

Endometrial Thickness Measurement by TVS Predicts Pregnancy Rates

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ABSTRACT

Objective: To evaluate the influence of endometrial pattern and thickness on number of pregnant patients after intrauterine insemination.

Material and methods: All patients received sequential 150 mg clomiphene citrate from cycle day 2 to 6 and followed by Follicle Stimulating Hormone from 7 day to day 10 of cycle. From day 10 serial transvaginal ultrasonography was performed to monitor follicular growth and endometrial pattern thickness by human chorionic gonadotrophin. When follicle size was more than 18 mm human chorionic gonadotrophin was given I/M. 36 hrs after the injection, intrauterine insemination was performed. Endometrial thickness was also emphasized. Main out come measured number of pregnancies achieved among treated patients.

Results: Out of a total 500 patients, 152(30%) patients conceived. 322 patients had endometrium >10 mm thick, out of which 110(34%) conceived, whereas 178 patients had <10mm endometrium out of which 41(23%) conceived pregnancy.

Conclusion: In infertile women, on the day of human chorionic gonadotrophin administration less than 10 mm endometrial thickness predicts significantly less chances of pregnancy as compared to thick endometrium.

Keywords: Endometrial Thickness, Transvaginal Ultrasound

INTRODUCTION

There are various predictors of success of infertility treatment procedures. One of the important factor is the endometrial receptivity which is estimated by endometrial thickness and appearance. During each menstrual cycle, in the first half under the influence of estradiol, proliferative changes occur in endometrium, while in the second half under the influence of progesterone, secreted by corpus luteum, secretory changes occur. These make the endometrium fully prepared for an embryo for implantation. Several studies have evaluated the effect of endometrial thickness on pregnancy outcome. If endometrium is damaged by infections, surgeries and becomes abnormal (Asherman syndrome) the process of normal implantation fails & abortion rates are high^{1,2}.

MATERIALS AND METHODS

A retrospective study was conducted from January 2004 to January 2011 in Surgimed Infertility Center among 500 patients. The stimulation protocol was chosen by the primary physician according to physician or patient preference. All the patients included in the study received clomiphene citrate

from cycle day 2 to day 6 and then follicle stimulating hormone from 7 day to day 10 of cycle. From day 10 serial transvaginal ultrasounds were performed to monitor follicular growth and endometrial thickness.

On the day of human chorionic gonadotrophin administration, endometrial thickness was measured from the outer edge of the endometrial-myometrial interface to the outer edge in the widest part of the endometrium. All the patients who had overdue periods were followed by ultrasound to confirm the pregnancy.

Data were collected for patient characteristics (age, baseline follicle stimulating hormone), stimulation characteristics (dose of follicle stimulating hormone required for stimulation, number of follicles, endometrial thickness on day of human chorionic gonadotrophin) and cycle outcome (pregnant or non pregnant). Categorical variable were compared by chi square test. The factors which potentially influence cycle outcome were evaluated by multiple logistic regression. A p value <0.05 was considered to be statistically significant.

RESULTS

Five hundred patients were selected from a group of infertile couples coming to Surgimed Care, who underwent infertility treatment by clomiphene citrate and (follicle stimulating hormone) gonadotrophin.

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Table 1 shows number of pregnant patient in correspondence to endometrial thickness. The over all pregnancies were 151 (n=151) 30%. It was noted that 322 patient had thick >10mm appearance of endometrial out of which 110 patients i.e. 31% conceived. Whereas 178 patients had <10mm endometrium out of which 40 patients (23%) conceived.

Table 2 shows various parameters of patients affecting intrauterine insemination outcome. It shows that in cycles that resulted in pregnancy, the patients were younger, had lower baseline FSH, required less dose of FSH for stimulation and yielded more follicles as compared to the group of patients who failed to conceive. Age and high baseline FSH were negatively associated whereas trilaminar endometrium was positively associated with

pregnancy outcome; mean (\pm SD) endometrial thickness on the day of hCG was significantly greater than 10mm in cycles where pregnancy was achieved.

Table 3 shows the results of the final logistic regression model. Although a clear discriminating value of endometrium is difficult to identify, but it was noted that more pregnancies were achieved when the endometrium reached at least 10 mm supporting the fact that with increased endometrial thickness is associated with successful. The estimated odds ratio (OR) for successful pregnancy with each additional millimeter of endometrial thickness was 1.12 (95% CI 1.04- 1.2: p=0.002). Age of patient did not affected endometrial thickness. The interactions between endometrial thickness and age ($\chi^2=0.05$, df=1, p=0.821) were not significantly related.

Table 1: Pregnancy among various groups on the bases of endometrial thickness

	> 10mm	<10mm	Total
Total patients	322	178	500
Pregnant patients	110 (34%)	41 (23%)	152 (30%)

Table 2: Comparison between pregnant and non pregnant patients

Parameter	Pregnant (n=152)	Non-pregnant (n=348)
Age (years)*	32.0 \pm 4.5	33.1 \pm 5.0
Baseline FSH (IU)	7.2 \pm 2.8	8.0 \pm 3.1
No. of ampoules used	22.0 \pm 9.0	23.2 \pm 10.1
No. of follicles > 14 mm*	9.0 \pm 3.7	8.0 \pm 3.7
Endometrial Thickness (mm)*	10.8 \pm 1.8	10.4 \pm 1.7

Values are mean \pm SD

*P < 0.05 pregnant versus non-pregnant

Table 3: Results of the final logistic regression model.

Variable	Logistic Regression Coefficients (B)	P*	Adjusted OR (95% CI)**
Age	-0.0354	0.0155	0.9612 (0.9343–0.9889)
Endometrial thickness	0.1122	0.0016	1.1187 (1.0435–1.1993)

*Wald statistic test. P < 0.05 was considered statistically significant, **OR (odds ratios) were adjusted for other variables in the equation.

DISCUSSION

The outcome of assisted reproductive techniques have been evaluated by various cycle characteristics. One important parameter which has been evaluated by several groups is endometrial thickness and appearance. It has been utilized as an indirect indicator for endometrial receptivity and is measured simply in the mid saggital place during TVS as adequate proliferative and secretory changes are necessary of implantation to occur^{3,4}.

Our study addressed the effect of endometrial thickness on day 12 achieving pregnancy. The endometrial thickness was measured on the day of hCG. Various studies have demonstrated a positive significant correlation between endometrial thickness on day of hCG and pregnancy rate.⁵ Our results are in agreement to that reported positive correlation as endometrial thickness measured on the day of hCG

administration was significantly higher (10.8 \pm 1.8) in cycles where pregnancy was achieved.

In a study it was found that when endometrium was at least 9mm thick the fecundity was high, however only biochemical pregnancies were with thin endometrium⁶.

In a later study >10mm endometrium thickness was considered to be significantly related to more chances of conception.⁷ One study confirms these results as it was noted that chances of conceiving were high when an endometrial thickness of at least 10 mm was achieved. It is however, in contrast to some studies⁸ which demonstrate no significant association between endometrial thickness and pregnancy outcome. It is possible that with more advanced medicines and stimulation protocols, a small effect of endometrial thickness on outcome might be obscured or over ridden.

Various studies⁹ have also evaluated the effect of excessive endometrial thickness on achieving of pregnancies, for example one group reported lower implantation and chances of conception among patients with an endometrial thickness of >14 mm on day of hCG, which is in contrast to our study. But in another study no adverse effect were identified by thick endometrium¹⁰. Our study also supports the fact that >8 mm endometrium significantly improves the chances of pregnancy after IUI.

There were several reports of successful pregnancies resulting from cycles with endometrial thickness <4 mm indicating that a thin endometrium does not necessarily preclude the possibility of chance of conceiving and cycle cancellation is unwarranted¹¹. It is contrast to our study in which pregnancy rates have significantly low (23%) when endometrium was less than 10 mm.

CONCLUSION

Adequate endometrial development is required for a pregnancy to occur, pregnancy rates were found to be higher when on day of hCG administration, the endometrium thickness was at 10mm and pattern was trilaminar, whereas on the day of hCG administration their endometrium and homogenous pattern predicts significantly decreased pregnancy rates. Consequently in all the infertile couples undergoing ovulation induction, endometrial thickness and pattern should be carefully evaluated in addition to follicle growth.

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