

laser vaporization

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The endocrine changes and alteration of the ovarian response to clomiphene citrate after laparoscopic laser vaporization in patients with polycystic ovary syndrome

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Objectives: Polycystic ovary syndrome(PCOS) has the feature of excessive LH, hyperandrogenism and disturbance of folliculogenesis. Also, insulin, IGF-I and IGFBP-1 are involved in the pathogenesis of PCOS. Various surgical and medical therapies have been used and the action mechanisms are related to the endocrine effect. Laparoscopic ovarian electrocautery or laser vaporization is effective in the restoration of ovulation and normal menstrual cycle with minimal invasive procedure especially in the patients resistant to medical therapy. Clomiphene citrate(CC) is used for the ovulation induction in PCOS and the resistance is known to be related to insulin, IGF-I, IGFBP-1 levels.

This study was performed to evaluate the effect of the laparoscopic laser vaporization on the levels of LH, FSH, testosterone, IGF-I and IGFBP - 1 and on the ovarian response to clomiphene citrate in patients with CC-resistant PCOS.

Materials and Methods: The fasting basal serum LH, FSH, testosterone, IGF-I and IGFBP - 1 level were measured in 10 PCOS patients with CC-resistance and 7 normal controls with regular menstrual cycle. In PCOS, after laparoscopic CO₂ laser vaporization, endocrine levels were measured in 1 week interval for 4 weeks and then compared with preoperative levels.

Results: In PCOS group, mean serum LH/FSH ratio, testosterone, IGF-I levels were higher and IGFBP-1 level was lower than control. LH/FSH ratio decreased from 2.51 ± 0.67 to 1.7 ± 0.6 ($P < 0.05$) in 2 weeks, to 0.56 ± 0.2 ($P < 0.01$) in 3 week and to 1.41 ± 0.3 ($P < 0.01$) in 4 week after operation. Testosterone level decreased from 1.51 ± 0.82 ng/ml to 0.65 ± 0.34 ng/ml ($P < 0.05$) in 2 weeks, to 0.56 ± 0.67 ng/ml ($P < 0.01$) in 3 weeks after operation. IGF-I level also decreased from 436 ± 47.5 μ g/l to 187 ± 38 μ g/l ($P < 0.01$) in 1 week, to 167 ± 42 μ g/l ($P < 0.01$) in 2 weeks, 179 ± 55 μ g/l ($P < 0.01$) in 3 weeks and to 120 ± 43 μ g/l ($P < 0.01$) in 4 weeks after operation. IGFBP-1 level showed no significant change. In 8 of 10 PCOS patients, ovulation was induced with low dose clomiphene citrate.

Conclusion: Laparoscopic CO2 laser vaporization restores normal menstrual cycle and ovulation through endocrine effect of decreasing LH/FSH ratio, testosterone and IGF-I level and increases the response to CC. Therefore it is useful for restoration of normal menstruation and induction of ovulation in CC resistant PCOS patients.

Key words : Laparoscopic laser vaporization, Endocrine effect, CC response, Polycystic ovary syndrome

(Polycystic ovary syndrome, PCOS) ,

(hyperandrogenism), ,

.1),2) (LH)

thecal cell (androgen) 가

(folliculogenesis) 가 ,3) Stein (1935)4)

wedge resection ,

가 LH

.5),6) wedge resection (ovarian electrocautery) ,7)

laser LH androstenedione, testosterone (sex hormone binding globulin, SHBG) 가 ,8)-12)

가 .13)

PCOS (insulin) (insulin like growth factor, IGF), factor) system (insulin like growth factor binding protein, IGFBP) (growth ,14)15) PCOS IGF-I 가, IGFBP-1 ,16),17) IGF-I IGFBP-1 가 PCOS androgen ,18)

IGF-I , SHBG IGFBP-1 가 (clomiphen citrate) .19)

antiestrogen gonadotropin 가 ,

antiestrogen 가 obesity IGF, IGFBP .20)

PCOS CO2 laser vaporization LH, IGF-I, IGFBP-1

10 PCOS , PCOS
LH, FSH LH/FSH 2.0 ,
hirsutism 28.2 (: 23-39),
3.5 , 150mg
LH, FSH, testosterone, IGF-I IGFBP-1
LH, FSH Amerelex LH, FSH kit(American International Plc, U.K.)
, testosterone RIA , IGF-I, IGFBP-1
immunoenzyme assay(Medix Biochemica, Kannainen, Finland)
7
laser vaporization 1 4
t-test Tukey-Kramer
multiple comparisons test
2 puncture technique , coupler CO2 laser set
, 25W CO2 laser 5-10 1mm focal diameter
vaporization , hole diameter 2-4mm 25-40 hole
Ringer's lactate irrigation
가 5 50mg 5
, 3 가
150mg
가 E2, progesterone

LH/FSH, testosterone, IGF-I 가
 (Table 1).
 (Body mass index, BMI) 가
 Fig.1, LH/FSH 1, 2, 3,
 4 2.51 ± 0.67(Mean ± SD) 2 1.7 ± 0.6 (P<0.05),
 3 0.56 ± 0.2(P<0.01), 4 1.41 ± 0.3(P<0.01) . testosterone
 1.51 ± 0.82 2 0.65 ± 0.34(ng/ml) (P<0.05),
 3 0.56 ± 0.67(ng/ml) (P<0.01). IGF-I 436 ± 47.5(μ g/l)
 1 187 ± 38(μ g/l) (P<0.01), 2 167 ± 42 μ g/l(P<0.01), 3
 179 ± 55 μ g/l(P<0.01), 4 120+43 μ g/l(P<0.01) . IGFBP-1
 (Fig.1). 10 7 4-6
 가 50mg 5 5
 . 3 3 가
 7 3 1 8 가
 2 150mg .

Table 1. Endocrine characteristics of control and PCOS

	Control	PCOS
No. of patients	7	10
LH/FSH	1.15 ± 0.32	2.51 ± 0.67
Testosterone(ng/ml)	0.61 ± 0.37	1.51 ± 0.82
BMI(Kg/m ²)	21.9 ± 0.7	22.9 ± 1.1
IGF-I(g/l)	287.4 ± 27.1	436 ± 47.5
IGFBP-1(g/l)	8.8 ± 2.4	2.7 ± 0.2

PCOS: polycystic ovary syndrome

Mean ± SD(standard deviation)

p< 0.01

Fig. 1. Comparison of endocrine level of control and PCOS and changes before and after laparoscopic CO2 laser vaporization in PCOS (Mean \pm SD, *P<0.05, **P<0.01)

, LH androgen 가 ,
 가 FSH LH 가
 .29) PCOS IGF-I IGFBP-1 가, SHBG
 가 androgen
 가 estrogen 가 granulosa cell IGFBP-1
 가 ,18) androgen SHBG 가 가
 .34) insulin IGFBP-1
 ,18) PCOS insulin .35)
 , insulin SHBG IGFBP-1 가
 , insulin .36)
 insulin, IGF IGFBP
 insulin IGFBP-1 level insulin
 LH 가
 .36)
 PCOS LH, testosterone 가 , IGF-I 가,
 IGFBP-1 , laser vaporization 1-2 LH
 testosterone 가 . laser vaporization
 , resource
 .10),37) IGFBP -1 level 가 IGF-I level
 36) , IGF-I tropic hormone local
 factor , IGF-I thecal-interstitial cell granulosa cell IGF-II mRNA가
 , IGF-I thecal cell insulin thecal cell
 steroidogenesis ,38) local factor 가
 IGF-I level 가 ,
 가 IGFBP-1 theca-stroma cell steroidogenesis
 IGFBP-1 insulin level ,39)
 insulin PCOS insulin level
 IGFBP-1 가 가
 10 IGFBP-1 가 LH/FSH testosterone, IGF-I level ,
 8 , laser vaporization LH, testosterone IGF-I
 가 , laser
 vaporization IGFBP-1 insulin .
 testosterone IGF-I laser vaporization LH,
 , PCOS
 , laser vaporization PCOS IGF IGFBP
 가 .

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: LH, insulin, IGF-I IGFBP-1 , 가 laser vaporization insulin, IGF IGFBP CO2 laser vaporization LH, FSH, testosterone, IGF-I IGFBP-1

: 10 7 LH, FSH, testosterone, IGF-I IGFBP-1 level CO2 laser vaporization 1 4

: LH/FSH , testosterone, IGF-I IGFBP-1 LH/FSH 2.51 ± +0.67 2 1.7 ± 0.6(P<0.05) , 3 0.56 ± 0.2(P<0.01), 4 1.41 ± 0.3(P<0.01) Testosterone 1.51 ± 0.82ng/ml 2 0.65 ± 0.34ng/ml(P<0.05), 3 0.56 ± 0.67ng/ml(P<0.01) IGF-I 436 ± 47.5 μ g/l 1 187 ± 38 μ g/l(P<0.01) , 2 167 ± 42 μ g/l(P<0.01), 3 179 ± 55 μ g/l(P<0.01), 4 120+43 μ g/l(P<0.01) IGFBP-1 가 10 8

: CO2 laser vaporization LH/FSH , testosterone IGF-I 가 가