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Do Cortisone Shots Actually Make Things Worse?

By Gretchen Reynolds

In the late 1940s, the steroid cortisone, an anti-inflammatory drug, was first synthesized and hailed as a landmark. It soon became a safe, reliable means to treat the pain and inflammation associated with sports injuries (as well as other conditions). Cortisone shots became one of the preferred treatments for overuse injuries of tendons, like tennis elbow or an aching Achilles, which had been notoriously resistant to treatment. The shots were quite effective, providing rapid relief of pain.

Then came the earliest clinical trials, including one, published in 1954, that raised incipient doubts about cortisone’s powers. In that early experiment, more than half the patients who received a cortisone shot for tennis elbow or other tendon pain suffered a relapse of the injury within six months.

But that cautionary experiment and others didn’t slow the ascent of cortisone (also known as corticosteroids). It had such a magical, immediate effect against pain. Today cortisone shots remain a standard, much-requested treatment for tennis elbow and other tendon problems.

But a major new review article, published last Friday in *The Lancet* [summary reproduced below], should revive and intensify the doubts about cortisone’s efficacy. The review examined the results of nearly four dozen randomized trials, which enrolled thousands of people with tendon injuries, particularly tennis elbow, but also shoulder and Achilles-tendon pain. The reviewers determined that, for most of those who suffered from tennis elbow, cortisone injections did, as promised, bring fast and significant pain relief, compared with doing nothing or following a regimen of physical therapy. The pain relief could last for weeks.

But when the patients were re-examined at 6 and 12 months, the results were substantially different. Overall, people who received cortisone shots had a much lower rate of full recovery than those who did nothing or who underwent physical therapy. They also had a 63 percent higher risk of relapse than people who adopted the time-honored wait-and-see approach. The evidence for cortisone as a treatment for other aching tendons, like sore shoulders and Achilles-tendon pain, was slight and conflicting, the review found. But in terms of tennis elbow, the shots seemed to actually be counterproductive. As Bill Vicenzino, Ph.D., the chairman of sports physiotherapy at the University of Queensland in Australia and senior author of the review, said in an e-mail response to questions, “There is a tendency” among tennis-elbow sufferers “for the majority (70-90 percent) of those following a wait-and-see policy to get better” after six months to a year. But “this is not the case” for those getting cortisone shots, he wrote. They “tend to lag behind significantly at those time frames.” In other words, in some way, the cortisone shots impede full recovery, and compared with those “adopting a wait-and-see policy,” those getting the shots “are worse off.” Those people receiving multiple injections may be at particularly high risk for continuing damage. In one study that the researchers reviewed, “an average of four injections resulted in a 57 percent worse outcome when compared to one injection,” Dr. Vicenzino said.

Why cortisone shots should slow the healing of tennis elbow is a good question. An even better one, though, is why they help in the first place. For many years it was widely believed that tendon-overuse injuries were caused by inflammation, said Karim Khan, M.D., Ph.D., a professor at the School of Human Kinetics at the University of British Columbia and the co-author of a commentary in *The Lancet* accompanying the new review article. The injuries were, as a group, given the name tendinitis, since the suffix “-itis” means inflammation. Cortisone is an anti-inflammatory medication. Using it against an inflammation injury was logical.

But in the decades since, numerous studies have shown, persuasively, that these overuse injuries do not involve inflammation. When animal or human tissues from these types of injuries are examined, they do not contain the usual biochemical markers of inflammation. Instead, the injury seems to be degenerative. The fibers within the tendons fray. Today the injuries usually are referred to as tendinopathies, or diseased tendons.

Why then does a cortisone shot, an anti-inflammatory, work in the short term in noninflammatory injuries, providing undeniable if ephemeral pain relief? The injections seem to have “an effect on the neural receptors” involved in creating the pain in the sore tendon, Dr. Khan said. “They change the pain biology in the short term.” But, he said, cortisone shots do “not heal the structural damage” underlying the pain. Instead, they actually “impede the structural healing.”

Still, relief of pain might be a sufficient reason to champion the injections, if the pain “were severe,” Dr. Khan said. “But it’s not.” The pain associated with tendinopathies tends to fall somewhere around a 7 or so on a 10-point scale of pain. “It’s not insignificant, but it’s not kidney stones.”

So the question of whether cortisone shots still make sense as a treatment for tendinopathies, especially tennis elbow, depends, Dr. Khan said, on how you choose “to balance short-term pain relief versus the likelihood” of longer-term negative outcomes. In other words, is reducing soreness now worth an increased risk of delayed healing and possible relapse within the year?

Some people, including physicians, may decide that the answer remains yes. There will always be a longing for a magical pill, the quick fix, especially when the other widely accepted and studied alternatives for treating sore tendons are to do nothing or, more onerous to some people, to rigorously exercise the sore joint during physical therapy. But if he were to dispense advice based on his findings and that of his colleagues’ systematic review, Dr. Vincenzino said, he would suggest that athletes with tennis elbow (and possibly other tendinopathies) think not just once or twice about the wisdom of cortisone shots but “three or four times.”

SUMMARY OF THE ORIGINAL SCIENTIFIC ARTICLE PUBLISHED IN *THE LANCET*

Efficacy and Safety of Corticosteroid Injections and Other Injections for Management of Tendinopathy: A Systematic Review of Randomised Controlled Trials

By Brooke K. Coombes, MPhty, Leanne Bisset, PhD, Bill Vincenzino PhD

Background

Few evidence-based treatment guidelines for tendinopathy exist. We undertook a systematic review of randomised trials to establish clinical efficacy and risk of adverse events for treatment by injection.

Methods

We searched eight databases without language, publication, or date restrictions. We included randomised trials assessing efficacy of one or more peritendinous injections with placebo or non-surgical interventions for tendinopathy, scoring more than 50% on the modified physiotherapy evidence database scale. We undertook meta-analyses with a random-effects model, and estimated relative risk and standardised mean differences (SMDs). The primary outcome of clinical efficacy was protocol-defined pain score in the short term (4 weeks, range 0–12), intermediate term (26 weeks, 13–26), or long term (52 weeks, ≥ 52). Adverse events were also reported.

Findings

3824 trials were identified and 41 met inclusion criteria, providing data for 2672 participants. We showed consistent findings between many high-quality randomised controlled trials that corticosteroid injections reduced pain in the short term compared with other interventions, but this effect was reversed at intermediate and long terms. For example, in pooled analysis of treatment for lateral epicondylalgia, corticosteroid injection had a large effect (defined as $SMD > 0.8$) on reduction of pain compared with no intervention in the short term ($SMD 1.44$, 95% CI $1.17-1.71$, $p < 0.0001$), but no intervention was favoured at intermediate term (-0.40 , -0.67 to -0.14 , $p < 0.003$) and long term (-0.31 , -0.61 to -0.01 , $p = 0.05$). Short-term efficacy of corticosteroid injections for rotator-cuff tendinopathy is not clear. Of 991 participants who received corticosteroid injections in studies that reported adverse events, only one (0.1%) had a serious adverse event (tendon rupture). By comparison with placebo, reductions in pain were reported after injections of sodium hyaluronate (short [3.91 , $3.54-4.28$, $p < 0.0001$], intermediate [2.89 , $2.58-3.20$, $p < 0.0001$], and long [3.91 , $3.55-4.28$, $p < 0.0001$] terms), botulinum toxin (short term [1.23 , $0.67-1.78$, $p < 0.0001$]), and prolotherapy (intermediate term [2.62 , $1.36-3.88$, $p < 0.0001$]) for treatment of lateral epicondylalgia. Lauromacrogol (polidocanol), aprotinin, and platelet-rich plasma were not more efficacious than was placebo for Achilles tendinopathy, while prolotherapy was not more effective than was eccentric exercise.

Interpretation

Despite the effectiveness of corticosteroid injections in the short term, non-corticosteroid injections might be of benefit for long-term treatment of lateral epicondylalgia. However, response to injection should not be generalised because of variation in effect between sites of tendinopathy.

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None.