Effect of Endometrial Thickness on Pregnancy outcome after Intracytoplasmic Sperm Injection

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Background:

Intra cytoplasm sperm injection (ICSI) is a highly developed practice of "Assisted reproductive treatment" carried out in a period of four to six weeks from initiation of ovulation to embryo transfer in infertile couples.

Objective:

To study association of endometrial thickness on ovulation induction (OI) day with cycle outcome after ISCI.

Study Protocol :

After approval from "Ethical Review Board of Islamabad Clinic Serving Infertile Couples" treatment protocol was carried explained in Figure 1
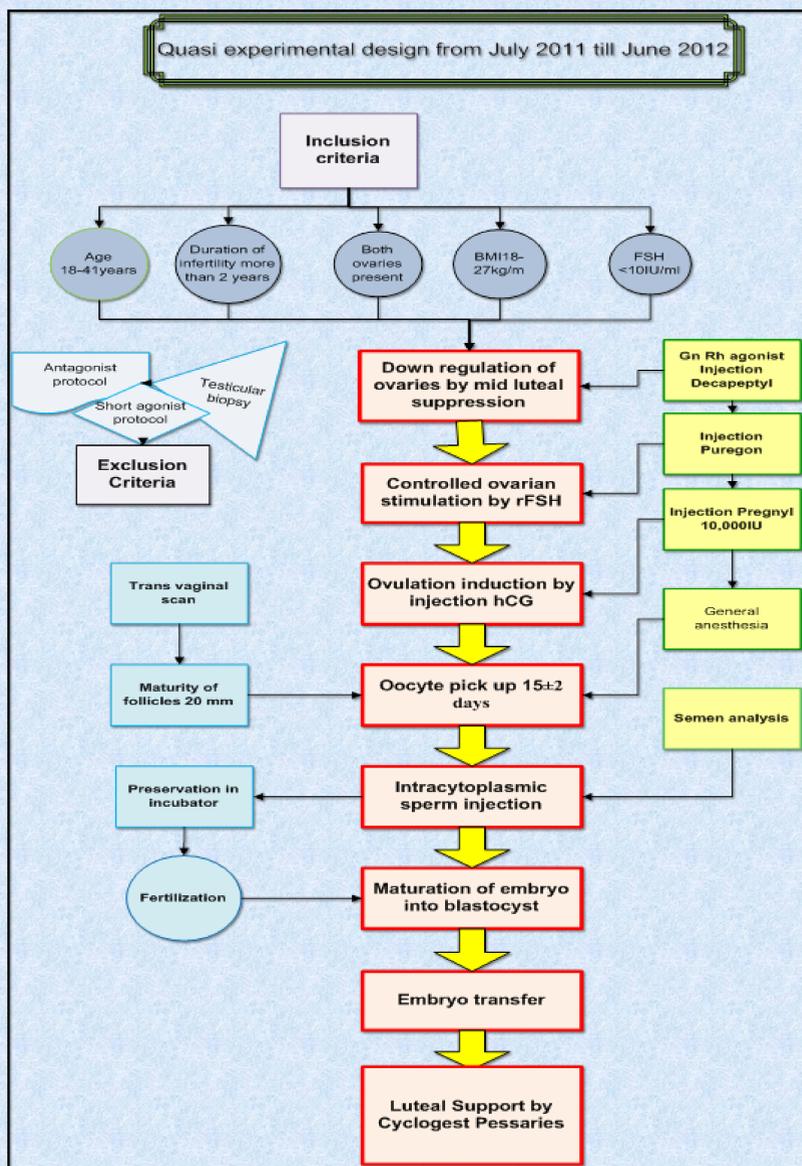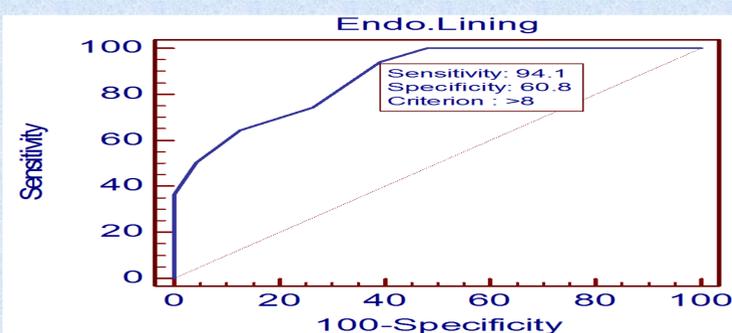

Results:

Fig. 2: ROC curve at cut-point 8.0 mm of endometrial thickness for clinical pregnancy measured on ovulation induction day (Area Under the Curve = 87.5%)

Table 1: Comparison of clinical pregnancy results on the basis of endometrial thickness

Categories of Endometrial thickness		Not pregnant (n = 181)	Pregnant (n = 101)	Total (n = 282)	P value
Group A	< 8	110 (95%)	6 (5%)	116	<0.0001
Group B	≥ 8	71(43%)	95(57%)	166	

Not pregnant and pregnant groups stratified on the basis of beta HCG <5 mIU/ml non pregnant and >5 mIU/ml pregnant.

Table 2: Comparison of hormones & cytokines in study groups

Endometrial Thickness Categories	Group A <8mm (n=116)	Group B ≥8mm (n=166)	P Values
Progesterone	1.8 ±0.7	1.2 ± 0.7	<0.001
Estradiol	2194.4±336.6	2412.9± 229.7	<0.001
Interleukin I-β	71.8±49.6	139.4± 57.4	<0.001

Values expressed as Mean ± SD
Peak values estimated on OI day (day of hCG administration)
Results were measured by Repeated Measure ANOVA

A high estradiol (E2), Interleukin- 1 β (IL- 1 β) and less Progesterone (P);P < 0. 0001 was found in pregnant patients with ≥ 8mm thickness.

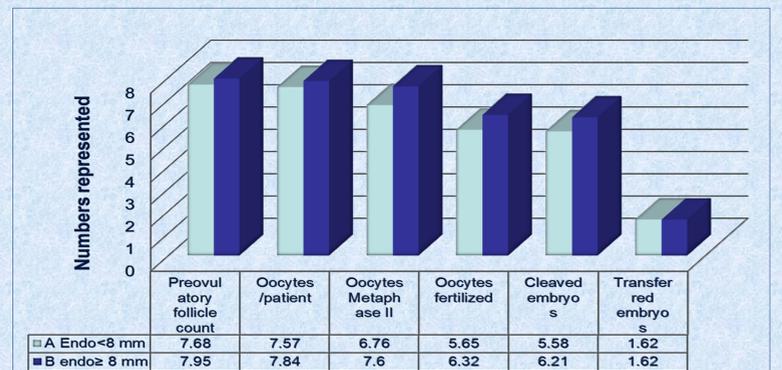|	Preovulatory follicle count	Oocytes/patient	Oocytes Metaphase II	Oocytes fertilized	Cleaved embryos	Transferred embryos
▢ A Endo<8 mm	7.68	7.57	6.76	5.65	5.58	1.62
▪ B endo≥ 8 mm	7.95	7.84	7.6	6.32	6.21	1.62

Fig. 2: Comparison of ovarian response to stimulation in study groups. It showed increased number of retrieved, mature and fertilized oocytes in Group B.

Table 3: Predictors of Endometrial Thickness

Variables	Odds ratio	95% CI for Odds Ratio Lower	Upper	P value
Progesterone on OI day	0.665	0.356	1.244	0.202
Estradiol on OI day	1.220	1.00	1.003	0.29
Interleukin-1β on OI day	1.017	1.008	1.026	<0.0001
Oocytes	1.053	0.837	1.324	0.661

Variables measured on the day of ovulation induction (OI) entered Logistic regression applied on endometrial thickness and its determinants

The model showed that serum IL-Iβ significantly helped in increasing endometrial thickness (OR=1.02, 95% CI =1.008-1.026).

Table 4: Effect of reproductive rates in study groups

Rates		Group A	Group B	P Value	OR	95% CI of OR
Oocyte Maturity	< 50%	15 (88.2%)	2 (11.8%)	<0.001	12.2	2.7- 54.4
	50% +	101(38.1%)	164(61.9%)			
Cleavage	< 50%	16 (84.2%)	3 (15.8%)	<0.001	8.7	2.5- 30.6
	50% +	100 (38%)	163 (62%)			
Implantation	< 50%	108(52.2%)	99 (47.8%)	<0.001	9.1	4.2 – 19.9
	50% +	8 (10.7%)	67 (89.3%)			
Fertilization	< 50%	16 (84.2%)	3 (15.8%)	<0.001	8.7	2.5 – 30.6
	50% +	100 (38%)	163 (62%)			

Values are numbers and percentages in parenthesis.

The model showed that Oocyte maturity, fertilization and implantation rate were significantly more in Group B.

Conclusions:

The endometrial thickness of 8 mm was associated with a positive pregnancy outcome after ICSI. These patients showed better oocyte parameters, number of embryos, raised peak E2 and IL-1β and less significant on OI day.