Relationship Between Blood Radioimmunoreactive Beta-Endorphin and Hand Skin Temperature During The Electro-Acupuncture Induction of Ovulation

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(Received October 24, 1990; Accepted with revisions, December 8, 1990)

Source: ACUPUNCTURE & ELECTRO-THERAPEUTICS RES., Vol. 16, pp. 1-5,1991

Abstract:

Thirteen cycles of anovulation menstruation in 11 cases were treated with Electro-Acupuncture (EA) ovulation induction. In 6 of these cycles which showed ovulation, the hand skin temperature (HST) of these patients was increased after EA treatment. In the other 7 cycles ovulation was not induced. There were no regular changes in HST of 5 normal subjects. The level of radioimmunoreactive beta-endorphin (rß-E) fluctuated, and returned to the preacupunctural level in 30 min. after withdrawal of needles in normal subjects. After EA, the level of blood rß-E in cycles with ovulation declined or maintained the range of normal subjects. But the level of blood rß-E and increase of HST after EA ($r=-0.677$, $P<0.01$). EA is able to regulate the function of the hypothalamic pituitary-ovarian axis. Since a good response is usually accompanied with the increase of HST, monitoring HST may provide a rough but simple method for prediciting the curative effect of EA. The role of rß-E in the mechanism of EA ovulation induction was discussed.

KEY WORDS: Electro-Acupuncture (EA), Hand Skin Temperature (HST), radioimmunoreactive beta-endorphin (rß-E), ovulation, radioimmunoassay (RIA)

INTRODUCTION

In our previous work, it has been demonstrated that EA is an effectual method of ovulation induction (1). The present work studied the relationship between the curative effect of EA and the changes of the HST and the level of blood beta-endorphin.

MATERIALS AND METHODS

Selection and Treatment of Cases

Eleven cases of chronically anovulatory patients including 9 cases of polycystic ovarian disease (PCO), 1 case of hypogonadotropic amenorrhea and case of oligomenorrhea were treated with EA in 13 menstruation cycles. They were 22 to 35 years of age and their courses of disease were 3 to 12 years. The basic body temperature (BBT) of these patients was monophase for at least 3 months. Each patient accepted the vaginal dropping cell examination twice or more a week. The results showed that the eosinocyte index (EI) of 10 cases was less than 30% and the EI of 1 case was more than 70%.

On the 10th day of each menstruation cycle, the patients were treated with EA. "Guanyuan" "Zhongji," "Sanyinjiao" and both sides of "Zigong" points were stimulated for 30 min. at 8:00 AM, OD for 3 days. The stimulation parameters were 7-10mA and 4-5HZ with G6805 model generator. The electric current of EA was bearable for every patient. Before and after the EA, HST was measured by a semiconduct thermometer and blood samples were collected from the forearm vien of patients for ß-E RIA. Five healthy woman voluteers with normal menstruation cycle were selected as controls. They were 31 to 35 years old and the menstruation cycle was 28 days. BBT showed change of biphase. All of them were healthy in premenorrhea and did not take any drug one month before EA. The stimulation points and parameters of EA were the same as above mentioned.

Plasma ß-Enorphin Radioimmunoassay

The blood samples were added to 100ug/ml bacitracin for inhibiting blood aminopeptidase and centrifuged at 3,000g for 15 min. The plasma was stored at -40°C.

The sensitive radioimmunoassay was performed as a routine in our lab (2,3), to determine the concentration of ß-E in the samples of plasma. Each estimative tube was added 0.1ml 1:8000 rabbit ß-E antiserum, 0.1ml[125]I-ß-E . That is 0.03ml sheep antiserum to rabbit gamma-globulin diluted 20-fold with RIA buffer was added to each tube, than shaken and incubated at 0-4°C for 24 hours, and centrifuged at 3,000g for 15 min. The supernatant was poured out and the precipitate was counted for radioactivity in Model FH 408 gamma counter. ß-E contents were quantitated according to the standard curve which was performed at the same time with the sample tubes. The least detected quantity of RIA was 10pg/tube.

RESULTS

Clinical Observation

It was adopted standards of ovulation that BBT showed biphase and EI became cyclic variation. Six of 13 menstruation cycles treated with EA showed ovulation, while the other 7 cycles failed to do so. No EA effect was found in normal control subjects.

In the 13 anovulatary cycles, increased HST occurred in 6 cycles, of which 5 cycles showed ovulation after EA treatment. 7 cycles manifested decreased HST and only one of them produced ovulation (Table 1). No regular change was seen in HST in normal subjects.

Table I. Effect of EA Induction of Ovulation in 13 Cycles

Changes of HST	Ovulation	No Ovulation	Total
Increased	5*	1	6
Decreased	1	6	7

* P<0.05 as estimated by X[2] test

Change of Plasrna rß-E

In normal menstruation cycles the level of plasma rß-E before and after EA fluctuated and returned to the preacupural level after 30 minutes.

In the 13 anovulatory cycles the level of plasma rß-E on the 10th day of the cycles was higher but not statistically significant from that of normal subjects.

After EA the plasma rß-E contents of 6 cycles with ovulation either declined or maintained within the range of normal. And the plasma level of 7 cycles that failed to show ovulation after EA were significantly higher than those of normal subjects and 6 ovulatory cases as estimated by t test (P<0.05), (Table 2).

Table 2. Changes of blood ß-E level before and after EA* (pg/ml)

Group of cases	No. of cycles	Before EA	After EA
Ovulation	6	65.59 ± 24.15	38.86 ± 10.11
No ovulation	7	65.59 ± 24.15	80.09 ± 22.16**
Normal	5	38.84 ± 10.13	41.52 ± 6.40

*The values in this table are Mean ± SE
**P<0.05

Cycles which showed increase of HST after EA were associated with a declination of plasma rß-E level but in cycles where HST decreased, the plasma rß-E level elevated after EA. There was a negative correlation between changes of plasma rß-E and HST as measured by rank correlation (r=0.677, P<0.01).

Discussion

According to our clinical practice of using EA to cure barreness, the curative effect was related to the changes of patients' HST. In general, provided that the body temperature was normal and the environmental temperature was constant round 25°C, the HST may reflect the state of sympathetic system of a patient.

From present results, it seems that the successful rate of EA ovulation induction was higher in patients with the depression of sympathetic activity. In normal subject whether HST increased or declined, no influence in ovulation was found. These results suggest that the relationship of ovulation and HST in normal women is different from that in anovulatory patients. Yen and his colleagues (4) first reported that enogenous opioid peptides can inhibit pituitary pulse secreting LH. Fumiko, Akio and Michael reported in succession that morphine, ß-E and dynorphin can

also depress LH pulse secretion (5,6,7). These substances may exert their action via regulating the secretion of LH-RH in hypothalmus. EA can affect the central opioid peptide level (2,8,9) thus it may regulate the function of hypothalamic-pituitary-ovarian axis via brain endogenous opiod peptides, such as ß-E and dynorphin etc.

In this study 11 cycles were PCO and the blood LH level in these cycles was marked higher than that of normal subjects. EA may promote the release of ß-E in the brain and reduce LH-RH secretion from hypothalamus. Therefore, the blood LH content released from the pituitary was decreased. This might be one of the mechanisms of EA ovulation induction.

The injection of ß-E into rat cerebellomedullary cisterm resulted in the increase of blood epinephrine (E), norepinephrine (NE) and dopamine (DA) levels, and there was a positive correlation in the dose of ß-E and the levels of blood E, NE, and DA (10). The result suggests that control ß-E may influence the activity of the sympathetic system. Our study showed that the sympathetic activity in normal subjects was not affected and the level of blood ß-E was relatively stable. Thus EA was not able to influence the normal ovulatory cycles. In anovulatory patients, especially in PCO cases, EA can depress sympathetic activity resulting in the increase of HST and the lowering the level of blood ß-E.

These results suggest that in anovulatory cases the hyperactive sympathetic system can be depressed by EA and the function of the hypothalamus-pituitary-ovarian axis can be regulated by EA via central sympathetic system. This might be another possible mechanism of EA ovulation induction.

Our study also suggest that measuring HST my provide a rough but simple method for predicting the effect of EA ovulation induction.

ACKNOWLEDGEMENT

This report has been directed by Prof. He Lian Fang.

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