis elbow. There is no evidence to suggest that botox has any impact on grip strength. The methodological quality of the included studies needs to be assessed in detail in future work.

Clinicians need to make decisions regarding treatment of LE patients with botox on an individual basis evaluating the benef ts and risks of treatment for each individual case.

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