

IVF, ICSI 또는 TESE-ICSI에서 수정을 유도한 난자의 배아 발생능력 및 임신율

경북대학교병원 산부인과¹, 비뇨기과², 대구대학교 생명자원학부³

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Embryonic Developmental Capacity and Pregnancy Rates of Fertilized Oocytes in IVF, ICSI and TESE-ICSI Cycles

Kee Sang Park¹, Yoon Kyu Park², Hai Bum Song³, Taek Hoo Lee¹, Sang Sik Chun¹

¹Department of OB/Gyn, ²Department of Urology, Kyungpook National University Hospital and
³Division of Life Resources, Daegu University

Objective: This study was performed to evaluate and compare the embryonic developmental capacity and pregnancy rates in conventional *in vitro* fertilization (IVF) and intracytoplasmic sperm injection (ICSI) with ejaculated sperm or testicular sperm cycles.

Materials and Methods: Fertilization was examined in the following morning after IVF (group I), ICSI (group II) or TESE-ICSI cycles (group III). Fertilized oocytes were co-cultured with Vero cells until embryo transfer (ET). On day 2 and 5~7, grades of embryos (<4- or 4-cell) and blastocysts (BG1, 2, 3 or early) were evaluated. Clinical pregnancy rate was determined by detecting G-sac with transvaginal ultrasonogram. We analyzed the results by χ^2 and Student's *t*-test and considered statistically significant when P value was less than 0.05.

Results: Fertilization rate was significantly higher ($p < 0.05$) in group I (79.0±21.2%) than in group II and III (56.8±21.6% and 36.7±25.3%). Cleavage and blastulation rate of group I (95.8±13.8% and 59.5±25.3%) were significantly higher ($p < 0.05$) than those of group III (83.4±18.6% and 40.4±36.5%). Clinical pregnancy rate was significantly higher ($p < 0.05$) in group I and II (40.7% and 41.7%) than that in group III (12.5%). No differences were found in the rates of multiple pregnancy and abortion among three groups. Embryonic implantation rate was higher in group I (15.1±20.2%, $p < 0.05$) and II (14.7±20.6%, NS) than that in group III (5.1±15.6%). However, embryonic implantation rate was increased in ET with blastocyst(s) among three groups.

Conclusions: Fertilized oocytes obtained from TESE-ICSI were harder to be successfully cultured to blastocyst stage for 5~7 days than that from IVF cycles. However, all blastocyst(s) ET increased the embryonic implantation rate equally in IVF, ICSI and TESE-ICSI cycles.

Key Words: Blastulation rate, Cleavage rate, ICSI, IVF, Pregnancy rate, TESE-ICSI

: ,) 700-721, 27가 50 ,
Tel: (053) 420-5727, Fax: (053) 423-7905, e-mail: keespark@yahoo.com
: ,) 700-721, 27가 50 ,
Tel: (053) 420-6852, Fax: (053) 421-9618, e-mail: uropark@mail.knu.ac.kr
* 2001

ICSI TESE-ICSI 0.1%
hyaluronidase가 가 2 ml Ham's F-10 5)
Vero cell

3) (hFF, human follicular fluid) 20% hFF가 가 MEM
, 2~3

hFF (Rotina35, Hettich, Ger- 6)
many) (3,500 rpm) 30 day 2 2-
59 30 가 , 4-
0.2 μm^2 -25
(3682, Forma, USA) 가 day 5~7 Park ⁸ Dokras ¹
blastocyst grade 1 (BG1), BG2, BG3

4) ICSI early blastocyst (EB)
IVF 7)
Tomcat catheter (8890-
793021, Sherwood, USA) , Tomcat
catheter Jansen-Anderson
catheter (Jansen-Anderson Bulb Tip Embryo Transfer
Catheter Set, K-JET-3200, COOK, Australia)
Embryo ET day 2~3 2~8-
가
Embryo-blastocyst ET day 2~
3 2~8- 1~3
day 5~7
가 (BG1, BG2)
1~3 (subsequent ET, SET) . Bla-
stocyst ET day 5~7
(BG1, BG2)
4 가
4
가
8)
50 mg (Proge-
sterone in oil, Progest, Samil, Korea)
10~12 β -hCG 가
10 mIU/ml
3
6~7
가

group II (7.9±4.5)가 group I (11.4±8.5) , group III가 가 (p<0.05).
 NS) group III (12.3±6.6) , p<0.05) . 2-
 (2 PN) 79.9±21.1%, group III (83.4±18.6%)가 (95.3±13.8~
 56.8±21.6%, 36.7±25.3% group I 가 98.1±4.8%) (p<0.05) .

Table 2. Effects of fertilization methods on pregnancy rates

	Group I (IVF)	Group II (ICSI)	Group III (TESE-ICSI)
No. of patients	72	8	20
No. of cycles	113	12	32
No. of ET cycles	113	12	32
Embryo(s)	45	7	27
Embryo(s) & blastocyst(s)	11	3	2
Blastocyst(s)	57	2	3
No. of transferred embryos and blastocysts (/cycles)	336 (3.0±1.0) ^a	34 (2.8±1.1) ^{ab}	78 (2.4±1.1) ^b
Embryo(s)	116 (2.6±1.1)	17 (2.4±1.1)	64 (2.4±1.1)
Embryo(s) & blastocyst(s)	40 (3.6±0.9)	11 (3.7±0.6)	6 (3.0±1.4)
Blastocyst(s)	180 (3.2±0.9)	7 (3.5±0.7)	8 (2.7±0.6)
No. of clinical pregnancy (%)			
Total /cycles	46 (40.7) ^a	5 (41.7) ^a	4 (12.5) ^b
/patients	39 (54.2) ^a	4 (50.0) ^{ab}	3 (15.0) ^b
Singleton /cycles	42 (37.2) ^a	5 (41.7) ^a	4 (12.5) ^b
/patients	36 (50.0) ^a	4 (50.0) ^{ab}	3 (15.0) ^b
Twin /cycles	3 (2.7)	0 (0)	0 (0)
/patients	3 (4.2)	0 (0)	0 (0)
Triplet /cycles	1 (0.9)	0 (0)	0 (0)
/patients	1 (1.4)	0 (0)	0 (0)
No. of abortion (%)			
Per cycles	7 (6.2)	1 (8.3)	0 (0)
Per patients	5 (6.9)	1 (12.5)	0 (0)
No. of ongoing pregnancy (%)			
Per cycles	39 (34.5) ^a	4 (33.3) ^{ab}	4 (12.5) ^b
Per patients	35 (48.6) ^a	4 (50.0) ^{ab}	3 (15.0) ^b
No. of implanted embryos (%)	51 (15.1±20.2) ^a	5 (14.7±20.6) ^{ab}	4 (5.1±15.6) ^b
Per transferred embryo(s)	12 (10.3±19.7)	2 (11.8±20.9)	2 (3.1±13.3)
Per transferred embryo(s) & blastocyst(s)	6 (15.0±14.0)	2 (18.2±14.4)	1 (16.7±35.4)
Per transferred blastocyst(s)	33 (18.3±21.3)	1 (14.3±13.0)	1 (12.5±19.2)

^{a,b} Means separation within a row by χ^2 or Student's *t*-test (p<0.05).
 Values in parentheses are mean ± SD.

2, 4- (<4-cells) group II III (44.4±28.3%, 39.7±38.1%)가 group I (25.3±35.9%) , 4- (4-cells) group I (74.7±32.3%) group II III (54.7±28.3%, 60.3±38.1%) (p<0.05). 5~7 group I (59.5±25.3%, p<0.05) group II (58.6±35.0%, NS) 가 group III (40.4±37.5%) , BG1 BG2 group I (36.9±32.2%, 33.1±30.5%) group II (23.5±38.9%, 11.8±11.1%) group III (26.3±22.7%, 26.3±21.1%) , BG3 EB group II (23.5±40.4%, 41.2±37.6%) group III (10.5±21.9%, 36.8±31.1%)가 group I (8.2±13.1%, 21.8±30.8%) (Table 1). Group I, II, III , ET (,) 113 (336 , 3.0±1.0) , 12 (34 , 2.8±1.1) 32 (78 , 2.4±1.1) , embryo ET (,) 45 (116 , 2.6±1.1) , 7 (17 , 2.4±1.1) 27 (64 , 2.4±1.1) , embryo-blastocyst ET 11 (40 , 3.6±0.9) , 3 (11 , 3.7±0.6) 2 (6 , 3.0±1.4) , blastocyst ET 57 (180 , 3.2±0.9) , 2 (7 , 3.5±0.7) 3 (8 , 2.7±0.6) . group III (2.4±1.1)가 group I (3.0±1.0 , p<0.05) II (2.8±1.1 , NS) . (singleton) group III (12.5% / cycle; 15.0% / patient) group I (40.7% , 37.2% / cycle; 54.2% , 50.0% / patient, p<0.05) group II (41.7% / cycle; 50.0% / patient, NS)가 group III (5.1±15.6%) group I (15.1±20.2%, p<0.05) group II (14.7±20.6%, NS) . group embryo-blastocyst blastocyst ET 가 , embryo-blastocyst blastocyst group 가 ET TESE-ICSI (Table 2).

Palermo ¹² ICSI , 가 . (MESA), (PESA) , TESE가 (TESE) , TESE가 가 ^{8,13} TESE-ICSI . TESE ICSI TESE-ICSI TESE Percoll ⁸ 가 TESE-ICSI 가 TESE-ICSI IVF, ICSI, TESE-TESE-ICSI 가 가 가 (Table 1, 2). TESE-ICSI 가 ^{10,11} ET 가 IVF ICSI TESE-ICSI

IVF ICSI TESE-ICSI
blastocyst ET embryo-blastocyst ET
group , day 2~3 embryo ET
, day 2~3 day 5~7 embryo-blastocyst
ET (Table 1, 2).
ICSI (group II, III) IVF (group I) <4-
, BG1 BG2 ICSI
embryo-blastocyst ET blastocyst ET
가 (Table 1,
2))
ICSI TESE-ICSI
가가 13~17 가
ICSI TESE-ICSI
, TESE-ICSI
2~3 1~2 5~7
, 3,8
2~4 2- ~ (subsequent
5~7 blastocyst ET
ET, SET) SET
SET 4,5,8 Beauchamp 18
(double ET, DET)

(single ET) 14%
DET
가
가
3 3 5
(sequential ET)
sequential ET 가
, IVF ICSI TESE-ICSI
.19
subsequent ET
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