

Acupuncture Therapy for Severe Oligoasthenoteratozoospermia

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ABSTRACT

Background: Infertility affects ~15%–20% of couples. Of the 16.7% infertility rate reported based on World Health Organisation questionnaire data, 6.4% of cases are associated with male factors. Male infertility can result from abnormal semen parameters; oligoasthenoteratozoospermia (OAT) is the most common diagnosis. Acupuncture is an ancient method that has been used for centuries to treat and prevent various conditions. In modern medicine, it is gaining popularity as a complementary infertility therapy.

Case: A 41-year-old male presented to the Medical Acupuncture Department of Dr. Cipto Mangunkusumo Hospital (in Jakarta, Indonesia) because he wanted to have a child. His semen was analyzed, and he was diagnosed with severe OAT. Manual acupuncture therapy was performed at CV 3, CV 4, CV 5, CV 6, CV 7, ST 29, SP 6, SP 3, ST 36, and KI 3, alternating with KI 7 5 days per week and at LR 8 once per week, for a total of 28 sessions.

Results: Semen analysis after 2 series of manual acupuncture treatments revealed improvement, especially in sperm motility, from 25% to 33% and then to 67% after the first and second serial therapies, respectively, changing the diagnosis from severe OAT to severe oligoteratozoospermia.

Conclusions: Manual acupuncture combined with medication improves male fertility, especially sperm motility.

Keywords: acupuncture, oligoasthenoteratozoospermia, male infertility

INTRODUCTION

INFERTILITY, WHICH AFFECTS ~15%–20% OF COUPLES, is defined as the inability to conceive within 12 months of regular unprotected sexual intercourse.^{1,2} Many reports suggest that male infertility has increased over the last decade. This growing condition causes significant marital and psychosocial stress and contributes to the high cost of infertility treatment. Of the 16.7% infertility rate based on World Health Organisation (WHO) questionnaire data, 6.4% of cases are associated with male factors.¹

Male infertility is diagnosed when abnormal semen parameters in motility, morphology, or concentration are observed in at least 1 of 2 semen analyses. Because these abnormalities often occur concurrently, the most-common male infertility condition is called oligoasthenoteratozoospermia (OAT),² in-

dicating that the concentration of spermatozoa as well as the percentages of both progressively motile and morphologically normal spermatozoa are below the lower reference limits. Other conditions related to semen quality are oligozoospermia (low spermatozoa concentration), asthenozoospermia (low percentage of progressively motile spermatozoa), teratozoospermia (low percentage of morphologically normal spermatozoa). The lower reference limits are shown in Table 1.³

Some modifiable lifestyle factors contribute to semen quality, including: (1) obesity, which is associated with lower serum testosterone and luteinizing hormone, elevated oligospermia and azoospermia rates, and decreased ejaculate volume, sperm concentration, and total sperm count; (2) smoking, which is associated with lower sperm concentration, impaired sperm motility and morphology, and reduced fecundability; and (3) alcohol consumption,

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TABLE 1. LOWER REFERENCE LIMITS OF SEMEN CHARACTERISTICS³

Parameters	Lower reference limits
Semen volume (mL)	1.5 (1.4–1.7)
Total sperm number (10 ⁶ /ejaculate)	39 (33–46)
Sperm concentration (10 ⁶ /mL)	15 (12–16)
Total motility (PR + NP, %)	40 (38–42)
Progressive motility (PR, %)	32 (31–34)
Vitality (live spermatozoa, %)	58 (55–63)
Sperm morphology (normal forms, %)	4 (3.0–4.0)
Other consensus threshold values	
pH	≥ 7.2
Peroxidase-positive leukocytes (10 ⁶ /mL)	< 1
MAR test (motile spermatozoa with bound particles, %)	< 50
Immunobead test (motile spermatozoa with bound beads, %)	< 50
Seminal zinc (μmol/ejaculate)	≥ 2.4
Seminal fructose (μmol/ejaculate)	≥ 13
Seminal neutral glucosidase (mU/ejaculate)	≥ 20

PR, progressive; NP, nonprogressive; MAR, mixed antiglobulin reaction.

which is associated with deterioration of sperm parameters.⁴ Impaired spermatogenesis causes an increase in reactive oxygen species (ROS) concentration in seminiferous tubules and seminal plasma as well as an imbalance in germ-cell apoptosis, which can affect spermatozoa concentration, motility, and morphology.⁵

OAT diagnosed by semen analysis can be treated by targeting infections, varicoceles, and hormone abnormalities, using assisted reproductive technology empirical therapies, such as hormonal preparations and antioxidants, if there is no definitive therapy.² Various medications and supplements can improve semen quality. Coenzyme Q10 (Co-Q10), for example, can increase sperm production, while L-carnitine (2 g daily), omega-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and α-lipoic acid), selenium, and zinc can improve sperm motility.⁴

Acupuncture is an ancient method that has been used for centuries to treat and prevent various conditions. In modern medicine, acupuncture is gaining popularity as a complementary infertility therapy and as *in vitro* fertilization (IVF) support therapy.⁶ It has been reported that acupuncture increases the success of treatment for semen abnormalities when given in conjunction with standard therapy. Acupuncture is a relatively safe and inexpensive procedure with few side-effects.

CASE

A 41-year-old male presented to the Medical Acupuncture Department of Dr. Cipto Mangunkusumo Hospital (in Jakarta, Indonesia) because he wanted to have a child.

He had been married for almost 3 years. He previously smoked as much as 1 pack of cigarettes per day but had not smoked since his marriage. He had never engaged in regular exercise, often stayed up late, and placed his laptop on his lap while working. He denied any history of alcohol consumption and reported regularly consuming 1–2 cups of coffee per day. He had no history of diabetes mellitus, allergies, or needing blood thinners. Following consultations with an andrologist and an obstetrician, his semen was analyzed, and he was diagnosed with severe OAT. The andrologist prescribed Seloxy (vitamins containing β-carotene, vitamins C and E, zinc, and selenium), Blesifen (clomifene citrate), Oligocare (a supplement that contains lycopene, Co-Q10, glutathione, and minerals), and Vitan (herbal *Tribulus terrestris*), which the patient consumed routinely. The patient received no treatment other than these medicines and acupuncture therapy.

A physical examination revealed that his vital signs were within normal limits. The patient was 165 cm tall, weighed 84 kg, and had a body mass index of 30.85, placing him as obesity grade II according to the WHO's Asia-Pacific obesity classification. Based on this status, the patient was advised to change his lifestyle by eating a high-fiber diet and doing 200 kcals of exercise every day.

Manual acupuncture therapy was performed using 0.25 mm × 40 mm and 0.20 mm × 15 mm stainless-steel filiform disposable needles at CV 3 (*Zhongji*), CV 4 (*Guan-nyuan*), CV 5 (*Shimen*), CV 6 (*Qihai*), CV 7 (*Yinjiao*), ST 29 (*Guilai*), SP 6 (*Sanyinjiao*), SP 3 (*Taibai*), ST 36 (*Zusanli*), and KI 3 (*Taixi*) alternating with KI 7 (*Fuliu*), 5 days per week and at LR 8 (*Ququan*) once per week. Two series of therapy were completed (14 times per series), for a total of 28 sessions. The progressive results of the treatment are outlined in Table 2.

Follow-up semen analysis should be done 2 weeks after completing a series of acupuncture treatments. However, for this patient, it was performed 1 week after the first serial therapy because the IVF program recommended by the obstetrician began a week earlier than previously scheduled.

RESULTS

Semen analysis after 2 series of manual acupuncture revealed improvement, especially in sperm motility, from 25% to 33% and then 67% after first and second serial therapy, respectively, changing the diagnosis from severe OAT to severe oligoteratozoospermia.

DISCUSSION

Acupuncture reduces inflammation, modulates the immune system, and increases the motility of sperm and semen parameters. Acupuncture mechanisms can be local, segmental, or central by activating the somatic afferent nerve that

TABLE 2. RESULTS COMPARISON BEFORE AND AFTER THERAPY

Parameters	Before treatment	1 week after 1st serial therapy	2 weeks after 2nd serial therapy
Analysis of seminal fluid (macroscopic)			
Appearance	Normal	Normal	Normal
Liquefaction	Normal	Normal	Normal
Volume	1.0*	0.8*	0.5*
pH	8.0*	8.0*	7.7
Viscosity	Normal	Normal	Normal
Analysis of sperm (microscopic)			
Concentration	0.3	0.3	0.3
Motility:			
PR	25*	33	67
NP	0*	33*	0*
Immotile	75*	34*	33*
Vitality	28*	40*	40*
Morphology	2*	2*	3
Agglutination	Negative	Negative	Negative
Leucocytes	2–3	1–2	2–3
Erythrocytes	Negative	Negative	Negative
Others	Negative	Negative	Positive (epithelial-cell)
HOS test	Positive	Positive	Positive
MAR test	Negative	Negative	Negative
Fructose test			
Diagnosis	Severe oligo-astheno-teratozoospermia	Severe oligo-teratozoospermia	Severe oligo-teratozoospermia

*Abnormal results.

PR, progressive, NP, nonprogressive; HOS, hypo-osmotic; MAR, mixed antiglobulin reaction.

innervates the skin and muscles, which can modulate the activities of the somatic and autonomic nervous systems, including metabolism and endocrine function. Research shows that interleukin(IL)-10, IL-8, and tumor necrosis factor- α levels in the prostate are reduced after acupuncture therapy, suggesting that the treatment can reduce inflammatory reactions, increase immunoglobulin A secretion into the prostatic fluid, and improve the function of local prostate immunity.⁶

Acupuncture also improves blood circulation in the testes and epididymis, and some studies have shown that acupuncture reduces semen ROS levels significantly, especially in men with varicoceles or genital-tract inflammations. Oxidative stress damages the specific lipid composition of sperm cells, causing functional and morphologic changes. Acupuncture has been shown to increase the activity of superoxide dismutase (SOD) and glutathione peroxidase (GPx), which have antioxidant effects that can reduce ROS levels.⁷

A recent study suggested that poor sperm parameters occur due to changes in calcium and integrin-binding protein 1 (CIB1) along with cell cycle regulator cyclin-dependent kinase 1 (CDK1). Dysregulation of CDK1 or other cell-cycle regulators can interfere with the normal interval of Sertoli-cell proliferation, causing an imbalance in the numbers of Sertoli and developing germ cells, which can increase germ-cell apoptosis and cause defective spermatogenesis. Thus, changes in sperm CIB1 and CDK1 signaling pathways are potentially important for regulating sperm parameters in

patients with oligoasthenozoospermia.⁸ A 2019 randomized controlled trial (RCT), conducted by Yu et al., reported that 2-Hz transcutaneous electrical acupoint stimulation on BL 23 (*Shenshu*), ST 36, CV 1 (*Huiyin*), and CV 4 for 30 minutes daily for 2 months can increase sperm count and motility in patients with semen-parameter abnormalities associated with increased semen levels of zinc, N-acetylglucosamine, and fructose. These positive effects can be attributed to increased CIB1 and decreased CDK1 levels.⁹ Unfortunately, in the current case, the patient's CIB1 and CDKI levels were not tested.

A systematic review and meta-analysis by Jerng et al., in 2014, reported that, in 4 RCTs involving at least 500 research subjects, the most widely used acupuncture points were CV 3, CV 4, CV 6, KI 3, ST 36, SP 6, BL 23, BL 32 (*Ciliao*), and GV 4 (*Mingmen*) and the most commonly used modalities are manual acupuncture and electroacupuncture.¹⁰

A serial case study by Claiçi et al., in 2009, of 45 male patients diagnosed with idiopathic male infertility reports increases in numbers, motility, and morphology of spermatozoa after 10–15 sessions of manual acupuncture every 2–3 days at LR 3 (*Taichong*), SP 6, SP 8 (*Diji*), SP 9 (*Yinlingquan*), CV 2 (*Qugu*), CV 3, CV 4, GV 4, BL 23, BL 52 (*Zhishi*), and BL 32.¹¹

A prospective randomized placebo-controlled study by Dieterle et al., in 2009, which assessed the effects of acupuncture in patients with severe oligoasthenozoospermia, showed significantly increased sperm motility but reduced

semen volume following manual acupuncture at ST 36, SP 6, KI 3, LR 3, BL 23, BL 32, ST 29 (*Guilai*), SP 10 (*Xuehai*), and CV 4 twice weekly for 6 weeks.¹² These results were consistent with the present case, which resulted in improved sperm motility after manual acupuncture.

According to the theory of Traditional Chinese Medicine, infertility can result from a Kidney Deficiency (hormonal imbalance) or Damp-Heat syndrome (inflammation of the genital tract). Therefore, acupuncture points such as SP 6, CV 4, LU 7 (*Lieque*), KI 6 (*Zhaohai*), ST 30 (*Qichong*), KI 3, BL 23, KI 1 (*Yongquan*), and BL 52 are typically selected to treat Kidney Yang deficiency (spermatogenesis failure), while SP 9, LR 5 (*Ligou*), LI 11 (*Quchi*), ST 28, and GB 41 (*Zulinqi*) may be chosen to treat Damp-Heat syndrome.¹³ For the current patient, a combination of acupuncture points was used—CV 3, CV 4, CV 5, CV 6, CV 7, ST 29, SP 6, SP 3, ST 36, and KI 3 alternating with KI 7. According to Wang et al., in 2008, using CV 3, CV 4, and CV 6 is 67.6% effective for improving sperm quality.¹⁴ CV 4, ST 36, GV 20, and SP 6 increase germ-cell proliferation by improving Sertoli-cell function, thus improving spermatogenesis and restoring normal semen parameters.¹⁵ Only a few studies, however, have examined the underlying mechanism of acupuncture in treating OAT. Therefore, future research should seek to elucidate this mechanism.

CONCLUSIONS

Acupuncture reduces inflammation, modulates the immune system, improves blood circulation in the testes and epididymis, and reduces semen ROS levels significantly by increasing SOD and GPx activity. Acupuncture also improves sperm motility and semen parameters by increasing CIB1 and decreasing CDK1. In the current case, medications paired with manual acupuncture at CV 3, CV 4, CV 5, CV 6, CV 7, ST 29, SP 6, SP 3, ST 36, and KI 3 alternating with KI 7 5 days per week and at LR 8 once per week for a total of 28 sessions resulted in improved sperm motility.

AUTHOR DISCLOSURE STATEMENT

No financial conflicts of interest exist.

FUNDING INFORMATION

The funding of this present work was wholly provided by the first author.

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