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Influence of Sperm Fertilizing Capacity on Embryonic Development and Pregnancy in *In Vitro* Fertilization

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Objectives: To assess the fertilizing capacity using sperm penetration assay (SPA) to predict the outcome of the in vitro fertilization-embryo transfer (IVF-ET) outcome.

Materials and Methods: Semen samples were provided by 129 patients undergoing IVF. We attempted to correlate the extent of sperm penetration under enhanced SPA protocol with the results of fertilization, cleavage, preimplantation embryo development, and pregnancy.

Results: Univariate analysis demonstrated a statistically significant correlation between fertilizing capacity and motility, kinetics, fertilization, cleavage and embryo development, and pregnancy rate. By logistic regression analysis, fertilizing capacity was found to be the only variable that was statistically significant with respect to pregnancy rate. Fertilizing capacity, cleavage rate and pregnant rate were significantly higher in pregnant group. However, the fertilization rates was comparable with both group.

Conclusions: Lower fertilizing capacity could denote a poorer prognosis for establishing a pregnancy, even after satisfactory fertilization rate is achieved.

Key Words: Fertilizing capacity, SPA, IVF-ET

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가 가 Parinaud²
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, Janny Menezo³ ($3 \times 10^6/ml$)

(1)

30

Shoukir⁴ sperm 10 ?1 37

parameter가 Makler counting chamber (motility index; MI)

가 (kinetics) (motility)

가 Kinetics 1.2 1.2

가 1 , TYB 42

가 swim-up 2

2) Sperm Penetration Assay

SPA⁸ 9

(1)

N-tris (hydroxymethyl) methyl-2-aminoethane sulfonic acid (TES) 211 mM, hydroxymethyl amino methane (Tris) 96 mM, dextrose 11 mM, 1% penicillin-streptomycin 20%

가 pH 7.4, 290~320 mOsm/kg

TEST-yolk buffer (TYB)

1 : 1

4 42

(fertilizing capacity)

SPA TYB 37 0.3% human serum albumin (HSA) Ham's F-103 ml 가 600 G 5

Ham's F-10 (0.3% HSA) 1 ml 가 300 G 10 2

1. Ham's F-10 (1.0% HSA) 가 2

SPA 37 5% CO₂

129 (2)

12~16

2. 12

1) GnRH-agonist (GnRHa ; 1

Decapeptyl[®], Dtrp-6-LH, Ferring, Malmoe, Sweden) PMSG (Sigma G-4877, USA) 35 IU

Table 1. Comparison with pregnant and non-pregnant group

	Non-pregnant (n=93)	Pregnant (n=36)
Age (female)	33.1 ±3.3	33.5 ±3.5
Age (male)	39.2 ±5.2	38.9 ±5.5
No. of oocytes	602	233
No. of fertilized oocytes	386 (64.1%)	158 (67.8%)
PN	51 (13.21%)	0
2 cell	46 (11.92%)	0
4 cell	157 (40.67%)	103 (65.19%)
8 cell	132 (34.2%)	55 (34.81%)
Fertilizing capacity	6.9 ±4.6	11.8 ±8.0*
Fertilization rate (%)	68.8 ±31.9	71.5 ±22.4
Cleavage rate (%)	61.2 ±33.1	71.5 ±22.6*
Well development rate (%)	50.8 ±32.8	71.5 ±22.4*

* p<0.05, Values: Mean ±SD

3 , hCG (Sigma C- coverslip
 1063, USA) 35 IU (methanol : glacial acetic acid = 3 :
 . hCG 15~16 1) 24 0.25% acetic lac-
 (cervical dislocation) , mold ×1,000
 PBS (0.3% HSA
)가 가
 (cumulus com- 가
 plex)가 0.1% hyaluro- 가
 nidase PBS (0.3% HSA) (pene-
 , 0.1% trypsin PBS (0.3% tration index; /
 HSA) ; PI) ,
 (3)
 2
 가 1 ×10⁶/ml 37 , 5% CO₂
 10
 0.3% HSA Ham's F-10 3.5 WHO 10
 가 SPA
 (4) , 3
 , (5~10 ?1) 가 (Table 1).
 . Coverslip vase- (Bivariate correlation analysis)
 line-paraffin 가 netics 1 1 2 (fertilizing capacity) Ki-

0.30, 0.219 0.205 0.01 가
0.001 SPA
0.365, 0.356 (penetration index)가
0.001 ROC curve cut-off 3.0
(Multiple regression ana- 가 가 가 3.0
lysis) (R=0.213, p<0.001). 98.2% 30%
SPA
가 SPA
Zahalsky¹⁴ SPA
50~80% 10~15% morphology) SPA
가 (Kruger
SPA
(Liu, 1992).¹²
(male factor)
Ron-EL¹³ Painaud²
SPA
ICSI
(capacitation), 가 가
(acrosome reaction), (decondensation) 가
^{15,16} Shibahara¹⁷
SPA ICSI
가 TYB 30%
가 SPA 50% 26%
ICSI
가 가 SPA

ICSI

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