

# Successful pregnancy in a woman with bilateral fallopian tube obstruction and diminished ovarian reserve treated with electroacupuncture

## A case report

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### Abstract

**Rationale:** Fallopian tube obstruction and diminished ovarian reserve (DOR) are main factors including female infertility. Acupuncture might be effective in the treatment of the disease.

**Patient concerns:** A 39-year-old woman diagnosed with fallopian tube obstruction and DOR has been unable to conceive in the past 5 years, despite of receiving various treatments and 3-time in vitro fertilization (IVF) in different countries.

**Diagnoses:** Under comprehensive consideration of clinical manifestations and hysterosalpingography examinations results, the patient was diagnosed as female infertility due to fallopian tube obstruction and DOR.

**Intervention:** Electroacupuncture treatment was performed 3 times per week for about 3 months.

**Outcomes:** After 2-months of electroacupuncture treatment, the patient's menstrual cycle was back to normal, and she conceived after 3-month treatment and gave birth to a healthy baby boy finally.

**Lessons:** Electroacupuncture might be a complementary or alternative treatment for female infertility, particularly for women with fallopian tube obstruction and DOR.

**Abbreviations:** AMH = anti-Mullerian hormone, DOR = diminished or diminished ovarian reserve, E2 = estrogen, FSH = follicle stimulating hormone, HCG = human chorionic gonadotropin, IVF = in vitro fertilization, LH = luteinizing hormone, WHO = World Health Organization.

**Keywords:** case report, diminished ovarian reserve, electroacupuncture, fallopian tube obstruction, female infertility

## 1. Introduction

Infertility is generally defined as the disability of conceiving after 12 months of unprotected sexual intercourse. It bothers about 8% to 12% of reproductive-aged couples worldwide.<sup>[1]</sup> Along with infertility, patients may also suffer from menstrual

irregularities and be burdened with pressure to conceive from society and family. Of all unpregnant couples, woman infertility accounts for 40% of all cases.<sup>[2]</sup> The etiological factors of female infertility include tubal problems (15–40%), ovulation (15–20%), endometriosis (5–10%), and unexplained factors (20–30%).<sup>[3]</sup> In infertile women with tubal damages, fallopian tube obstruction accounts for 10% to 25% of tubal disease and is often treated by recanalization.<sup>[4,5]</sup> Ovulation factors are also underlying causes of female infertility. Diminished ovarian reserve (DOR) occurs in reproductive-age women with regular menses whose response to ovarian stimulation or fecundity is reduced compared with their peers.<sup>[6]</sup> DOR occurs in 10% infertile women.<sup>[7]</sup> Treatment of DOR remains a great challenge. Although the primary treatment includes administration of sex hormones is often provided to improve ovarian responses; it has bothering adverse effects.<sup>[8]</sup> Given the complex etiologies and treatment risks, many patients stop trying to conceive naturally and turn to in vitro fertilization (IVF). In China, acupuncture is frequently applied to treat female infertility, but the curative effect is uncertain. Here, we present a successful case of electroacupuncture treatment for a patient with bilateral fallopian tube obstruction and DOR

## 2. Case description

A 39-year-old children-seeking woman was unable to conceive naturally after being married in 2013. In addition to infertility, the patient also had hypomenorrhea and menstrual disorder. From January 2014 to November 2015, the patient received

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This work was conducted with the approval of the review board and ethics committee of Guang'anmen Hospital (No. 2014EC097).

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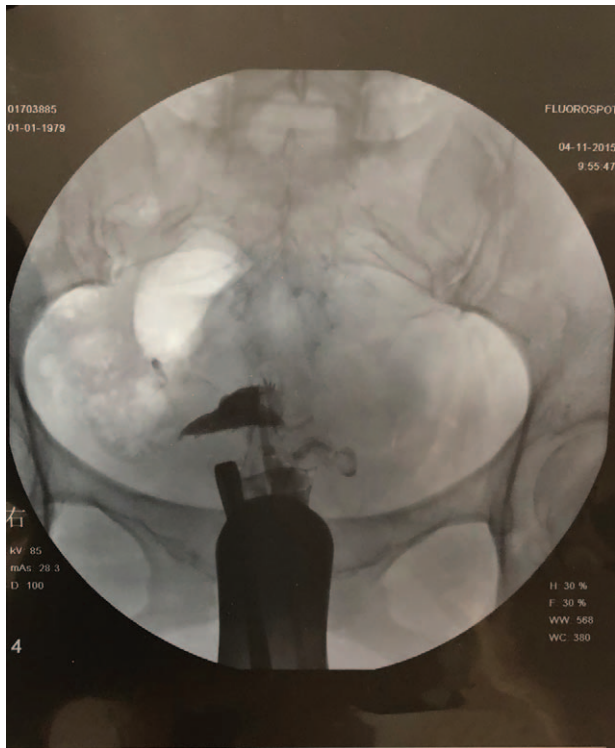
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**Figure 1.** Hysterosalpingography image (April 11, 2015) of the patient: fallopian tube obstruction in ampulla.

traditional Chinese herbal medicine in different hospitals, but remained unable to conceive. After systematic examination, the woman was diagnosed with fallopian tube obstruction and DOR upon gynecologic exam in 2015. Her anti-Müllerian hormone (AMH) level on November 27, 2015 was 0.18 ng/mL (an excellent ovarian response to gonadotropins range: 1.0–3.5 ng/mL<sup>[9]</sup>) and hysterosalpingography examination on November 14, 2015 indicated bilateral fallopian tube obstruction in ampulla (Fig. 1).<sup>[10]</sup> The patient refused fallopian tube recanalization for fear of the risks and sought help to conservative treatment. However, after pharmacotherapy, traditional Chinese herbal medicine, and acupuncture treatment, the situation of fallopian tube obstruction and DOR did not improve. The patient then elected IVF, which she attempted 3 times in different countries: United States in March 2016, Japan in November 2016, and China in March 2017. All IVF efforts ended in failure. According to biochemical tests over the past 4 years, the patient's follicle stimulating hormone (FSH) levels were between 12.8 and 28.1 IU/L (a relatively healthy ovarian range: <10 IU/L<sup>[9]</sup>), luteinizing hormone (LH) levels between 1.11 and 13.5 IU/L (normal reference range: follicular phase 2.12–10.89 IU/L), and FSH/LH between 1.29 and 4.37 (cut-off value: 2.0–3.6<sup>[9]</sup>). Three ultrasound images showed that there were 0 to 3 ovarian follicles in the left ovary and 1 to 4 in the right ovary. She ceased receiving any other medical treatment and opted for electroacupuncture treatment on June 4, 2018 in a hospital in Beijing, China.

### 3. Intervention

The electroacupuncture treatments were divided into 2 alternating formulas: A: bilateral Tianshu (ST25), bilateral Zigong

(EX-CA1), and Guanyuan (CV4); and B: bilateral Ciliao (BL32) and bilateral Zhongliao (BL33). In formula A, Hwato-brand disposable acupuncture needles (size 0.30 × 70 mm) were vertically inserted approximately 40 to 50 mm into the ST25, and needles (size 0.30 × 40 mm) were vertically inserted at 25 to 30 mm into the EX-CA1 and CV4. After “de qi” sensation was get (manifesting as numbness, heaviness, distention, and soreness, with a spreading sensation), paired electrodes from the Hwato-brand SDZ-V electroacupuncture apparatuses were attached to the needle handles at bilateral ST25 and EX-CA1, respectively. In formula B, the same brand needles (size 0.40 × 125 mm) were inserted at an angle of 30° to 45° in an inferomedial direction to a depth of 70 to 100 mm into the skin at BL32, and needles (size 0.30 × 70 mm) were inserted at the same angle to a depth of 50 to 60 mm into the skin at BL33. After “deqi” sensation was get, paired electrodes from the same apparatuses were attached respectively to the needle handles at bilateral BL32 and BL33. Electroacupuncture stimulation lasted for 20 minutes with a 2 Hz continuous wave and the current intensity was adjusted within patient's tolerance level. The 2 formulas were used alternatively every other day, 3 times per week, for about 3 months. During the period of electroacupuncture treatment, the patient did not receive any other treatment. The study procedures were explained to the patient and informed consent was obtained. The study was conducted in accordance with the Declaration of Helsinki and was approved by the review board and ethics committee of Guang'anmen Hospital (No. 2014EC097).

### 4. Outcome and follow-up

The intervention was carried out from June 4, 2018 to September 1, 2018 at a hospital in Beijing. After 1 month of electroacupuncture treatment, hormone measurements showed that the patient's FSH level was 13.74 IU/L, LH level was 3.5 IU/L. Compared with pretreatment levels, these key hormones did not significantly change, but the patient said that her menstrual blood volume increased. Two months after treatment, the patient's menstrual cycle became regular. Unfortunately, she did not go to the hospital to take female hormone test, thus the levels of hormone were unable to be compared with before. After 3 months of electroacupuncture treatment, serum human chorionic gonadotropin (HCG) levels indicated that the patient had conceived a baby. On October 18, 2018, ultrasound examination showed that the patient was 8 weeks and 2 days pregnant. During the patient's pregnancy, hysterosalpingography examination could not be conducted and the patient refused other fallopian tube examination. The patient gave birth to a baby boy by cesarean section on May 24, 2019 and follow-up examination showed that the baby was healthy. The patient was generally satisfied with the electroacupuncture treatment and even called the boy as “an acupuncture baby.” No adverse events occurred during the treatment period.

### 5. Discussion

Based on data from the World Health Organization (WHO), infertility affects 1 in 4 couples in developing countries.<sup>[11]</sup> Fallopian tube obstruction is a significant factor underlying female infertility, and its common causes include pelvic, vaginal, and peripheral organ inflammation.<sup>[12]</sup> The pathological process of tube obstruction involves inflammation, which results in

fallopian tube wall stiffness, peripheral tissue adhesion, and lumen obstruction. These inflammatory pathologies increase the difficulty of sperm motility, thus inducing secondary infertility.<sup>[13]</sup> In the case presented here, the patient had been diagnosed with secondary infertility of fallopian tube obstruction 3 years before and did not receive recanalization surgery. Although there was no imaging evidence, we inferred, given the fact that the patient did conceive, that her fallopian tube might be partial recanalized as the result of electroacupuncture treatment.

Some studies have indicated the effects of acupuncture in treating infertility before. Fang et al,<sup>[14]</sup> reported blood invigoration and the dissolution of stasis as a key strategy for treating infertility caused by obstructed fallopian tubes. Ding et al,<sup>[15]</sup> used acupuncture combined with traditional Chinese herbal medications and hydrotubation with gentamicin, dexamethasone, and chymotrypsin to treat fallopian tube obstruction related infertility with good outcomes. Collectively, these studies indicated that acupuncture treatment might be an effective treatment strategy for female infertility due to fallopian tube obstruction.

The patient in this case was also diagnosed with DOR 3 years prior to treatment. The cause of DOR is unknown. It might relate to poor ovary response, as supported by biochemical tests (FSH 10–20 IU/L, AMH 0.2–0.7 ng/mL) and ultrasound imaging of the ovaries (decrease of antral follicle counts 3–10).<sup>[16]</sup> Assisted reproductive technology (such as IVF) and hormone replacement therapy are common treatments for DOR-related infertility. However, patients with DOR receiving IVF are at risk of low ovarian response, low oocyte acquisition rates, and high abortion rates.<sup>[17]</sup> Hormone replacement therapy has some side effects with long-term use, such as an increased risk of breast cancer.<sup>[18]</sup> A previous study found that mean FSH levels of 21 patients with DOR fell from  $19.33 \pm 9.47$  mIU/mL at baseline to  $10.58 \pm 6.34$  mIU/mL after 12-week electroacupuncture treatment, mean E2 and LH levels, FSH/LH ratios were improved as well.<sup>[19]</sup> Another study found that acupuncture modulated the endocrine, sympathetic nervous, and neuroendocrine systems to benefit the reproductive system.<sup>[20]</sup>

It was acknowledged that there were certain limitations of the case report. Due to the personal reasons of patients in the second month and the pregnancy in the third month, changes of hormone levels, ovarian reserve function, and situation of fallopian tube had not been monitored throughout treatment, so we could not see the further changes of hormone levels, and neither could we provide a comparison image post-acupuncture of hysterosalpingography examination.

However, given the facts of increased menstrual blood volume, normal period, and natural pregnancy (3 times IVF failed previously), we suggested that the patient's ovarian reserve function might be increased during the electroacupuncture treatment.

From the case reported, electroacupuncture might have some effect in treating female infertility due to fallopian tube obstruction and DOR. But more evidence is required to explore the effectiveness and safety of it and the possible mechanism under it.

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## Author contributions

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