

**Espandar R, Heidare P, et al. Use of anatomic measurement to guide injection of botulinum toxin for the management of chronic lateral epicondylitis: a randomized controlled trial. CMAJ 2010;182(8):768-773.**

Design: Randomized clinical trial

Population/sample size/setting:

- 48 patients ( 44 women, 4 men, mean age 44) treated for lateral epicondylitis (LE) in the department of sports medicine at the Imam Khomeini Hospital in Tehran
- Inclusion criteria were age 18-70, at least 6 months of symptoms, pain in lateral epicondyle provoked by pressure on epicondyle, passive flexion of wrist, active extension of wrist against counterforce, or extension of third finger against counterforce
- All patients had completed a course of physiotherapy or steroid injection or both
- Exclusion criteria included systemic disease, medial epicondylitis, bilateral LE, arthritis, neurologic deficits (including radial nerve entrapment), current enrolment in physiotherapy course, previous adverse reaction to botulinum toxin, having hobby or job requiring extension of fingers or wrist

Main outcome measures:

- Randomized to injection with 1 ml of 60 U of botulinum toxin A (n=24) or 1 ml of saline (n=24)
- Injection was placed using insulin syringes at a site 1/3 of the distance from the tip of the lateral epicondyle to the posterior midpoint of the wrist, in order to have a high probability of affecting the function of the posterior interosseous nerve
- Primary outcome was pain at rest 4 weeks after injection; this showed an advantage for the botulinum group (28.4 points of improvement vs. 7.6 points of improvement for saline group)
- Other repeated measures were taken as secondary outcomes; pain at rest continued to show an advantage for botulinum at 8 weeks and at 16 weeks (average final pain score 3.9 vs. 30.6 for saline group)
- Pain score during maximum grip showed a smaller advantage for botulinum at 4 weeks (group difference of 5.3 points,  $p=0.22$ ); for pain during maximum pinch the difference was 15.4 points ( $p=.004$ )
- Maximum grip strength decreased in the botulinum group from 17.4 kg at baseline to 13.1 kg at week 8, then recovered to 17.1 kg by week 16; the saline group grip strength showed only small and nonsignificant fluctuations during the 16 weeks of observation
- In the botulinum group, all but one had weakness in extension of the 3<sup>rd</sup> and 4<sup>th</sup> fingers at week 4 that interfered with work; the weakness resolved by the end of the study

- Other adverse reactions included pain at injection week during weeks 0-4 (n=10 for botulinum group and 4 for saline group); 8 botulinum patients reported a subjective feeling of muscle spasm at injection site

Authors' conclusions:

- Injection of botulinum toxin based on precise anatomic measurement of the forearm significantly reduced the intensity of pain at rest in patients with LE
- However, the same injections caused a decrease in grip strength and also resulted in weakness of the extensors of the fingers (which may have compromised the blinding of the patient to the injection received)
- Because of extensor weakness, botulinum toxin should not be used to treat LE in workers whose jobs require finger extension
- Effect of botulinum toxin beyond 4 months is not known

Comments:

- Well thought-out and executed study; care was taken to conceal allocation, to administer the injections, and to measure pertinent outcomes a several time intervals
- Although the sample size is rather small (and nearly all women), the follow-up was 100%
- Exclusion of patients whose jobs require finger extension was part of the study design; this caution is appropriate but does limit the ability of the study to measure functional consequences at work of the injection
- Considerable attention was paid to exact technique (including the expected area of diffusion of the botulinum injection), underscoring the need for the injection to be done by experienced clinicians
- With 24 patients in each group, a difference has to be fairly large (about 0.8 standard deviation) in order to have an 80% chance of being detected with a Type I error of 0.05
- The trade name of the botulinum toxin is not reported (the potencies of different trade names differ in the USA); the study was done in Iran, where the manufacturer may not be the same as in Europe or North America

Assessment: High quality to support a statement that botulinum toxin can alleviate the pain of LE in the short term, with significant but reversible extensor weakness.