

## 난소의 자궁내막종에 대한 다양한 치료적 적응에 따른 체외수정 및 배아이식술 결과의 비교 연구

매이저 병원 산부인과<sup>1</sup>, 불임연구소<sup>2</sup>

1,2 . 1,2 . 2 . 2 . 1 . 1 . 1 . 1

### Comparison of IVF-ET Outcome after Various Therapeutic Approaches for Ovarian Endometriomas

Bang Hyun Lee<sup>1,2</sup>, Hyuck Chan Kwon<sup>1,2</sup>, Jae Hyun Lee<sup>2</sup>, Bo Hyun Kim<sup>2</sup>, Sang Hee Lee<sup>1</sup>,  
Min Hye Park<sup>1</sup>, Byung Kwan Lee<sup>1</sup>, Jung Ae Lim<sup>1</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, <sup>2</sup>Division of Reproductive Endocrinology &  
Infertility, Major Women's Care Center, Seoul, Korea

**Objective:** To compare COH characteristics and IVF outcomes among IVF-ET patients who were treated with various therapeutic modalities for ovarian endometriomas and to propose effective pre-cyclic therapeutic modalities to improve IVF-ET outcomes in the patients with ovarian endometriomas.

**Methods:** All cases that had undergone IVF-ET after laparoscopy between January 1997 to August 2003 were reviewed. Forty-eight patients with tubal factor were assigned to Group I. Twenty seven, 22 and 38 patients diagnosed as severe pelvic adhesion with ovarian endometriomas by laparoscopy received only medical therapy (Group II), cyst aspiration (Group III), and sclerotherapy (Group IV), respectively. Laparoscopic cystectomy was performed in 20 patients (Group V). Resistance index was measured on day administering hCG.

**Results:** As compared with Group I, in Group II resistance index increased ( $p<0.05$ ) but number of oocytes, good-quality oocyte ratio (mature and intermediate oocytes/total retrieval oocytes), fertilization rate, and embryo development rate decreased ( $p<0.05$ ). In Group III fertilization rate and embryo development rate decreased ( $p<0.05$ ). There was no difference between Group IV and Group I in all parameters except basal FSH which increased ( $p<0.05$ ). In Group V basal FSH, and resistance increased ( $p<0.05$ ) and number of oocytes and good-quality oocytes ratio decreased ( $p<0.05$ ).

**Conclusion:** Sclerotherapy is an effective therapeutic option which can be done prior to IVF-ET cycles in the patients with ovarian endometriomas. Further studies on a large scale are necessary to confirm these data.

**Key Words:** Ovarian endometriomas, Sclerotherapy, Cystectomy, IVF-ET

30%

(the Revised

American Fertility Society)

0~7.0% 0~50.3%

.<sup>2</sup>

가

가 ( )

tive outcome)

가

(poor reproduc-

.<sup>14-18</sup>

.<sup>3,4</sup>

(poor ovarian reserve)

.<sup>5,6</sup>

.<sup>7</sup>

가 (47%)

.<sup>7,8</sup>

1.

1997 1 2003 8

가 (gold

standard)

가

2.

associated infertility)

(advanced endometriosis-

48

(Group I).

가

.<sup>9,10</sup>

(window operation)

(frozen pelvis)

가

27

(Group II), 22

(Group

III), 38

가

(Group IV).

.<sup>11-13</sup>

**Table 1.** Clinical characteristics in the control group and the study population

	Group I (n=48) [n=8]	Group II (n=27) [n=10]	Group III (n=22) [n=10]	Group IV (n=38) [n=20]	Group V (n=20) [n=8]
Age	30.9±2.4	30.8±2.53	31.0±2.4	29.8±2.5	31.6±2.2
Type (%)					
Primary	30 (62.5)	17 (63.0)	18 (81.8)	21 (55.3)	13 (65.0)
Secondary	18 (37.5)	10 (37.0)	4 (18.2)	17 (44.7)	7 (35.0)
Duration (months)	25.3±12.7	27.5±14.3	29.5±12.7	26.8±13.5	30.0±15.0
Basal FSH	5.3±1.3*	5.4±0.9†	6.0±0.7	5.9±1.1	6.4±0.9*†
[Bilateral endometrioma] (mIU/mL)	[5.3±1.3*†]	[6.0±0.8]	[6.1±0.6]	[6.4±0.8*]	[7.0±1.2†]
Largest cyst size (mm)	-	25.3±7.7	22.2±7.0	24.2±8.7	26.3±7.8

[ ]: bilateral endometrioma, Mean ± SD, \*†: p<0.05 by Scheffe test

20 가 .

(Group V). 3.

Group II, Group III, Group IV Group V

10 , 20 , 8 .

3

1~2 .

1 2 , , 가

2/3 가

99.9% 가 1 3 Group I Group II Group V

1/10 (p<0.05)

5% Group I Group IV Group V

(p<0.05).

가 (Table 1).

(basal FSH) (COH)

(conventional GnRH agonist long step-down protocol) 가 .

Group I Group V

(p<0.05)

(resistance index) Group I Group IV Group V

(p<0.05).

**Table 2.** COH characteristics in the control group and the study population

Total	Group I (n=48)	Group II (n=27)	Group III (n=22)	Group IV (n=38)	Group V (n=20)
COH duration (days)	10.8±1.6	11.0±1.2	10.9±1.7	10.6±1.5	10.7±1.7
Gonadotropin ampoules (75 IU/A)	31.6±2.9*	32.4±2.7	33.1±2.7	32.7±3.7	34.3±2.5 <sup>†</sup>
Peak E <sub>2</sub> (pg/mL)	3214.6±829.2 <sup>*,†</sup>	2597.4±648.8*	2691.8±711.4	2832.9±799.7	2508.0±819.3 <sup>‡</sup>
Endometrial depth (mm)	10.5±2.2	10.7±2.1	10.0±2.2	9.8±2.8	10.9±2.4
Higher RI on cyst	0.52±0.05 <sup>*,†</sup>	0.57±0.06 <sup>*,‡,¶</sup>	0.53±0.03 <sup>‡</sup>	0.52±0.05 <sup>¶,***</sup>	0.52±0.05 <sup>‡,***</sup>
<hr/>					
Bilateral ovarian endometriomas	[n=48]	[n=8]	[n=10]	[n=20]	[n=8]
COH duration (days)	10.8±1.6	12.0±1.3	11.1±1.7	10.3±1.1	11.5±2.0
Gonadotropin ampoules (75 IU/A)	31.6±2.9 <sup>*,†</sup>	32.3±2.5	34.3±2.5	35.6±3.6*	35.6±2.1 <sup>†</sup>
Peak E <sub>2</sub> (pg/mL)	3214.6±829.2 <sup>*,†,‡</sup>	2266.3±594.3*	2346.0±680.1 <sup>†</sup>	2668.0±830.7	1968.8±596.4 <sup>‡</sup>
Mean RI on both ovaries	0.52±0.02 <sup>*,†</sup>	0.59±0.03 <sup>*,‡,¶</sup>	0.51±0.02 <sup>‡</sup>	0.52±0.02 <sup>¶,***</sup>	0.59±0.05 <sup>‡,***</sup>

Mean ± SD, <sup>\*,†,‡,¶</sup>: p<0.05 by Scheffe test, RI: resistance index, Higher RI on cyst: RI in unilateral endometrioma and higher RI in bilateral endometriomas, Mean RI on both ovaries: mean value of RI on ovarian arteries of both ovaries

(p<0.05). Group II  
 (Peak E<sub>2</sub> level) Group I Group II Group III Group I Group IV  
 Group V (p<0.05) (p<0.05)  
 Group I Group II Group III  
 Group II, Group III, Group V Group I (p<0.05).  
 (p<0.05). , ,  
 가 (p<0.05)  
 가 .  
 가 (p<0.05)  
 (higher RI) 가 .  
 Group I, Group III, Group Group II, Group III, Group V  
 IV Group II Group V Group I Group V  
 (p<0.05) (Table 2). Group II, Group III, Group V  
 Group I Group IV  
 (p<0.05).  
 Group II Group V Group I Group II Group III  
 (p<0.05). Group Group I (p<0.05).  
 II Group I Group IV Group II, Group III, Group V  
 (p<0.05) Group I Group I (p<0.05)

**Table 3.** IVF-ET outcomes in the control and study groups

Total	Group I (n=48)	Group II (n=27)	Group III (n=22)	Group IV (n=38)	Group V (n=20)
Total No. of oocyte	9.5±5.3 <sup>*,†</sup>	5.8±2.1 <sup>*</sup>	6.6±2.4	7.6±3.9	5.3±2.2 <sup>†</sup>
No. of good quality oocyte (GQOR <sup>††</sup> , %)	6.6±4.6 <sup>*,†</sup> (67.2)	2.9±1.5 <sup>*</sup> (50.3)	4.0±2.0 (61.0)	5.4±3.1 (70.6)	2.6±1.4 <sup>†</sup> (48.1)
No. of fertilized oocyte (FR <sup>‡‡</sup> , %)	6.4±4.3 <sup>*</sup> (66.6)	3.2±1.5 <sup>*,†</sup> (54.8)	3.9±2.2 (58.2)	5.8±3.3 <sup>†</sup> (76.8)	23.9±2.1 (72.6)
Total No. of embryo (CR <sup>¶¶</sup> , %)	5.6±3.9 <sup>*,†</sup> (88.9)	2.2±1.1 <sup>*,‡</sup> (68.6)	2.7±1.5 <sup>†,¶</sup> (70.6)	5.2±3.0 <sup>‡,¶</sup> (89.6)	3.4±1.8 (88.3)
No. of good quality embryo	3.9±3.4 <sup>*,†,‡</sup>	1.1±0.8 <sup>*</sup>	0.9±0.8 <sup>†</sup>	2.5±2.0	1.6±1.0 <sup>‡</sup>
No. of embryo transferred	3.8±1.8 <sup>*,†,‡</sup>	2.2±1.1 <sup>*,¶</sup>	0.9±0.8 <sup>†</sup>	3.9±1.7 <sup>¶, **</sup>	1.6±1.0 <sup>‡, **</sup>

  

Bilateral ovarian endometriomas	[n=48]	[n=8]	[n=10]	[n=20]	[n=8]
Total No. of oocyte	9.5±5.3 <sup>*,†</sup>	4.4±1.6 <sup>*</sup>	5.8±2.1	6.9±2.6	4.0±1.3 <sup>†</sup>
No. of good quality oocyte (GQOR, %)	6.6±4.6 <sup>*,†</sup> (67.2)	1.9±1.0 <sup>*</sup> (50.3)	3.1±1.5 (61.0)	4.8±2.1 (70.6)	1.8±0.7 <sup>†</sup> (48.1)
No. of fertilized oocyte (FR, %)	6.4±4.3 <sup>*</sup> (66.6)	2.0±0.9 <sup>*</sup> (54.7)	3.4±2.0 (58.6)	5.2±2.3 (75.4)	2.8±1.8 (68.8)
Total No. of embryo (CR, %)	5.6±3.9 <sup>*,†</sup> (88.9)	1.5±0.5 <sup>*</sup> (75.0)	2.3±1.2 <sup>†</sup> (67.7)	4.4±2.0 (84.6)	2.3±1.6 (81.8)
No. of good quality embryo	3.9±3.4 <sup>*,†</sup>	0.8±0.5 <sup>*</sup>	0.6±0.7 <sup>†</sup>	2.1±1.3	1.3±1.0
No. of embryo transferred	3.8±1.8 <sup>*,†,‡</sup>	1.5±0.5 <sup>*</sup>	0.6±0.7 <sup>†,¶</sup>	3.5±1.7 <sup>¶</sup>	1.3±1.0 <sup>‡</sup>

Mean ± SD, <sup>\*,†,‡,¶, \*\*</sup>: p<0.05 by Scheffe test, <sup>††,‡‡,¶¶</sup>: p<0.05 by Chi-square test, <sup>†, ‡</sup>: p>0.05 by Chi-square test.  
 GQOR: good quality oocyte ratio (mature and intermediate oocytes/total retrieval oocytes), FR: fertilization rate, CR: cleavage rate

Group III Group V Group IV  
 (p<0.05), (Group III)  
 가 (Table 3),  
 (Group I) 가  
 (Group II) (p<0.05).  
 가 (p<0.05) 가 (p<0.05). (Group IV)  
 가 (p<0.05)

**Table 4.** Pregnancy outcomes in the control and study groups

Total	Group I (n=48)	Group II (n=27)	Group III (n=22)	Group IV (n=38)	Group V (n=20)
CPR (%)	16/48 (33.3)	6/27 (22.2)	4/22 (18.2)	11/38 (28.9)	3/20 (20.8)
OPR (%)	14/48 (29.2)	5/27 (14.8)	3/22 (13.6)	10/38 (26.3)	3/20 (15.0)
IR (%)	25/185 (13.5)	6/30 (20.0)	5/19 (26.3)	18/96 (18.8)	5/32 (15.6)
<hr/>					
Bilateral ovarian endometriomas	[n=48]	[n=8]	[n=10]	[n=20]	[n=8]
CPR (%)	16/48 (33.3)	1/8 (12.5)	2/10 (20.0)	5/20 (25.0)	2/8 (25.0)
OPR (%)	14/48 (29.2)	0/8 (0)	2/10 (20.0)	5/20 (25.0)	1/8 (12.5)
IR (%)	25/185 (13.5)	1/6 (16.7)	2/6 (33.3)	7/41 (17.1)	2/10 (20.0)

No significance by Chi-square test, expected value (<5)-30~50%: statistically no significance by Chi-square test because the groups in which expected value was less than 5 occupied 30~50%, CPR : clinical pregnancy rate, OPR: ongoing pregnancy rate, IR : implantation rate

가 가 (p<0.05). 80% 100%

(Group V) , 가 11-13.19

가 (p<0.05)

, , . Chang

(p<0.05).

32

. 34.37% 46.87%

Group I Group II, Group III, Group V Group IV 가

(folliculogenesis)

.<sup>14</sup> Noma Yoshida

(ultrasound-guided trans-

가 (Table 4). vaginal ethanol sclerotherapy; TV-EST) 83

52.1%

14.9% .<sup>15</sup>

10

가 ( : 7.5%)

33.3%

. Koike

47.4% 45

(47% vs 39%)  
 (76% vs 76%) 가 . Ho  
 5.2±3.9 13.3%  
<sup>16</sup> 5 (poor response)  
 가  
 (reproductive performance) II) ,  
 1998 1~3 oup III) ,  
 - (Group IV)  
 7 3 가  
<sup>20</sup> 가  
 (laser vaporization) (electro-coagulation) 가  
 (fenestration) 가 가  
 (capsule ablation) (Group II)  
 23.5% 60% 6% (space occupying lesion) 가  
 18.8% 가 (remnant ectopic endometrial tissues) 가가  
<sup>21-24</sup> (Group III)  
 (Group IV)  
 (ovarian reserve) 가  
 6.2% 33.3% 66.7% 가  
 23% 가  
<sup>5,13,23-26</sup> 가

- viously treated with cystectomy to controlled ovarian hyperstimulation. *J Assist Reprod Genet* 2002; 19 (11): 507-11.
6. Chang CC, Lee HF, Tsai HD, Lo HY. Sclerotherapy --an adjuvant therapy to endometriosis. *Int J Gynaecol Obstet* 1997; 59(1): 31-4.
  7. Yanushpolsky EH, Best CL, Jackson KV, Clarke RN, Barbieri RL, Hornstein MD. Effects of endometriomas on oocyte quality, embryo quality, and pregnancy rates in in vitro fertilization cycles: a prospective, case-controlled study. *J Assist Reprod Genet* 1998; 15(4): 193-7.
  8. Al-Azemi M, Bernal AL, Steele J, Gramsbergen I, Barlow D, Kennedy S. Ovarian response to repeated controlled stimulation in in-vitro fertilization cycles in patients with ovarian endometriosis. *Hum Reprod* 2000; 15(1): 72-5.
  9. Donnez J, Squifflet J, Pirard C, Jadoul P, Wyns C, Smets M. The efficacy of medical and surgical treatment of endometriosis-associated infertility and pelvic pain. *Gynecol Obstet Invest* 2002; 54 Suppl 1: 2-7; discussion 7-10.
  10. Donnez J, Chantraine F, Nisolle M. The efficacy of medical and surgical treatment of endometriosis-associated infertility: arguments in favour of a medico-surgical approach. *Hum Reprod Update* 2002; 8(1): 89-94.
  11. Vercellini P, Vendola N, Bocciolone L, Colombo A, Rognoni MT, Bolis G. Laparoscopic aspiration of ovarian endometriomas. Effect with postoperative gonadotropin releasing hormone agonist treatment. *J Reprod Med* 1992; 37(7): 577-80.
  12. Giorlandino C, Taramanni C, Muzii L, Santillo E, Nanni C, Vizzone A. Ultrasound-guided aspiration of ovarian endometriotic cysts. *Int J Gynaecol Obstet* 1993; 43(1): 41-4.
  13. Saleh A, Tulandi T. Reoperation after laparoscopic treatment of ovarian endometriomas by excision and by fenestration. *Fertil Steril* 1999; 72(2): 322-4.
  14. Chang CC, Lee HF, Tsai HD, Lo HY. Sclerotherapy --an adjuvant therapy to endometriosis. *Int J Gynaecol Obstet* 1997; 59(1): 31-4.
1. Witz CA, Burns WN. Endometriosis and infertility: is there a cause and effect relationship? *Gynecol Obstet Invest* 2002; 53 Suppl 1: 2-11.
  2. Olive DL, Haney AF. Endometriosis--associated infertility: a critical review of therapeutic approaches. *Obstet Gynecol Surv* 1986; 41(9): 538-55.
  3. Yovich JL, Matson PL, Richardson PA, Hilliard C: Hormonal profiles and embryo quality in women with severe endometriosis treated by in vitro fertilization and embryo transfer. *Fertil Steril* 1988; 50: 308-13.
  4. Dlugi AM, Loy RA, Dieterie S, Bayer SR, Seibel MM: The effect of endometriomas on in vitro fertilization outcome. *J In Vitro Fert Embryo Transfer* 1989; 6: 338-41.
  5. Ho HY, Lee RK, Hwu YM, Lin MH, Su JT, Tsai YC. Poor response of ovaries with endometrioma pre-



- ecol Obstet 1997; 59(1): 31-4.
15. Noma J, Yoshida N. Efficacy of ethanol sclerotherapy for ovarian endometriomas Int J Gynaecol Obstet 2001; 72(1): 35-9.
  16. Koike T, Minakami H, Motoyama M, Ogawa S, Fujiwara H, Sato I. Reproductive performance after ultrasound-guided transvaginal ethanol sclerotherapy for ovarian endometriotic cysts. Eur J Obstet Gynecol Reprod Biol 2002; 105(1): 39.
  17. Messalli EM, Cobellis G, Pecori E, Pierno G, Scaffa C, Stradella L, et al. Alcohol sclerosis of endometriomas after ultrasound-guided aspiration. Minerva Ginecol 2003; 55(4): 359-62.
  18. Kafali H, Yurtseven S, Atmaca F, Ozardali I. Management of non-neoplastic ovarian cysts with sclerotherapy. Int J Gynaecol Obstet 2003; 81(1): 41-5.
  19. Mittal S, Kumar S, Kumar A, Verma A. Ultrasound guided aspiration of endometrioma --a new therapeutic modality to improve reproductive outcome. Int J Gynaecol Obstet 1999; 65(1): 17-23.
  20. , , , , , , .  
1998; 41(4): 1055-60.
  21. Fayez JA, Vogel MF. Comparison of different treatment methods of endometriomas by laparoscopy. Obstet Gynecol 1991; 78(4): 660-5.
  22. Donnez J, Nisolle M, Gillet N, Smets M, Bassil S, Casanas-Roux F. Large ovarian endometriomas. Hum Reprod 1996; 11(3): 641-6.
  23. Beretta P, Franchi M, Ghezzi F, Busacca M, Zupi E, Bolis P. Randomized clinical trial of two laparoscopic treatments of endometriomas: cystectomy versus drainage and coagulation. Fertil Steril 1998; 70(6): 1176-80.
  24. Hemmings R, Bissonnette F, Bouzayen R. Results of laparoscopic treatments of ovarian endometriomas: laparoscopic ovarian fenestration and coagulation. Fertil Steril 1998; 70(3): 527-9.
  25. Milingos S, Kallipolitis G, Loutradis D, Liapi A, Drakakis P, Antsaklis A, et al. Factors affecting postoperative pregnancy rate after endoscopic management of large endometriomata. Int J Gynaecol Obstet 1998; 63(2): 129-37.
  26. Yoshida S, Harada T, Iwabe T, Terakawa N. Laparoscopic surgery for the management of ovarian endometrioma. Gynecol Obstet Invest 2002; 54 Suppl 1: 24-7; discussion 27-9.
  27. Marconi G, Vilela M, Quintana R, Sueldo C. Laparoscopic ovarian cystectomy of endometriomas does not affect the ovarian response to gonadotropin stimulation. Fertil Steril 2002; 78(4): 876-8.
  28. Canis M, Pouly JL, Tamburro S, Mage G, Wattiez A, Bruhat MA. Ovarian response during IVF-embryo transfer cycles after laparoscopic ovarian cystectomy for endometriotic cysts of >3 cm in diameter. Hum Reprod 2001; 16(12): 2583-6.