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Acupuncture for the Treatment of Male Infertility

By *Elad Schiff, MD*

INFERTILITY IS DEFINED AS THE INABILITY TO ACHIEVE PREGNANCY after one year of unprotected intercourse. An estimated 15% of couples meet this criterion and are considered infertile. Half of these couples will have a component of male factor infertility and almost 30% of infertility will be due solely to male factors.¹

Male conditions that affect fertility are still under-diagnosed and under-treated, as compared to female factor infertility. A complete evaluation is mandated for infertile men, which includes relevant medical history, physical exam, and laboratory and imaging studies.² In general, causes of infertility in men can be explained by deficiencies in ejaculate volume, sperm concentration (e.g., oligospermia, azoospermia), sperm motility, or sperm morphology. Male infertility can be due to anatomical abnormalities, endocrinopathies, or systemic disease. However, the clinician managing patients with male infertility often is frustrated by the limited therapeutic options available, especially since in 40% of patients no cause for the infertility can be found.³

After identifying abnormal parameters, the care of a subfertile male may depend on the desires of the affected couple, available resources, local referral patterns, and the treatment style of the involved physician. Various treatments exist for the infertile male, ranging from optimizing the current semen parameters with medical therapy, to minor surgical procedures, and finally to complex sperm retrieval and assisted reproduction techniques.

Approximately one-third of infertile males seek non-conventional therapies for their ailment.⁴ In the complementary and alternative medicine (CAM) setting, patients may be offered a variety of interventions such as dietary manipulation, supplements, herbs, mind-body practices, or specific CAM modalities.^{5,6} Acupuncture is one of the most studied CAM modalities for male infertility. This article will review and analyze the available literature on acupuncture for male infertility.

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TCM for Male Infertility

In traditional Chinese medicine (TCM), symptoms are a manifestation of an underlying *qi* (or chi) imbalance. There are six major patterns of *qi* (vital energy) disharmony that may manifest with male infertility.⁷ The two most commonly involved organs in male infertility according to TCM are the kidneys and liver. The kidneys store essence *qi*, which roughly corresponds to the Western concept of male reproductive cells, while the liver stores blood and regulates the flow of *qi*, which are both fundamental for fertility.

Traditionally, patients are categorized into their pattern of *qi* disharmony and treated accordingly with acupuncture and/or herbs. In addition, patients may receive lifestyle recommendations with regard to frequency of sexual activity, diet, exercise, and meditative practices as stress reduction techniques.

Within the paradigm of acupuncture, several approaches have evolved. Formulations of acupoints that have been empirically and traditionally associated with fertility-boosting effects may be used in protocols for infertility treatments. These protocol-based acupuncture treatments do not attempt to address the underlying *qi* disharmony. More recently, following the development of French auricular acupuncture therapy and its

endorsement in China, several protocols also combine auriculotherapy.

Case Series

Zongchang published a case series of 297 infertile males treated with various combinations of acupuncture, acupuncture point injections with Pilose Antler (a powder from the hairy, non-ossific, young horn of a stag), and Chinese herbs.⁸ Interventions were protocolized for acupuncture and point injections. Herbs were provided based on a standard formula on top of which other herbs were added according to specific TCM patterns of disharmony. Patient population was heterogeneous for age, underlying infertility etiology, sperm motility indices, and sperm count. Sperm morphology was not evaluated. Courses of acupuncture and point injection treatments were variable in length and were not well characterized in the article. Within the time period of eight treatment courses, approximately 50% of patients achieved pregnancy, 27% achieved normal sperm count and motility, 18% improved sperm count but not sperm motility, and 7% had no change in the above outcomes. Highest rates of improvement were noticed in the group that received a combination of all three interventions—herbs, acupuncture, and point injections.

This study exemplifies the common practice of TCM for male infertility in China, in that several interventions often are used. Although this article documents very high success rates, the methods used to report patient characteristics, treatments applied, and outcome measures are not rigorous, which makes it difficult to draw conclusions.

Controlled Clinical Trials

In a single-blind controlled trial, 19 patients (24-42 years of age) with semen abnormalities in concentration, morphology, and/or motility, were randomized into two groups.⁹ The study group received protocolized acupuncture plus moxa (warming *Artemisia vulgaris* wool over acupuncture points), while the control group was needed in acupuncture points not known to have any effect on infertility. Treatment was given twice weekly for 10 weeks. Semen analyses were performed before and after the treatment course. Patients in the study group showed a significant increase in the percentage of normal-form sperm compared to the control group. However, there were no significant differences between the two groups in sperm volume, concentration, or motility. Pregnancy outcomes were not mentioned in the article. This study suggests that acupuncture can improve sperm morphology, but not sperm activity or count. Although important, sperm morphology is just

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one of the variables necessary for fertility. Therefore, one cannot project from this study how acupuncture may affect the single most important outcome for infertile males—successful fertilization of an egg.

Siterman and colleagues conducted two randomized trials to assess the effect of acupuncture on the sperm quality of males experiencing subfertility related to sperm impairment.

In the first study, 16 males (average age 35 ± 5 years) with subfertility associated with low sperm activity received acupuncture treatments twice weekly for five weeks.¹⁰ A group of acupuncture points with effects on fertility was predefined for this study. From this group of points, the therapist selected specific points for individual patients according to their pattern of disharmony. Semen was assessed one month pre- and post-treatment in the acupuncture and the control group. Sixteen untreated subfertile males, matched with the experimental group for semen characteristics, served as a control group. The fertility index, which serves as a validated predictor of fertility, increased significantly in the acupuncture group following improvement in total functional sperm fraction, percentage of viability, total motile spermatozoa per ejaculate, and integrity of the axonema (structure of the sperm tail). Four (25%) spontaneous pregnancies were achieved in the acupuncture group.

In their second randomized trial, Siterman et al evaluated the effect of acupuncture treatment on sperm density. Semen samples of 20 males with previously diagnosed azoospermia (the complete absence of sperm) were observed before and after acupuncture treatment using routine light microscope and special micro-scanning electron microscope examinations. These males had failed to achieve natural fertilization for an average period of 9 ± 4 years and none had undergone any treatment for at least one year prior to acupuncture. Age in both acupuncture and control group averaged 39 ± 7 years. Following microscopy studies and endocrinologic evaluation, participants were categorized into three subgroups:

1. Patients ($n = 6$) with high follicle-stimulating hormone (FSH) and/or leutinizing hormone (LH) levels without any signs of genital tract inflammation, were defined as suffering from spermatogenic failure.

2. Patients ($n = 9$) with normal basal blood FSH and LH levels, who exhibited signs of genital tract infection according to the laboratory criteria, were defined as suffering from inflammation of the genital tract.

3. Patients ($n = 5$) who exhibited high FSH and/or LH levels as well as inflammation of the genital tract, were defined as a combined subgroup of spermatogenic fail-

ure and genital tract inflammation.

Twenty males receiving no treatment with a matching andrological profile served as the control group. Acupuncture treatment was individualized according to the TCM pattern of disharmony, and was administered twice weekly for five weeks. Following treatment, 13 males exhibited a considerable improvement in sperm density. Even the three males with the most severe reduction in sperm count exhibited a marked but non-significant improvement in their sperm count (average $0.7 \pm 1.1 \times 10^6$ spermatozoa per ejaculate before treatment vs. $4.3 \pm 3.2 \times 10^6$ spermatozoa per ejaculate after treatment). No effect was observed in the spermatogenic failure patients (subgroup 1). Patients suffering from genital tract inflammation responded well to acupuncture treatment although levels of white blood cells and bacteria did not change following acupuncture treatment. Also noteworthy is that no changes in basal hormonal blood levels were observed in any of the participants of the experimental group. None of the untreated controls exhibited any substantial changes in sperm density. Only two of the 20 treated patients underwent in vitro fertilization with intracytoplasmic sperm injection (ICSI) following the acupuncture procedure. Pregnancies were achieved in both cases.

These studies are important in that patients were well characterized for their sperm abnormality, and that research methodology and outcome measures were adequate. Moreover, these studies, especially the latter, help identify infertility characteristics that are more amenable to acupuncture therapy. In summary, both sperm activity and sperm density were positively affected by acupuncture treatment.

A study by Paulus and colleagues assessed the influence of acupuncture on pregnancy rates in patients who undergo assisted reproduction therapy.¹¹ This study did not evaluate acupuncture's effectiveness on improving semen parameters but rather if acupuncture can improve pregnancy rates after ICSI. The severe male subfertility group in this study was randomized to either acupuncture plus ICSI ($n = 33$) or ICSI only ($n = 26$). Each female in the experimental group received a protocol-based body and ear acupuncture treatment. Acupuncture was administered 25 minutes before and after embryo transfer. Pregnancy rates for the acupuncture group were considerably higher than for the control group (42.5% vs. 26.3%; $P = 0.03$).

A small case series echoes Paulus' results and describes better outcomes for ICSI with acupuncture in terms of follicle yield and pregnancy rates.¹²

The controlled trial and case series are important, since with a brief, safe, and inexpensive intervention

(acupuncture), it appears one can optimize the main outcome for a complex and highly expensive procedure.

Mechanism of Action

The possible mechanisms by which acupuncture improves sperm morphology and activity were not directly studied. However, several mechanisms were suggested in the above articles.

Acupuncture point stimulation may facilitate, through neuronally mediated mechanisms, vasodilatation to testicular and epididymal structures. Vasodilation to these organs may in turn reduce oxidative stress, which contributes to subfertility.⁹

Acupuncture may also exert its effect via optimization of endocrine function. In at least one study, acupuncture was shown to cause a significant increase in beta-endorphin.¹³ Beta-endorphins in turn affect GnRH secretion, which regulates the reproductive organs. In addition, acupuncture has been shown to normalize the hypothalamus-pituitary-reproductive organ axis.¹⁴ These hormonal effects may create a more favorable environment for reproductive function.

Moreover, emotional stress is an acknowledged factor that decreases fertility rates.¹⁵ Acupuncture can reduce anxiety and stress both through specific, non-specific, and placebo effects, thereby diminishing the stress component of couples seeking to conceive.¹⁶

Safety

MacPherson et al conducted a prospective postal audit of acupuncture treatments administered by 574 professional acupuncturists who were members of the British Acupuncture Council.¹⁷ They found no serious adverse events after 34,407 acupuncture treatments. In 2001, White et al reported prospective data from 78 physicians and physiotherapists who administered 31,822 acupuncture treatments.¹⁸ Altogether, only 43 significant events were reported, giving a rate of 14/10,000 (95% confidence interval [CI] 8-20/10,000). All adverse events had cleared within one week, except for one incident of pain that lasted two weeks and one report of sensory symptoms that lasted several weeks. None of these events was serious. A total of 2,135 minor events was reported, giving an incidence of 671/10,000 (95% CI 42-1,013/10,000) consultations. The most common events were bleeding (310/10,000 consultations, 95% CI 160-590/10,000) and needling pain (110/10,000 consultations, 95% CI 49-247/10,000).

Most recently, Melchart et al conducted a prospective investigation of adverse effects of acupuncture in 97,733 patients receiving more than 760,000 acupuncture sessions.¹⁹ The mean (SD) number of inserted needles per

session was 12.6 (\pm 5.1). Mild adverse effects were reported in 6,936 patients (7.10%, 99% CI 6.88%-7.32%). The most frequently reported adverse effects were needling pain and hematoma. Comparison of this adverse event rate for acupuncture with those of drugs routinely prescribed in primary care suggests that acupuncture is a safe form of treatment.²⁰

Conclusion

Acupuncture has a long history in China of being an effective treatment for male infertility. Recent studies conducted in Western countries assessing acupuncture's effectiveness for this indication support those historical observations.

Recommendation

There is a paucity of methodologically sound studies on the effectiveness of acupuncture in the treatment of male infertility. However, artificial reproductive technologies are highly expensive and have limited effectiveness as well. In this setting, acupuncture with its excellent safety profile, low cost, and reported positive outcomes, may be recommended to patients with male infertility as part of an initial intervention or in conjunction with conventional therapies. ♦

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References

1. Poland ML, et al. Variation of semen measures within normal men. *Fertil Steril* 1985;44:396-400.
2. Sigman M, et al. Evaluation of the Subfertile Male. In: Lipshultz LI, Howard SS, eds. *Infertility in the Male*. St. Louis, MO: Mosby; 1997:173-193.
3. de Kretser DM. Male infertility. *Lancet* 1997;349:787-790.
4. Zini A, et al. Use of alternative and hormonal therapies in male infertility. *Urology* 2004;63:141-143.
5. Sinclair S. Male infertility: Nutritional and environmental considerations. *Altern Med Rev* 2000;5:28-38.
6. Domar AD. A New Fertility Factor. *Newsweek* Sept. 27, 2004.
7. Crimmel AS, et al. Withered yang: A review of traditional Chinese medical treatment of male infertility and erectile dysfunction. *J Androl* 2001;22:173-182.
8. Zongchang Z. Analysis on the therapeutic effect of combined use of acupuncture and medication in 297 cases of male sterility. *Tradit Chin Med* 1997;17:190-193.
9. Gurfinkel E, et al. Effects of acupuncture and moxa treatment in patients with semen abnormalities. *Asian*

- J Androl* 2003;5:345-348.
10. Siterman S, et al. Effect of acupuncture on sperm parameters of males suffering from subfertility related to low sperm quality. *Arch Androl* 1997;39:155-161.
 11. Paulus WE, et al. Influence of acupuncture on the pregnancy rate in patients who undergo assisted reproduction therapy. *Fertil Steril* 2002;77:721-724.
 12. Emmons S, Patton P. Acupuncture treatment for infertile women undergoing intracytoplasmic sperm injection. *Medical Acupuncture* 2000;12:8-13.
 13. Petti F, et al. Effects of acupuncture on immune response related to opioid-like peptides. *J Tradit Chin Med* 1998;18:55-63.
 14. Chen BY, Yu J. Relationship between blood radio-immunoreactive beta-endorphin and hand skin temperature during the electro-acupuncture induction of ovulation. *Acupunct Electrother Res* 1991;16:1-5.
 15. Schenker JG, et al. Stress and human reproduction. *Eur J Obstet Gynecol Reprod Biol* 1992;45:1-8.
 16. Chen A. An introduction to sequential electric acupuncture (SEA) in the treatment of stress related physical and mental disorders. *Acupunct Electrother Res* 1992;17:273-283.
 17. MacPherson H, et al. The York acupuncture safety study: Prospective survey of 34,000 treatments by traditional acupuncturists. *BMJ* 2001;323:486-487.
 18. White A, et al. Adverse events following acupuncture: Prospective survey of 32,000 consultations with doctors and physiotherapists. *BMJ* 2001;323:485-486.
 19. Melchart D, et al. Prospective investigation of adverse effects of acupuncture in 97,733 patients. *Arch Intern Med* 2004;164:104-105.
 20. Vincent C. The safety of acupuncture. *BMJ* 2001;323:467-468.

Tai Chi for Anxiety and Depression

By Dónal P. O'Mathúna, PhD

THE SLOW GRACEFUL MOVEMENTS OF TAI CHI NOW REGULARLY show up in the backdrop of movies and TV shows. More and more tai chi classes are being offered as a way to gently exercise the body and relax the mind. In addition, tai chi is said to have many general health benefits, primarily coming from the prevention of illness rather than cure or relief of symptoms. Some claim it can reduce blood pressure, cholesterol levels, tension, depression, fatigue, and anxiety. Others claim it

improves circulation, digestion, and appetite. It is also said to bring mental and spiritual clarity.

Before recommending the practice, however, a closer examination of the growing number of clinical studies is warranted. Although much of the focus on tai chi has been on its potential to reduce falls among the elderly, the focus here will be on its psychological effects in this same population, and specifically its impact on depression and anxiety.¹

Background

Tai chi, or tai chi chuan, literally means “supreme ultimate power” and is part of traditional Chinese medicine (TCM). It originally was developed to provide general physical fitness for the martial arts.² However, the slow and smooth movements of tai chi now differ significantly from the vigorous movements of judo, karate, or tae kwon do. Five major styles of tai chi developed over the centuries, with the Yang form being the most popular.¹ A “combined” style developed from a meeting in China in 1956 and was designed to make the movements easy to learn and practice in shorter periods of time.² The Chinese government promoted this form widely and made it compulsory in most colleges and universities. As a result, millions of Chinese people practice tai chi today. Since the 1980s, it has also been growing in popularity in the West.

All forms of tai chi involve meditation, breathing exercises, and slow, graceful movements. Each session is composed of a series of specific postures combined into one long exercise. The movements are all considered circular with each session being viewed as one continuous, integrated circle.² Within each session, however, there are many variations and changes. Sessions come in short and long versions, lasting either 10 or 30 minutes.

Mechanism of Action

As with all aspects of TCM, the traditional purpose of tai chi is to restore a balanced flow of *qi* (or chi) and thereby promote health. *Qi* is a nonphysical “life energy” that is believed to pervade and animate the universe. Illness is held to be a manifestation of imbalances or poor flow of *qi*. Tai chi movements are viewed as part of a healthy lifestyle that promotes a more balanced flow of *qi*. Practicing tai chi outdoors is said to be better because it allows universal *qi* in the earth to rise up through one’s feet to replenish the person’s own *qi*. More biological or scientific mechanisms of action have not been established for tai chi, other than viewing it as a gentle form of exercise and “meditation in motion.”

Clinical Studies

One of the earliest studies of tai chi in the West found reduced tension, depression, anger, fatigue, confusion, and state-anxiety when comparing pre- and post-study scores among 33 beginners and 33 experienced tai chi practitioners.³ This study was neither controlled nor blinded. The same researcher did a similarly uncontrolled study to compare the psychological benefits of tai chi to those of brisk walking, meditation, and reading.⁴ After 3-4 years, all four regimens were equivalent in reducing mood disturbances, and the stress-reduction effects of tai chi and brisk walking were comparable. Another nonrandomized controlled trial involved 90 subjects using tai chi for 30 minutes daily, six days a week, for one month.⁵ At the end of the trial, those practicing tai chi had reduced stress and anxiety, and improved overall psychological symptoms.

The first randomized controlled trial examining psychological effects involved 135 subjects (average age 51 years).⁶ These were randomly assigned to one of five groups: tai chi, control, moderate-intensity walking, low-intensity walking, or low-intensity walking plus relaxation response. Each was practiced for 45 minutes, three times per week for 16 weeks. No significant differences were found among the five groups on measures of mood, self-esteem, personality, or life satisfaction. However, sub-group analysis did find that women in the tai chi group experienced significant reductions in mood disturbance ($P < 0.006$) and improvements in general mood ($P < 0.04$).

Another controlled trial involved 98 healthy subjects (average age 73 years) who were not involved in any structured exercise program in the previous month.⁷ They were randomly assigned to either the control group or to practice tai chi for one hour, twice a week, for six months. At that point, the tai chi group showed significantly greater reductions in depression, negative affect, and psychological distress and greater increases in positive affect and well-being, life satisfaction, and health perception compared to the control group ($P < 0.05$).

The third randomized controlled trial of tai chi in this area was conducted with 14 patients (average age 73 years) diagnosed with depression of a non-organic nature.⁸ None of the participants had been involved in regular exercise for the previous six months, and none had a medical contraindication to exercise. The subjects were randomly assigned to either a group that participated in three tai chi sessions per week for three months, or to a waiting group. According to their scores on the Chinese version of the Center for Epidemiology Studies Depression Scale, the tai chi group showed statistically

significant improvements compared to the control group ($P < 0.05$). A multivariate analysis of subcategories of depressive symptoms (somatic, negative affect, interpersonal, and well-being) showed significant improvements in all four categories ($P < 0.05$).

Adverse Effects

No adverse effects of tai chi were reported in the literature examined. Although Western medicine questions the existence of *qi*, tai chi can be practiced without any reference to, or in support of, any particular belief system.

Conclusion

Few rigorously controlled trials examine the impact of tai chi on depression or anxiety. Some of the trials have not been randomized and sometimes the outcomes reported were not clearly defined. All but the last trial examined above involved healthy subjects rather than those diagnosed with depression or anxiety. In spite of these limitations, the results have generally been supportive of tai chi's ability to improve mood and reduce anxiety among the elderly. Whether this is the result of a generalized benefit from moderate exercise, or specifically related to the combination of exercise, meditation, and breathing aspects of tai chi, cannot be clearly determined from the currently available trials. However, what evidence is available suggests that tai chi, as a result of its meditative and breathing dimensions, may provide benefits that go beyond those of exercise. The gentle nature of tai chi makes it particularly suited for elderly adults.

Recommendation

Those interested in becoming more active could consider tai chi as one option that may bring accompanying psychological and well-being benefits. All adults, especially the elderly, who are considering starting an exercise program should seek out medical advice to ensure they are physically ready to do so. Doctors and others examining such people should seek details on the precise nature of the tai chi program as the duration and rigor can vary considerably. Patients should be made aware of what symptoms to watch out for that would indicate overexertion. Keeping such cautions in mind, people can be advised that tai chi may bring the psychological benefits established for exercise along with possible benefits from "meditation in motion." ❖

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References

1. Wang C, et al. The effect of Tai Chi on health outcomes in patients with chronic conditions: A systematic review. *Arch Intern Med* 2004;164:493-501.
2. Li JX, et al. Tai chi: Physiological characteristics and beneficial effects on health. *Br J Sports Med* 2001;35:148-156.
3. Jin P. Changes in heart rate, noradrenaline, cortisol and mood during Tai Chi. *J Psychosom Res* 1989;33:197-206.
4. Jin P. Efficacy of Tai Chi, brisk walking, meditation, and reading in reducing mental and emotional stress. *J Psychosom Res* 1992;36:361-370.
5. Fu CY, et al. The effects of Tai Chi on psychological balance. *J Chin Rehabil* 1996;11:88-89.
6. Brown DR, et al. Chronic psychological effects of exercise and exercise plus cognitive strategies. *Med Sci Sports Exerc* 1995;27:765-775.
7. Li F, et al. Enhancing the psychological well-being of elderly individuals through Tai Chi exercise: A latent growth curve analysis. *Struct Equation Modeling* 2001;8:53-83.
8. Chou KL, et al. Effect of Tai Chi on depressive symptoms amongst Chinese older patients with depressive disorders: A randomized clinical trial. *Int J Geriatr Psychiatry* 2004;19:1105-1107.

Peppermint Oil for Irritable Bowel Syndrome

By David Kiefer, MD

THIS COMMON AND FLAVORFUL MEMBER OF THE MINT family has many well-proven uses that extend beyond simply being the tasty after-dinner candy. Peppermint (*Mentha x piperita*), in leaf form, essential oil extract, or as its primary purified compound, menthol, has been used in a variety of gastrointestinal, biliary, and upper respiratory conditions in the pharmacopeia of many cultures around the world. In addition, there are now many interesting in vitro and clinical research studies refining what we know about its mechanism of action and clinical availability.

History and Traditional Use

Plants in the mint family, including peppermint (*Mentha x piperita*) and spearmint (*Mentha spicata*), have a history of culinary and medicinal use dating back to Greek and Roman times, ancient Egypt, and 13th centu-

ry Iceland, with general use in Western Europe beginning in the 18th century.¹ Peppermint leaf tea was well-known to act as a digestive aid in cases of dyspepsia, to increase bile production, and was used as an inhalant to clear upper respiratory symptoms, as well as to relieve the cough of bronchitis and pneumonia.^{1,2}

Topically, peppermint oil has been used as an analgesic for headache. In more recent times, preparations of the oil are prescribed for systemic use in functional gastrointestinal disorders, intestinal spasm, and irritable bowel syndrome (IBS).

Peppermint is a plant known to many cultures around the world and, as such, has a variety of common names, including brandy mint, lamb mint, Pfefferminze and Katzenkraut (German), mente anglaise and menthe poivrée (French), and menta prima (Italian).^{1,2}

Botany and Pharmacology

Peppermint is an herbaceous perennial in the genus *Mentha*, in the family Lamiaceae (also called Labiatae), a family that includes other common aromatic plants such as basil, sage, and oregano. Peppermint has stems that are square in cross-section, a common characteristic of this family. Peppermint is a hybrid of spearmint (*Mentha spicata*) and water mint (*Mentha aquatica*), which is expressed with an “x” in its scientific name, *Mentha x piperita*.

The fresh, above-ground parts of *Mentha x piperita* are distilled to yield peppermint oil.¹ The resulting oil contains numerous compounds, including menthol (35-45%), menthone (15-20%), cineole (6-8%), and other volatile oils.^{1,3}

Irritable Bowel Syndrome

IBS is a clinical entity that includes a group of functional bowel disorders with chronic, intermittent, or continuous abdominal complaints or abnormal bowel habits, which are specifically defined by, most currently, the Rome II Diagnostic Criteria.⁴ Patients with IBS usually can be described as having one of three IBS subgroups: constipation-predominant, diarrhea-predominant, or alternating IBS.⁵ Treatments may be most effective when based on these IBS sub-types.^{6,7} In like manner, it is important to keep these characteristics in mind when interpreting the research behind the use of peppermint oil in IBS.

Mechanism of Action

The use of peppermint oil in IBS stems from several proposed mechanisms of action. Peppermint oil has been shown to reduce gastric motility⁸ by directly acting on gut calcium channels to relax gastrointestinal smooth

muscle, similar to the actions of dihydropyridine calcium antagonists.⁹ A recent review of peppermint oil supports in vitro research showing that peppermint oil relaxes animal and human gastrointestinal smooth muscle, and that menthol has two distinct calcium-antagonistic activities.³

Peppermint oil also is known to relax the lower esophageal sphincter, which can lead to symptoms of heartburn after oral administration. For this reason, several manufacturers have developed enteric-coated preparations, delivering the peppermint oil to the small bowel, allowing its effects to focus on the area of the gastrointestinal tract most relevant in cases of IBS. These enteric-coated preparations are those that have been studied for their effects in IBS in the clinical trials discussed below.

Clinical Studies

Peppermint oil has been used for the treatment of IBS for at least three decades.^{10,11} Recent reviews have addressed the quality of the current clinical evidence for its therapeutic benefits,^{3,12} generally concluding that the efficacy of peppermint oil in IBS has not clearly been established. These opinions are based on the few published clinical research trials, notable for their varying results and methodological quality.

For example, in a randomized, double-blind controlled trial in 42 children, enteric-coated peppermint oil capsules (Colpermin[®] capsules, 0.2 mL [187 mg], three times daily before meals; patients 30-45 kg received 0.1 mL three times daily) significantly reduced abdominal pain in acute IBS, though there was little effect on the other symptoms of IBS.¹³

This is in agreement with one study of 29 adults that showed enteric-coated peppermint oil (Elanco LOK[®] capsules, 0.2-0.4 mL three times daily) to be superior to placebo in the treatment of IBS abdominal symptoms,¹⁴ but contrary to another trial (n = 41 adults) that found no significant difference between peppermint oil (Colpermin capsules, 0.4 mL [374 mg] three times daily) and placebo for IBS abdominal pain.¹⁵ To further complicate assessment, one prospective, randomized, double-blind trial (n = 110) compared enteric-coated peppermint oil (Colpermin capsules, 0.2 mL [187 mg] 3-4 times daily before meals) to placebo for four weeks, demonstrating statistically significant improvements in abdominal pain, abdominal distension, stool frequency, and flatulence in the peppermint oil group.¹⁶

Some of the methodological problems in the published literature include short treatment duration (usually ≤ 6 weeks), small sample size, and failure to use established IBS criteria in inclusion criteria.

Proprietary blends are also occasionally mentioned in the medical literature, offshoots of some of the peppermint oil research. For example, 90 mg peppermint oil and 50 mg caraway oil (called Enteroplant[®]), has been studied in functional dyspepsia,^{17,18} and may affect gastrointestinal motility in healthy volunteers.¹⁹ These are interesting results, but difficult to apply directly to IBS.

Dosages and Forms

Enteric-coated preparations are preferred for the treatment of IBS to prevent upper gastrointestinal side effects and to deliver the herb to the desired site of action. The daily dose is 0.6 mL of peppermint oil in enteric-coated tablets or capsules, often dosed as a 0.2 mL of peppermint oil in a capsule or tablet three times daily before food.^{1,2}

Adverse Effects, Contraindications, and Drug Interactions

Peppermint oil is contraindicated in certain clinical situations, such as pregnancy, because it may cause the onset of menstruation; cholelithiasis or cholecystitis, due to its activity in stimulating the production of bile; and hiatal hernia or gastroesophageal reflux disease, because of lower esophageal sphincter relaxation.²⁰ With peppermint tea, one study in rats points to a possible effect on the cytochrome P450 system, specifically by reducing the activity of CYP2E and CYP1A2,²¹ though the medical literature does not mention a problem with human enzyme systems.

Conclusion

Peppermint (*Mentha x piperita*) has a long history of use for digestive disorders, and there is both clinical and in vitro research on the whole plant and one of its main phytochemicals, menthol, to support some of its traditional uses. Peppermint oil acts to reduce gastrointestinal smooth muscle motility by acting as a calcium antagonist. There are both positive and negative clinical trials for the use of peppermint oil in IBS, and some experts state that no conclusions can be drawn from the medical literature, mainly because of poor research methodology. Peppermint oil is dosed at 0.2 mL of peppermint oil per capsule or tablet, three times daily before meals, and it is contraindicated in pregnancy, gall bladder disorders, and gastroesophageal reflux disease.

Recommendation

As with many herbal medicines, high-quality research is needed to definitively prove the efficacy of

peppermint oil in IBS. Future studies should use the Rome II Diagnostic Criteria as inclusion criteria, divide treatment trials into IBS sub-types, be of longer duration, and use uniform dosing and herbal formulations. Despite these limitations, there are some positive research trials and well-documented effects via calcium antagonism on gastrointestinal smooth muscle, intriguing results especially for a clinical entity such as IBS where conventional treatments are not always successful. Provided peppermint oil is not contraindicated, the use of an enteric-coated preparation could be considered for a trial in patients with IBS until further research is undertaken to refine clinical use. ❖

Dr. Kiefer recently completed a fellowship at the Program in Integrative Medicine, College of Medicine, University of Arizona, Tucson.

References

1. Mills S, Bone K. *Principles and Practice of Phytotherapy*. Edinburgh, England: Churchill Livingstone; 2000.
2. Johnson LP. *Pocket Guide to Herbal Remedies*. Malden, MA: Blackwell Publishing; 2002.
3. Pittler MH, Ernst E. Peppermint oil for irritable bowel syndrome: A critical review and meta-analysis. *Am J*

- Gastroenterol* 1998;93:1131-1135.
4. Thompson WG, et al. Functional bowel disorders and functional abdominal pain. *Gut* 1999;45(Suppl 2): 1143-1147.
 5. Kiefer D, Ali-Akbarian L. A brief evidence-based review of two gastrointestinal illnesses: Irritable bowel and leaky gut syndromes. *Altern Ther Health Med* 2004;10:22-30.
 6. Camilleri M, et al. Consensus report: Clinical perspectives, mechanisms, diagnosis and management of irritable bowel syndrome. *Aliment Pharmacol Ther* 2002;16:1407-1430.
 7. Koch TR. Peppermint oil and irritable bowel syndrome. *Am J Gastroenterol* 1998;93:2304-2305.
 8. Evans BK, et al. Further studies on the correlation between biological activity and solubility of some carminatives. *J Pharm Pharmacol* 1975;27(suppl):66.
 9. Hills JM, Aaronson PI. The mechanism of action of peppermint on gastrointestinal smooth muscle: An analysis using patch clamp electrophysiology and isolated tissue pharmacology in rabbit and guinea pig. *Gastroenterology* 1991;101:55-65.
 10. Rees WD, et al. Treating irritable bowel syndrome with peppermint oil. *BMJ* 1979;2:835-836.
 11. Leicester RJ, Hunt RH. Peppermint oil to reduce

CME Questions

CME Instructions: Physicians participate in this continuing medical education program by reading the articles, using the provided references for further research, and studying the CME questions. Participants should select what they believe to be the correct answers, then refer to the list of correct answers to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material.

After completing this activity, participants must complete the evaluation form provided at the end of each semester (June and December) and return it in the reply envelope provided to receive a certificate of completion. When an evaluation form is received, a certificate will be mailed to the participant.

11. What percentage of couples fail to achieve pregnancy after one year of unprotected intercourse?
 - a. 10%
 - b. 15%
 - c. 20%
 - d. 25%

12. Acupuncture may be recommended to infertile male patients as part of an initial intervention or in conjunction with conventional therapies.
 - a. True
 - b. False
13. The traditional purpose of tai chi is to restore a balanced flow of *qi* and thereby promote health.
 - a. True
 - b. False
14. The results of clinical trials of tai chi have shown:
 - a. improved mood and reduced anxiety.
 - b. benefits that go beyond those of exercise.
 - c. that it is particularly suited for elderly adults.
 - d. All of the above
15. A recent review of peppermint oil supports in vitro research showing that it relaxes animal and human gastrointestinal smooth muscle, and that menthol has two distinct calcium-antagonistic activities.
 - a. True
 - b. False
16. Peppermint oil is contraindicated in:
 - a. pregnancy.
 - b. gall bladder disorders.
 - c. gastroesophageal reflux disease.
 - d. All of the above

Answers: 11. b, 12. a, 13. a, 14. d, 15. a, 16. d.

- colonic spasm during endoscopy. *Lancet* 1982;2:989.
12. Jailwala J, et. Pharmacologic treatment of the irritable bowel syndrome: A systematic review of randomized, controlled trials. *Ann Intern Med* 2000;133:136-147.
 13. Kline RM, et al. Enteric-coated, pH-dependent peppermint oil capsules for the treatment of irritable bowel syndrome in children. *J Pediatr* 2001;138:125-128.
 14. Dew MI, et al. Peppermint oil for the irritable bowel syndrome: A multicenter trial. *Br J Clin Pract* 1984;38:394-398.
 15. Nash P, et al. Peppermint oil does not relieve the pain of irritable bowel syndrome. *Br J Clin Pract* 1986;40:292-293.
 16. Liu JH, et al. Enteric-coated peppermint-oil capsules in the treatment of irritable bowel syndrome: A prospective, randomized trial. *J Gastroenterol* 1997;32:765-768.
 17. Holtmann G, et al. Effects of a fixed combination of peppermint oil and caraway oil on symptoms and quality of life in patients suffering from functional dyspepsia. *Phytomedicine* 2003;10(Suppl 4):56-57.
 18. Madisch A, et al. Treatment of functional dyspepsia with a fixed peppermint oil and caraway oil combination preparation as compared to cisapride. A multicenter, reference-controlled double-blind equivalence study. *Arzneimittelforschung* 1999;49:925-932.
 19. Micklefield GH, et al. Effects of peppermint oil and caraway oil on gastroduodenal motility. *Phytother Res* 2000;14:20-23.
 20. Brinker F. *Herb Contraindication and Drug Interactions*. 3rd ed. Sandy, OR: Eclectic Medical Publications; 2001.
 21. Maliakal PP, Wanwimolrum S. Effect of herbal teas on hepatic drug metabolizing enzymes in rats. *J Pharm Pharmacol* 2001;53:1323-1329.

Clinical Briefs

With Comments from Russell H. Greenfield, MD

St John's Wort and Major Depression

Source: Szegedi A, et al. Acute treatment of moderate to severe depression with hypericum extract WS 5570 (St. John's wort): Randomized controlled double blind non-inferiority trial versus paroxetine. *BMJ* 2005;330:503.

Goal: To evaluate the efficacy of a standardized extract of St John's wort for moderate-to-severe depression as compared with paroxetine.

Design: Multicenter phase III randomized, double-blind, controlled, double-dummy non-inferiority trial.

Subjects: Two hundred fifty-one outpatient adults (18-70 years) with single or recurrent acute unipolar major depression persisting for two weeks to one year recruited from 21 German psychiatric primary care centers (data available for analysis on 188 subjects). Subjects had to score ≥ 22 on the Hamilton depression scale and ≥ 2 points on the item for "depressive mood."

Methods: Subjects underwent a single-blind placebo run-in phase of 3-7 days

during which time they received three placebo tablets of hypericum and one of paroxetine. They were then randomized to six weeks of either 900 mg hypericum (standardized to 3-6% hyperforin and 0.12-0.28% hypericin) or 20 mg paroxetine daily plus an identically matched placebo for the other agent (i.e., three tablets of hypericum plus placebo paroxetine capsule or one capsule of paroxetine plus three placebo hypericum tablets). If at least 20% improvement in total depression score was not noted after two weeks of treatment, doses were increased to either 1,800 mg hypericum or 40 mg paroxetine daily. Primary outcome measure was decrease in Hamilton depression score after six weeks compared to baseline. Secondary outcome measures included results of the Montgomery-Asberg depression rating scale, clinical global impressions, and the Beck depression inventory. Assessments were made at baseline and at 4 and 6 weeks.

Results: Compared to baseline values, by day 42 Hamilton depression scores had decreased by 57% in the hypericum group and by 45% in the paroxetine group. Those patients who were

switched to higher dosages at week 2 showed significant responses during weeks 3-6. Regardless of dose, substantial symptom relief was achieved with treatment in each group. Statistical analysis of validated rating scales showed the hypericum extract to be superior to paroxetine at almost all of the centers. The number of adverse events was higher for paroxetine than for hypericum (mainly gastrointestinal in nature).

Conclusion: Six weeks of hypericum extract WS 5570 is at least as effective as paroxetine in the treatment of adults with moderate-to-severe major unipolar depression.

Study strengths: Method of blinding; use of multiple validated rating tools; comparison to standard form of therapy.

Study weaknesses: All participants were Caucasian, limiting generalizability; assessment of compliance (counting tablets); short duration of trial; three-quarters of the authors have ties to the manufacturer of the hypericum extract utilized.

Of note: Participants were not allowed to use other psychotropic agents or

engage in psychotherapy during the trial; all assessments were made by psychiatrists and psychologists familiar with the protocol; mean age and average duration of episode were higher in the hypericum group; more than half the participants in each group were severely depressed; after two weeks, 57% of those in the hypericum group and 48% in the paroxetine group were switched to the higher dosage; 14% dropout rate in hypericum group and 23% dropout rate in the paroxetine group; two serious complications occurred in the hypericum group, though they were felt to be unrelated to the agent (one hypertensive crisis, one psychotic decompensation due to social problems); there was no increase in adverse effects with higher dosages of the agents, including photosensitivity; an ongoing continuation phase will be reported at a later date.

We knew that: Therapeutic effectiveness of St. John's wort for severe major depression has been in doubt; standardized extracts of St. John's wort have been shown effective in treating mild-to-moderate depression, and to be as effective as fluoxetine and some antidepressants in this regard; a placebo control was not used for these severely depressed patients for ethical reasons; St. John's wort has been reported to lower levels of a number of pharmaceutical agents, including cyclosporine, warfarin, theophylline, indinavir, and irinotecan.

Comments: Regarding either conventional methods of care or complementary modalities, industry involvement in research is a given in today's environment. While it is cause for especially careful assessment before drawing conclusions, as well as for investigation by other centers, industry involvement alone does not nullify positive results. At a time when the benefits of antidepressant therapy are being challenged by fears of frightening side effects (i.e., increased suicide risk), practitioners and patients alike are likely to seek out safe alternatives. A single trial of short duration, in a clinical situation where placebos have also been reported to offer sig-

nificant benefit, is not sufficient to mandate change in the long-term management of depression. Potential drug interactions do loom large when considering the use of hypericum. However, the study is clean, and the results compelling enough to open the possibility that St. John's wort may be a viable option for those with major depression, a clinical recommendation that previously would have been cause for alarm in many professional circles.

What to do with this article: Keep a hard copy in your file cabinet. ❖

Chromium, Glucose Tolerance, and Insulin Sensitivity

Source: Gunton JE, et al. Chromium supplementation does not improve glucose tolerance, insulin sensitivity, or lipid profile. *Diabetes Care* 2005;3:712-713.

Goal: To determine the effect of supplementation with chromium picolinate on glucose tolerance, insulin resistance, and lipid profile in people with impaired glucose tolerance.

Design: Randomized, double-blind, placebo-controlled trial.

Subjects: Forty subjects (24 females) with proven impaired glucose tolerance recruited from tertiary referral centers in Sydney, Australia.

Methods: Patients were randomized 1:1 to receive either chromium picolinate 400 µg twice daily or placebo over three months. Fasting levels of insulin, chromium, cholesterol, and triglycerides were determined prior to intervention.

Results: At trial's end the only differences noted were a small increase in serum chromium levels in the active group and a small rise in cholesterol levels in the placebo group.

Conclusions: Chromium supplementation offers no significant benefit to people with impaired glucose tolerance.

Study strengths: Although the sample

size was small, the study was sufficiently powered to identify clinically relevant differences between treatment arms.

Study weaknesses: Compliance assessed by tablet count; 800 µg/d is a higher dose than used in some studies, but it is nonetheless a lower dose than what is commonly used in clinical practice (1,000 µg daily).

Of note: An estimated 10 million Americans use chromium supplements, making them the second most popular nutritional supplement; dietary requirements for chromium are controversial, and the present RDA is 0.05-0.20 µg; while many studies of chromium for the treatment of diabetes have been published, results have been inconsistent; subjects were asked not to use chromium supplementation outside the study parameters.

We knew that: The association between chromium deficiency and development of diabetes was first noted in patients receiving long-term parenteral nutrition (diabetes resolved following chromium supplementation, and chromium is now routinely added to TPN solutions); the most appropriate biomarker of adequate chromium status has yet to be identified; chromium is found in many foods including wheat germ, brewer's yeast, many meats, and a number of vegetables; chromium has been touted as a weight-loss/body-building supplement with little supportive research; one published study suggested that chromium picolinate can cause DNA damage (likely due to the picolinate moiety), but this has not been shown to be true in humans.

Clinical import: With a seemingly ever-increasing incidence of Type 2 diabetes, patients are exploring a wide variety of supplements, especially chromium, to help control the malady and limit complications. This small, but adequately powered, study showed no significant benefit attributable to a moderate dose of chromium picolinate in people with impaired glucose tolerance. Results of studies on chromium for the treatment of diabetes and dyslipidemia have been

inconsistent, the dosages used have often not approximated the dosage employed clinically (true even for the present study), and good data are scarce for weight loss and other advertised indications. Unfortunately, a reliable normal range for chromium levels has not yet been established, and it is possible that supplementation may benefit those patients with Type 2 diabetes who are also chromium-deficient. For those using chromium, the picolinate form is perhaps the most popular, but many practitioners steer their patients to GTF (glucose tolerance factor) chromium in part because of the concerns raised about picolinic acid in the single laboratory study cited above. That stated, the data supporting supplementation with magnesium in the setting of insulin resistance/diabetes appear more convincing.

What to do with this article: Keep a copy on your computer. ❖

Life Expectancy and the 21st Century

Source: Olshansky SJ, et al. A potential decline in life expectancy in the United States in the 21st century. *N Engl J Med* 2005;352:1138-1145.

Goal: To calculate the effect of current trends in obesity in the United States on life expectancy.

Design: Mathematical analysis.

Methods: The authors calculated the reduction in death rates in the United States if all Americans who currently are obese were to lose enough weight to meet criteria for having a normal body mass index, or BMI (24%). Data used for the calculations were taken from the Third National Health and Nutrition Examination Survey and the National Center for Health Statistics. Calculations included probability of death for the non-obese population and obesity-adjusted conditional probability of death.

Results: If obesity were completely eradicated, life expectancy at birth could rise by almost one year across racial and sexual categories. Should the current death rate associated with obesity remain constant, obesity would lower life expectancy by 4-9 months (more than the negative impact of all accidental deaths combined). Should trends in obesity prevalence and associated illnesses continue, the negative impact on life expectancy could increase to 2-5 years, approaching or exceeding that of cardiovascular disease or cancer.

Conclusion: Life expectancy at birth and at older ages could level off or even decline within the next few decades given the present trends in obesity. The youth of today may live less healthy and shorter lives than their parents.

Study strengths: Calculations and background data are based on firm statistics that have been repeatedly verified.

Of note: Human life expectancy has been slowly increasing over the past 1,000 years, with valleys due to infectious disease, epidemics/pandemics, famines, and war, and peaks in response to technological advances, improved living conditions, and advances in public health; most predictions of future life expectancy are based upon historical trends that do not take into account the current health status of the population; the largest increases in obesity have occurred among children and minorities, populations for whom primary medical care often is woefully inadequate; one prior study noted that obesity causes 300,000 deaths per year; the lifetime risk of diabetes for people born in the United States is now 30-40%, the mean age of onset of diabetes has decreased dramatically, and diabetes shortens lifespan by almost 13 years on average.

We knew that: Last year the Social Security Administration projected life expectancy in the United States to reach close to 85 years sometime this century, while other experts believe this estimate to be too conservative; a 2004 United

Nations report predicted that in most countries of the world men and women could expect to live until age 100 years by 2300; observed trends in obesity in the United States continue to worsen, with prevalence increasing by 50% through both the 1980s and 1990s; > 60% of U.S. adults are overweight or obese, with 28% of men, 34% of women, and almost 50% of non-Hispanic black women meeting criteria for obesity; the increase in rates of obesity crosses all racial and socioeconomic strata; obesity increases the risk for numerous illnesses including diabetes, cardiovascular disease, and cancer; infection with antibiotic-resistant organisms, increased exposure to environmental pollution, and smoking could all further adversely impact future life expectancy.

Comments: This space is typically reserved for clinical trials that may impact the way we care for our patients, yet this recently published special report should spur us to action more than any single randomized controlled trial could.

The information for this review was culled directly from the article, and there are many more statistics in the piece that can leave one's mouth agape. There's little need to seriously consider weaknesses in the study as the math is clear. The information contained herein serves notice to we health care professionals that the time for action is long overdue.

We must act individually and collectively on behalf of our patients (and ourselves), on both local and national levels, to ensure access to healthy fare, to promote additional physical education in schools, and to support more research into behavior modification and appropriate weight management. The political ramifications of these data are likewise profound. As the authors point out, "the U.S. population may be inadvertently saving Social Security by becoming more obese." Finally, a political stance no one could reasonably take.

What to do with this article: Make copies to hand out to your peers (and put some in the waiting room). ❖

ALTERNATIVE MEDICINE ALERT™

A Clinician's Evidence-Based Guide to Alternative Therapies

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Acupuncture and Female Infertility

IN THE UNITED STATES, AS MANY AS 15% OF ALL COUPLES ARE INFERTILE, WITH HIGHER RATES seen in older couples. Although nearly half of all infertile couples have some component of male infertility, only 30% of cases are a result of male infertility alone. Female infertility may be a result of anovulation, pelvic factors such as adhesions and tubal occlusion, and cervical factors.

It usually is the female partner who presents initially for an infertility problem, often in the context of an annual well-women examination. In this situation, the primary care provider may initiate certain diagnostic and treatment options. Given the expense and invasive nature of many conventional treatment options for infertility, complementary and alternative therapies such as acupuncture have begun to receive more attention from physicians and patients. Although there remains a paucity of clinical research in this area, the relative safety of acupuncture makes it a reasonable option as part of an initial intervention or in conjunction with conventional therapies.

Mechanism of Action

The mechanisms of action by which acupuncture may treat female infertility have not been elucidated. One possible mechanism is via hormonal regulation, with acupuncture regulating a dysfunctional hypothalamic-pituitary axis. Another mechanism might be improvement in uterine blood flow, which increases the receptivity of the endometrium to a fertilized egg.

Human Female Studies—Treatment

Infertile patients may seek assisted reproductive techniques such as in vitro fertilization (IVF). Successful IVF depends on adequate endometrial receptivity. Acupuncture has been demonstrated to improve uterine blood flow impedance, which is a measurement of blood flow to the uterus. It has been considered valuable in assessing endometrial receptivity.¹ Ten subjects with a high pulsatility index, a measurement made using Doppler transvaginal ultrasound, were treated with twice weekly acupuncture for the month prior to embryo transfer. A high pulsatility index is evidence of decreased uterine artery blood flow. Pulsatility index decreased both at the time of the embryo transfer and again at follow-up approximately two weeks later. The authors suggest that the effects arise from a central inhibition of the sympathetic activity.

Acupuncture also has been studied as analgesia during infertility treatment. A randomized controlled trial compared acupuncture to alfentanil as anesthesia for oocyte aspiration during IVF.² One hundred fifty women participated in this study. The acupuncture group experienced discomfort for a longer period of time during oocyte aspiration, but no differences between the groups were noted by visual analog scale, adequacy of anesthesia during aspiration, abdominal pain suffered, or degree of nausea. Surprisingly, the acupuncture group had a statistically significantly higher implantation rate, pregnancy rate, and take home baby rate

per embryo transfer. Compared with the alfentanil group, the electroacupuncture group's implantation rate was 27.2% vs. 16.3%; pregnancy rate was 45.9% vs. 28.3%; and take home baby rate was 41% vs. 19.4% per embryo transfer. The same authors are conducting a larger study to corroborate these findings.

A large fibroid may cause infertility. One case report presented a patient with a 13 x 8 x 10 cm fibroid uterus who had secondary infertility, unresponsive to "repeated" cycles of IVF.³ The exact number of IVF cycles was not reported. This patient underwent acupuncture treatment and her uterus decreased to 7 x 8 x 8 cm, after which she had successful IVF and delivered healthy twins.

The studies cited above all used body points, but auricular (or ear) acupuncture also has been used to treat female infertility.⁴ Forty-five infertile women with either oligomenorrhea or luteal insufficiency were treated with auricular acupuncture. Results of treatment were then compared with matched subjects who were treated with hormones. Pregnancy rate was similar for both groups, whereas side effects were observed only in the hormone group. However, the groups were not equal even though they were matched on several criteria. The authors conclude that auricular acupuncture seems to offer a valuable alternative therapy for female infertility from hormone disorders. However, lack of randomization and differences between the groups limit the ability to make this conclusion.

Human Female Studies—Hormone Levels

Chinese investigators studied 10 anovulatory women and five women with normal menstrual cycles.⁵ Subjects were treated with electroacupuncture for 30 min/d for three days per month for 13 cycles. Changes in blood hormone concentration were measured. Beta-endorphin, LH, and follicle-stimulating (FSH) normalized in those who ovulated but did not change in those who did not ovulate. However, the determination of ovulation was not described, and other important methodological details are missing.

Another Chinese study was equally difficult to interpret.⁶ Thirty-four subjects with amenorrhea and dysfunctional uterine bleeding received acupuncture three times per week for three months. The terms that the authors use are unclear. Criteria for the efficacy of therapy for inducing ovulation were defined as markedly

effective, effective, or ineffective, based on ultrasound, basal body temperature, and presence or absence of menstruation. Thirty-five percent, 48%, and 18% were markedly effective, effective, and ineffective, respectively. An endocrine profile was performed in 20 subjects before and after treatment. FSH, LH, and estradiol normalized compared to pre-acupuncture values. However, the time during the menstrual cycle at which the blood was drawn was not stated; different timing could greatly skew these results.

Safety

Several prospective investigations of the adverse effects associated with acupuncture have supported its relative safety.⁷⁻⁹ The most frequently reported adverse effects were needling pain and hematoma.

References

1. Stener-Victorin E, et al. Reduction of blood flow impedance in the uterine arteries of infertile women with electro-acupuncture. *Hum Reprod* 1996;11:1314-1317.
2. Stener-Victorin E, et al. A prospective randomized study of electro-acupuncture versus alfentanil as anaesthesia during oocyte aspiration in in-vitro fertilization. *Hum Reprod* 1999;14:2480-2484.
3. Sternfeld M, et al. The effect of acupuncture on functional and anatomic uterine disturbances: Case report—secondary infertility and myomas. *Am J Acupuncture* 1993;21:5-7.
4. Gerhard I, Postneek F. Auricular acupuncture in the treatment of female infertility. *Gynecol Endocrinol* 1992;6:171-181.
5. Chen BY. Acupuncture normalizes dysfunction of hypothalamic-pituitary-ovarian axis. *Acupunct Electrother Res* 1997;22:97-108.
6. Mo X, et al. Clinical studies on the mechanism for acupuncture stimulation of ovulation. *J Tradit Chin Med* 1993;13:115-119.
7. MacPherson H, et al. The York acupuncture safety study: Prospective survey of 34,000 treatments by traditional acupuncturists. *BMJ* 2001;323:486-487.
8. White A, et al. Adverse events following acupuncture: Prospective survey of 32,000 consultations with doctors and physiotherapists. *BMJ* 2001;323:485-486.
9. Melchart D, et al. Prospective investigation of adverse effects of acupuncture in 97,733 patients. *Arch Intern Med* 2004;164:104-105.