The Clinical Usefulness of Basal Follicle Stimulating Hormone Levels Measured by Immunoradiometric Assay(IRMA) as a Prognostic Indicator of Ovarian Reserve

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This study was performed to assess the usefulness of basal follicle stimulating hormone(FSH) levels measured by immunoradiometric assay(IRMA) as a prognostic indicator of ovarian reserve and to determine the discriminatory level of basal FSH that predicts the ovarian response and the probability of pregnancy in patients with controlled ovarian hyperstimulation(COH). From May 1994 to March 1995, ninety-three infertile women who had undergone intrauterine insemination(IUI) during COH cycles were allocated to the study group. COH was performed using ultrashort protocol of gonadotropin-releasing hormone(GnRH) agonist(n=38), long protocol of GnRH agonist(n=35) and exogenous gonadotropin only(n=20). All patients included in this study had blood samples drawn on cycle day 2 or 3 prior to COH for IRMA of basal FSH. There was a distinct negative correlation between rising FSH values and numbers of follicles(≥14 mm) on the day of human chorionic gonadotropin(hCG) administration. The values of estradiol(E₂) on the day of hCG administration showed distinct negative correlation with rising FSH values. There were no correlation between basal FSH values and total ampules(75 IU) of gonadotropin administered, and the duration of gonadotropin administration. With a cut-off level of 8.5 mIU/ml for the basal FSH concentration measured by IRMA, the false positivity rate for prediction of pregnancy were the lowest value. The false positivity increased as the cut-off level was decreased or increased,
and therefore we selected 8.5 mIU/ml as the cut-off to optimize sensitivity and minimize false positivity. There was a significantly higher pregnancy rate in in the low group (<8.5 mIU/ml), with 39.2% compared with 21.4% in the high group (≥8.5 mIU/ml).

In the group using ultrashort protocol of GnRH agonist, patients with low basal FSH levels (<8.5 mIU/ml) yielded a higher mean number of follicles (≥14 mm) on the day of hCG administration than those with high levels (≥8.5 mIU/ml) (11.52 vs 7.28). Mean peak E2 level of low group, 2.378 ± 1.034 pg/ml was significantly higher than that of high group, 983 ± 554 pg/ml. In the group using long protocol of GnRH agonist, patients with low basal FSH levels (<8.5 mIU/ml) yielded a higher mean number of follicles (≥14 mm) on the day of hCG administration than those with high levels (≥8.5 mIU/ml) (17.05 vs 10.68). The amounts of gonadotropins administered was significantly reduced in low basal FSH group. Mean peak E2 level of low group, 1,897 ± 1,137 pg/ml was significantly higher than that of high group, 1,241 ± 981 pg/ml. In the group using gonadotropin only protocol, patients with low basal FSH levels (<8.5 mIU/ml) yielded a higher mean number of follicles (≥14 mm) on the day of hCG administration than those with high levels (≥8.5 mIU/ml) without statistical significance. Mean peak E2 level of low group, 2.334 ± 1.812 pg/ml was significantly higher than that of high group, 1.375 ± 0.645 pg/ml.

Basal FSH levels are predictive of the ovarian response and probability of pregnancy in stimulated cycles and may be useful in patient selection and counseling of patients regarding their appropriateness for assisted reproduction.

Key Words: Follicle stimulating hormone (FSH), Immunoradiometric assay (IRMA), Controlled ovarian hyperstimulation (COH), Ovarian response.

I. 서 론

물임중치료를 위한 보조생식술에서 파페란유도의 목적은 다수의 건강하고 수정가능한 성숙된 난자를 확득하기 위한 것이다. 많은 난자가 확득되어야 수정의 가능성이 증가하고 임신성공율을 증가시킬 수 있기 때문에 파페란유도에 대한 환자의 반응이 보조 생식술의 성패를 결정한다고 할 수 있다 (Muasher et al., 1985; Ben-Rafael et al., 1987). 파페란유도를 시행하는 경우 연령 및 병력의 원인이 환자에 따라 다르고 투여되는 의인성 성숙자극호르몬에 대한 난소의 반응이 환자마다 매우 다양하여 파페란유도를 시행하는 환자의 12~30%에서는 파페란유도가 취소되거나 불량한 난소반응(poor-response)을 보이기도 한다 (Lyles et al., 1985; Plachot et al., 1985). 파페란유도 전 이러한 불량한 난소반응을 보이는 환자들을 미리 발견하면 모든 환자에게 동일한 표준 파페란유도법을 적용하게 되는 부적절한 파페란유도를 피하게 되어 시간 및 경제적 혜택을 줄이고 환자에게 가장 적합한 파페란유도 방법을 선택할 수 있을 뿐만 아니라, 이러한 불량한 난소반응이 예상되는 환자에게는 비교적 낮은 임신성공가능성에 대해 미리 인지해 줄 수 있을 것이다.

1988년 Muasher 등은 체외수정시술을 시행받는 환자에서 파페란유도 전 월경 제 3일의 혈중 난포자극호르몬 (follicle stimulating hormone; FSH) 농도를 측정함으로써 파페란유도 후 환자가 보이는 반응, 즉 혈중 estradiol(E2)농도와 혈중FE3+ 수치를 예측할 수 있었다고 보고한 바 있다. 또한 1990년 Scott 등은 체외수정시술을 시행받는 환자에 있어 월경 제 3일의 기초 혈중 FSH농도를 측정하여 난소의 반응 및 임신율을 예측할 수 있다고 하였다.