Poor ovarian reserve and high FSH levels

As a result of many positive studies over the past few years, the integrated treatment of infertility has become very popular. The shortcoming of Western medicine in its ability to resolve some infertility problems, in combination with the success of Chinese medicine to successfully do so, has further contributed to its popularity. This article deals with the approach to treating one of the most common problems that infertile patients present to Chinese medicine.

By Keren Zelicha & Udi Luria

Western medicine background

Poor ovarian reserve is a condition of poor infertility characterised by low numbers of oocytes remaining in the ovaries. Other familiar terms to describe this situation are “impaired ovarian reserve”, “premature ovarian failure” or “declining ovarian reserve”. Controversy and debate still exist over the definition of ovarian quality.

The common factors for the assessment of ovarian reserve are as follows:

Age is the most consistent variable that affects ovarian potential, but quite often young women in their early 30s can also show low ovarian potential. Passive tests, such as an isolated rise in serum FSH during the early follicular phase, may predict fertility outcome. Along with low antral follicle count (AFC) and ovarian volume, this is considered one of the predictors of ovarian failure. Women with normal FSH levels (days two to four of the menstrual cycle – 10 IU/L) behave as “normal” responders and will have an adequate number of mature oocytes available for fertilisation following standard ovarian stimulation.

On the contrary, patients with high FSH may respond poorly to standard ovarian stimulation both in terms of the number of oocytes and the outcome of treatment. It is important to note that women can have a normal follicular phase FSH level, yet still respond poorly to ovarian stimulation and hence are considered to have poor ovarian reserve.

Serum inhibin B levels can also be used to predict ovarian reserve, including egg quality and quantity. Because inhibin B is produced directly by ovarian follicles, the levels can correlate with the number of early antral follicles. An abnormal level of inhibin B, below 45 pg/mL on cycle day three, suggests poor ovarian reserve.

Due to the knowledge gained through
many previous studies, today FSH and AFC levels are the gold standard for diagnosing ovarian reserve. Other tests, like ones that measure inhibin B and anti mullerian hormone levels, are considered less reliable. If these test results are used clinically, the interpretation should be performed in the context of other clinical measures.

The most commonly used active test regarding oocyte quality and quantity is the Clomiphene Citrate Challenge Test (CCCT). In short, clomiphene citrate is given on days five through nine of the cycle and FSH levels are determined on days three and 10.

The value at day three is not stimulated and represents the same basal value used in the cycle day-three FSH screening. Clomiphene stimulates an increased release of FSH early in the follicular phase, which improves follicular function and when normal, the follicle would produce enough inhibin and estradiol feedback to the pituitary so as to suppress FSH production by cycle day 10. An FSH value of greater than 10 mIU/ml for either cycle days three or 10 indicates an abnormal test. However, there is little agreement about FSH values, and criteria for normal vs. abnormal results vary from study to study. ²

Since FSH is an important and reliable symptom in diagnosing poor ovarian reserve, this article will try to explain the energy, function and disharmony of FSH from the point of view of traditional Chinese medicine. With this, we can then understand how TCM can be used to treat poor ovarian response.

FSH secretion and function

FSH stimulates the growth and recruitment of immature ovarian follicles in the ovary. During the late luteal phase, estrogen and progesterone levels fall due to the degenerating corpus luteum, leading to a rise in FSH levels. This causes those antral follicles that happen to be at a more advanced stage of maturation to continue to grow. During the follicular phase, as the follicles mature they secrete estrogen and inhibin B, which leads to gradual FSH suppression via a negative feedback loop. If the follicles do not mature, FSH will continue to be produced and rise to high levels, as seen in patients going through menopause or those with poor ovarian reserve.

Chinese medicine theory

When trying to understand the energetic nature of FSH, we should look to the Nei Jing (Inner Classic) chapter one: “At the age of 14, a girl begins to have menstruation, energy in her conception meridian begins to flow, and energy in her rigorous meridian [tai chong mai] begins to grow in abundance. At this point, she begins to have reproductive energy, which is the reason why she is capable of pregnancy.” ³ Therefore follicles are related to the potential of female fertility and are part of essence. FSH is responsible for follicle maturation and growth; a fulfillment of the potential within the ovaries. Hence, FSH is related to Kidney qi energy and is considered to be yang energy.

It can be thought of as part of the Kidney-Heart Bao mai axis, as a pituitary-ovarian hormone that aids in the development of follicles. It should be emphasised that the energy of FSH relates to yuan (source) qi as well as Kidney qi. It is the qi that comes with the essence and influences the essence. Yuan qi is linked to the Kidneys and sometimes to the ming men (life gate), expressing a movement for regulating life in the rhythmic beating between the two kidneys. ⁴ The Kidney, Spleen, and Lung organs are very important for the production of qi and directly influence its renewal and original emanation. ⁵ Therefore, in order to support the function of FSH to stimulate the follicles, we can strengthen the yuan qi by supporting the Kidney, Spleen, and Lung organs.

Another way of supporting the follicles is by ensuring the harmonious distribution of the yuan qi throughout the San Jiao (triple burner). The 66th difficulty of the Nan Jing (Classic of Difficulties) states that the San Jiao carries the yuan qi to the source points. It is responsible for the initiation and circulation of yuan qi from the Kidneys to the rest of the body, and promotes the functional activities of the zang fu and various other tissues. By supporting the

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Yang energy is an important factor in the maturation of follicles and in transforming the potential essence into matter.

Distribution of the San Jiao, yuan qi can flow into the organs and support the essence of life as well as influence folliculogenesis. The distribution of the San Jiao relies on the free flow of Liver qi and the shaoyang, therefore one should also pay attention to these systems.

The importance of the San Jiao in creating life might also relate to the fact that it has no form. Formlessness is the great ancestor of matter; it is transformed by shen to create form and life. The sense of “no form” describes the San Jiao as being the base of existence for the vital processes and the relation of life to jing (essence) and shen (spirit). The San Jiao connects the Heart and Kidney pathways to allow the transportation of jing and shen through the body. Maintaining the Kidney (jing aspect) – Heart (shen aspect) axis can balance the ovary-pituitary axis and regulate FSH levels. In these situations, we may observe patterns of Kidney yin deficiency, Kidney jing deficiency, Heart yin deficiency, or qi obstruction.

Zhang Jing-Yue mentioned that the San Jiao not only regulates fluids, but that it also regulates yang and has a title of “Minister of Fire.” He also stated that jing and shen reside in the ming men. Yang energy (ming men) is an important factor in the maturation of follicles and in transforming the potential essence into matter. Sometimes women with a yang deficiency constitution may show high FSH levels with few follicles and a low fertilisation percentage.

Summary of regulating FSH functions

- Strengthen Kidney, Spleen and Lung organs in order to support the functions of yuan qi.
- **Point examples**: Taixi KID-3, Taibai SP-3, Taiyuan LU-9.
- **Herbs**: Ren Shen (Ginseng Radix), Dang Shen (Codonopsis Radix), Huang Qi (Astragalus Radix), Tu Si Zi (Cuscutae Semen).
- Support the San Jiao functions of initiating and distributing yuan qi so as to promote folliculogenesis.
- **Point examples**: Yangchi SJ-4, Shimen REN-5, Yanglingquan GB-34 with Zhigou SJ-6, or Zulingqi GB-41 with Waiguan SJ-5.
- **Herbs**: Xiang Fu (Cyperi Rhizoma), Chai Hu (Bupleuri Radix), Zhi Zi (Gardenia Fructus).
- Support the function of the San Jiao to transport jing and shen (Kidney-Heart axis).
- **Point examples**: Yangchi SJ-4, Waiguan SJ-5, Zhulin KID-9, Lingdao HE-4.
- **Herbs**: Dan Shen (Salvia Miltiorrhiza, Radix), Xiang Fu (Cyperi Rhizoma), He Huang Pi (Albiziae Cortex), Niu Xi (Achyranthis Radix).
- Support the ming men as an important factor in follicle maturation, as a yang energy and as a regulator between jing and shen.
- **Point examples**: Mingmen DU-4, Guanyuan REN-4.
- **Herbs**: Rou Gui (Cinnamomi Cortex), Tu Si Zi (Cuscutae Semen), Ba Ji Tian (Morindae Radix).

Another way to understand the nature of FSH is to look at the pathological causes of its elevation:

- Genetic factors such as fragile x syndrome
- Autoimmune disorders
- Adrenal gland impairment
- Iatrogenic factors such as radiation, chemotherapy or surgery.

The above reasons relate directly or indirectly to Kidney qi and jing deficiency and can be treated by strengthening the Kidneys. These pathologies may appear in women over the age of 35 with high FSH levels. According to the seven-year cycles as discussed by the Yellow Emperor, this is the point of life when the body starts to decline. Therefore, by strengthening Kidney qi and jing, FSH levels may decrease.

- **Point examples**: Taixi KID-3, Guanyuan REN-4, Qihai REN-6, Shenshu BL-23, Gaohuangshu BL-43.
- **Herbs**: Shu Di Huang (Rehmanniae Radix Preparata), Shan Yao (Dioscorea Radix), Tu Si Zi (Cuscutae Semen), Gui Ban (Testudinis Plastrum), Lu Jiao Jiao (Cervi Cornus Colla).

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Case 2

The patient was a 37-year-old female, who had been trying to conceive for one year. The patient reported that she had done four IVF treatments and her FSH level was 16.7 IU/L. Although she was given a high amount of gonadotropins during IVF treatments, she had only one to two eggs retrieved and fertilised. Acupuncture treatments were given on days one and four after egg transfer in order to improve implantation. Shortly after, it was very exciting to hear that the pregnancy test was positive and that the couple awaits a baby boy.

Endnotes
1. Ahmed Kassab et al. (July 2007). Does measuring early basal serum follicular luteinizing hormone assist in predicting In vitro fertilization (IVF)/ Intracytoplasmic sperm injection (ICSI) outcome? Reproductive Biology and Endocrinology
5. Lu, Henry C. A complete translation of the Yellow Emperor’s Classic of Internal Medicine and the Difficult Classic. The International College of Traditional Chinese Medicine, Vancouver
7. ibid, p. 49.
11. ibid, p. 63.
12. ibid, p. 365.

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powder at dosage of nine grams per day. Modifications were made over time but the base formula remained the same. Omega-3 pills and barley grass were also added.

Acupuncture treatments included points such as: Guanyuan REN-4, Sanyinjiao SP-6, Shuidao ST-28, Taichong LIV-3, Hegu L.I-4, Houxi SI-3, Shenmai BL-62, Taixi KID-3.

After five months of integrated treatments, the patient underwent successful egg aspiration during which two eggs were retrieved and fertilised. Acupuncture treatments were given on days one and four after egg transfer in order to improve implantation. Shortly after, it was very exciting to hear that the pregnancy test was positive and that the couple awaits a baby boy.

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