

Acupuncture in PM&R – Oporto 2017

Dr Mike Cummings – summary notes with references to accompany presentation

Introduction

Acupuncture is a therapeutic needling technique that may date back into prehistory.[1,2] It became most well known, and most like the forms used today as part of Chinese medicine and other forms of traditional east Asian medicine 2000 or more years ago. Confusion often arises over definitions of acupuncture, as the needling technique is intertwined with ancient medical theories from East Asia. Western medical acupuncture (WMA) tries to address this confusion by taking a modern scientific view of the technique and separating it from its philosophical roots in ancient medicine.[3–6]

Confusion is most prevalent regarding so called acupuncture points. These are defined locations but scientific inquiry has failed to determine any unique anatomical or physiological substrate for such locations. Consequently the WMA approach does not put emphasis on points, but rather on stimulation techniques and the neurophysiological consequences. Unfortunately this idea has been very slow to permeate the world of clinical research so there are numerous randomized controlled trials (RCTs) that use sham acupuncture techniques based more on ‘missing points’ than on the neurophysiological parameters of the stimulus. Consequently it is no surprise to find that sham acupuncture is more effective than most other controls and placebos,[7] and that it has significant benefit over conventional care in terms of health-related quality of life.[8]

The WMA approach still uses points for the purposes of teaching and notation,[4] but equally acknowledges approaches to needling that do not use classical acupuncture points at all.[9–11]

Topics

Myofascial Pain

This is a common form of acute, sub acute or chronic muscle pain that will be familiar to any health professional that palpates soft tissue during physical assessment. It is characterised by tender spots within palpable taut bands of skeletal muscle, and therefore creates an obvious target for a needle. The pathophysiology is still not clear, and the mechanism of needling is also somewhat uncertain, however, clinical experience seems to suggest direct needling is the most effective approach, and this may be via physical or neural mechanisms.[12] The formal evidence base has been slow to catch up with the strong clinical impression of efficacy, but reviews are now starting to look more positive,[13,14] and there is even a suggestion that [more targeted needling may be better](#). [14]

Osteoarthritis / chronic MSK pain

The main role of acupuncture or electroacupuncture for these indications is probably a reduction or normalization of central (spinal cord) amplification of pain, but local effects of needling may contribute to healing processes (via neurogenic inflammation) and antinociception (via adenosine release). The data from controlled trials is most robust in the individual patient data meta-analysis (IPDM) lead by Andrew Vickers, including 29 trials and 17 922 patients.[15] This dataset demonstrates small but highly significant effects (SMD 0.26^{95%} 0.37^{95%}) of acupuncture over sham acupuncture (usually procedures that involve

needling) and larger effects (SMD 0.57^{FE&RE}) over no acupuncture controls (these vary from usual care to intensive guideline-based conventional care). This IPDM has been updated to include 39 trials and 20 827 patients, and the relevant effect sizes have increased marginally over sham and to a slightly larger degree over no acupuncture controls (data awaiting publication). An analysis using the same dataset has estimated that about 90% of the effect of acupuncture is maintained at 12 months when compared with no acupuncture.[16]

Fibromyalgia

Acupuncture needling has long been a chosen intervention for patients with fibromyalgia (FM). This may be because acupuncture appears to work well in soft tissue pain especially myofascial pain, or because acupuncture is often tried as a last resort when conventional care is exhausted or has little to offer. The problem is that the tender points of patients with FM are not necessarily the same as the trigger points in patients with myofascial pain. There is clearly some overlap, but there is also more central amplification in FM, which raises a challenge when the treatment involves multiple needle insertions into tender soft tissues.

Two approaches have condensed out of the confusion: the most prevalent is gentle needling in the hope of symptom control for those that are the best responders to acupuncture (this is probably a genetically determined characteristic);[17] the second, less common approach, is to adequately target peripheral pain sources in the hope that this will lead to an overall improvement in somatic sensitivity.[18,19]

The evidence from clinical trials is in favour of an effect of acupuncture over no acupuncture controls but not over sham.[20] This is likely in part to be due to an enhanced effect of sham (or gentle acupuncture) in patients with conditions dominated by central sensitisation. We see a similar discrepancy in meta-analytic data for migraine – a bigger effect over conventional drugs than over sham acupuncture.[21] A large and carefully designed trial has subsequently demonstrated a clear effect over a non-needling sham acupuncture technique.[22]

Stroke rehabilitation

In the 1990's there was great interest in the use of acupuncture to improve rehabilitation from acute hemiplegic stroke.[23] This was later tempered by sham controlled trials in an environment where all patient were exposed to an enhanced sensory environment.[24]

So the addition of acupuncture to an enhanced sensory environment does not appear to altered the speed of overall recovery; however, it may still have a useful role in treatment of musculoskeletal pain (see above), and in a temporary reduction in muscle tone to augment physical therapy in spasticity.[25]

Neuroprotection

There are numerous laboratory studies demonstrating neuroprotection in a variety of animal models of disease and injury, such as dementia, Parkinson's disease, stroke and spinal cord injury. There are far fewer clinical studies in humans of course, and this is an area where the transition of research from bench to bedside is particularly challenging.

One trial in acute spinal cord injury in humans seemed to demonstrate a benefit,[26] but there are very few trials of this nature.

Inflammation

In a review paper in the journal *Nature* in 2002,[27] Tracey discussed the anti-inflammatory role of the vagus nerve, focusing on the anti-TNF effect of peripheral

acetylcholine release and implied that acupuncture might be a possible method of stimulating this homeostatic response.

In 2014 a team in the US published an experimental trial in a mouse model of sepsis that demonstrated a novel anti-inflammatory mechanism of indirect vagal stimulation.[28] The intervention they used was 10 minutes of EA to the point ST36, and it saved the majority of mice in the experiment from an otherwise fatal outcome. The effect of EA on TNF lasted for 72 hours after just 10 minutes of stimulation at ST36.

Since vagal stimulators are now starting to be used in patients with severe inflammatory arthropathies,[29] it is tempting to wonder if self-applied EA to ST36 twice a week could have the same effect, and ideally result in a reduction in frequency of inflammatory episodes.

References

- 1 Dorfer L, Moser M, Spindler K, *et al.* 5200-year-old acupuncture in central Europe? *Science*. 1998;282:242–3. doi:10.1126/science.282.5387.239f
- 2 Dorfer L, Moser M, Bahr F, *et al.* A medical report from the stone age? *Lancet*. 1999;354:1023–5. doi:10.1016/S0140-6736(98)12242-0
- 3 Filshie J, Cummings M. Western medical acupuncture. In: Ernst E, White A, eds. *Acupuncture - A Scientific Appraisal*. Oxford: Butterworth Heinemann 1999. 31–59.
- 4 White A, Cummings M, Filshie J. *An Introduction to Western Medical Acupuncture*. London: Churchill Livingstone 2008.
- 5 White A. Western medical acupuncture: a definition. *Acupunct Med* 2009;27:33–5. doi:10.1136/aim.2008.000372
- 6 Filshie J, White A, Cummings M. *Medical Acupuncture - A Western Scientific Approach*. 2nd ed. Elsevier 2016.
- 7 Meissner K, Fässler M, Rücker G, *et al.* Differential effectiveness of placebo treatments: a systematic review of migraine prophylaxis. *JAMA Intern Med* 2013;173:1941–51. doi:10.1001/jamainternmed.2013.10391
- 8 Saramago P, Woods B, Weatherly H, *et al.* Methods for network meta-analysis of continuous outcomes using individual patient data: a case study in acupuncture for chronic pain. *BMC Med Res Methodol* 2016;16:131. doi:10.1186/s12874-016-0224-1
- 9 Mann F. *Reinventing Acupuncture: A New Concept of Ancient Medicine*. Oxford: Butterworth Heinemann 2000.
- 10 Campbell A. Acupuncture without points. In: Filshie J, White A, Cummings M, eds. *Medical Acupuncture - A Western Scientific Approach*. London: Elsevier 2016. 125–32.
- 11 Dommerholt J, Fernández-de-las-Peñas C, editors. *Trigger Point Dry Needling An Evidence and Clinical-Based Approach*. 1st ed. Edinburgh: Elsevier Churchill Livingstone 2013.
- 12 Cummings M, Baldry P. Regional myofascial pain: diagnosis and management. *Best Pract Res Clin Rheumatol* 2007;21:367–87. doi:10.1016/j.berh.2006.12.006
- 13 Kietrys DM, Palombaro KM, Azzaretto E, *et al.* Effectiveness of Dry Needling for Upper-Quarter Myofascial Pain: A Systematic Review and Meta-analysis. *J Orthop Sport Phys Ther* 2013;43:620–34. doi:10.2519/jospt.2013.4668
- 14 Wang R, Li X, Zhou S, *et al.* Manual acupuncture for myofascial pain syndrome: a systematic review and meta-analysis. *Acupunct Med* 2017;;acupmed-2016-011176. doi:10.1136/acupmed-2016-011176

- 15 Vickers AJ, Cronin AM, Maschino AC, *et al.* Acupuncture for chronic pain: individual patient data meta-analysis. *Arch Intern Med* 2012;172:1444–53. doi:10.1001/archinternmed.2012.3654
- 16 MacPherson H, Vertosick EA, Foster NE, *et al.* The persistence of the effects of acupuncture after a course of treatment: a meta-analysis of patients with chronic pain. *Pain* 2017;158:784–93. doi:10.1097/j.pain.0000000000000747
- 17 Wan Y, Wilson SG, Han J, *et al.* The effect of genotype on sensitivity to electroacupuncture analgesia. *Pain* 2001;91:5–13. pm:11240073
- 18 Affaitati G, Costantini R, Fabrizio A, *et al.* Effects of treatment of peripheral pain generators in fibromyalgia patients. *EurJPain* Published Online First: 1 October 2010. pm:20889359
- 19 Giamberardino MA, Affaitati G, Fabrizio A, *et al.* Effects of Treatment of Myofascial Trigger Points on the Pain of Fibromyalgia. *CurrPain Headache Rep* Published Online First: 5 May 2011. pm:21541831
- 20 Deare JC, Zheng Z, Xue CCL, *et al.* Acupuncture for treating fibromyalgia. *Cochrane database Syst Rev* 2013;:CD007070. doi:10.1002/14651858.CD007070.pub2
- 21 Linde K, Allais G, Brinkhaus B, *et al.* Acupuncture for the prevention of episodic migraine. *Cochrane database Syst Rev* 2016;:CD001218. doi:10.1002/14651858.CD001218.pub3
- 22 Vas J, Santos-Rey K, Navarro-Pablo R, *et al.* Acupuncture for fibromyalgia in primary care: a randomised controlled trial. *Acupunct Med* 2016;34:257–66. doi:10.1136/acupmed-2015-010950
- 23 Johansson K, Lindgren I, Widner H, *et al.* Can sensory stimulation improve the functional outcome in stroke patients? *Neurology* 1993;43:2189–92.
- 24 Johansson BB, Haker E, von Arbin M, *et al.* Acupuncture and transcutaneous nerve stimulation in stroke rehabilitation: a randomized, controlled trial. *Stroke* 2001;32:707–13.
- 25 Cai Y, Zhang CS, Liu S, *et al.* Electroacupuncture for Poststroke Spasticity: A Systematic Review and Meta-Analysis. *Arch Phys Med Rehabil* Published Online First: 25 April 2017. doi:10.1016/j.apmr.2017.03.023
- 26 Wong AM, Leong CP, Su TY, *et al.* Clinical trial of acupuncture for patients with spinal cord injuries. *Am J PhysMed Rehabil* 2003;82:21–7. pm:12510181
- 27 Tracey KJ. The inflammatory reflex. *Nature* 2002;420:853–9. doi:10.1038/nature01321
- 28 Torres-Rosas R, Yehia G, Peña G, *et al.* Dopamine mediates vagal modulation of the immune system by electroacupuncture. *Nat Med* 2014;20:291–5. doi:10.1038/nm.3479
- 29 Andersson U, Tracey KJ. A new approach to rheumatoid arthritis: treating inflammation with computerized nerve stimulation. *Cerebrum* 2012;2012:3.