Assessment of the late proliferative phase endometrium by ultrasonography in patients undergoing in-vitro fertilization and embryo transfer (IVF/ET)

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This study reports on 330 women aged 29 to 45 years, who underwent 411 cycles of in-vitro fertilization and embryo transfer (IVF/ET). Vaginal sonograms were performed during the late proliferative phase of natural cycles and cycles of controlled ovarian hyperstimulation (COH) with gonadotrophins, to evaluate both the thickness and echogenicity of the endometrium. Findings classified as Grade I; characterized by homogeneous echogenicity of the endometrium, and Grade II; characterized by an outer peripheral layer of dense echogenicity surrounding a central sonoluent area (i.e. a 'halo pattern'). Grades I and II were subclassified on the basis of thickness into A (> 9 mm) and B (<9 mm). Grade IIA ('optimal') was associated with a clinical pregnancy rate per embryo transfer of 33% while Grades IA, IB and IIB ('poor') were associated with a rate of only 7%. Women aged 41–45 years experienced a 25% incidence of 'poor' sonographic grades while the incidence in women ≤40 years of age was 5%. The presence of various uterine pathologies was associated with 'poor' endometrial grades in 86% of cases while only 11% of normal uteri manifested 'poor' grades. 'Optimal' endometrial grades in natural cycles were consistently associated with 'optimal' grades in ensuing cycles of COH (96%). Women with 'poor' endometrial grades in natural cycles improved in 55% of cases during subsequent COH. The results of this study indicate that sonographic assessment of the endometrial lining in the late proliferative phase during both natural and COH cycles is a valuable method for screening and managing IVF/ET candidates.

Key words: endometrium/ultrasonography/IVF/ET

Introduction

The high emotional, financial, and physical cost associated with in-vitro fertilization and embryo transfer (IVF/ET) demands that candidates be thoroughly counselled with regard to their likelihood of conceiving after undergoing a procedure. Multiple variables have been described (Wilkes et al., 1985; Steptoe et al., 1986; Hughes et al., 1989) which are known to impact on success rates and must be taken into account. Recent observations that a relationship exists between endometrial development during cycles of controlled ovarian hyperstimulation (COH) for IVF/ET and the likelihood of a subsequent pregnancy, potentially represents an important additional variable for consideration. With the introduction of high resolution ultrasound, an opportunity has been provided to investigate changes in the thickness and echogenicity of the developing endometrium during both spontaneous and stimulated cycles (Fleischer et al., 1984; Smith et al., 1984; Forrest et al., 1988; Gonen et al., 1989). Several investigators have found a significant correlation between the mean endometrial thickness measured sonographically and the likelihood of subsequent conception in those patients undergoing COH for IVF/ET (Smith et al., 1984; Glissant et al., 1985; Gonen et al., 1989; Gonen and Casper, 1990). Other investigators have failed to confirm this correlation (Fleischer et al., 1986; Rabinowitz et al., 1986; Adams et al., 1988; Welker et al., 1989). There are similar conflicting data regarding the ability of endometrial thickness to predict the number of oocytes recovered by aspiration and subsequent fertilization rates. Smith et al. (1984) found a positive correlation while Glissant et al. (1985) and Gonen et al. (1989) found no correlation between endometrial thickness and the number of oocytes recovered and/or subsequent fertilization rates. Imoedemhe et al. (1987) found a positive correlation between luteal phase endometrial thickness and subsequent pregnancy rates following IVF/ET.

Recently, investigators began incorporating patterns of sonographic endometrial evaluation following COH for IVF/ET in an attempt to predict the likelihood of pregnancy occurring. The hypoechoic 'halo' effect has been usually associated with increased endometrial thickness and with an improved potential to maintain a pregnancy following IVF/ET (Welker et al., 1989; Gonen et al., 1990). A positive correlation has been demonstrated between the pattern of endometrial development and subsequent fertilization rates following oocyte retrieval (Gonen et al., 1990).

In view of the significant controversy surrounding the relationship between endometrial development and outcome following IVF/ET, we undertook a retrospective study aimed at re-addressing this issue. A careful chart review enabled us to compare late proliferative phase endometrial development during natural cycles with subsequent endometrial development in ensuing cycles of COH. As several patients in the present study had undergone multiple cycles of COH, we were also able to analyse sequential patterns of proliferative phase endometrial development during consecutive cycles of COH for IVF/ET. Finally, appropriate subgrouping of the 330 patients studied enabled us to examine the potential effects of maternal age and uterine pathology on endometrial development assessed by vaginal ultrasonography in the later proliferative phase.
Materials and methods

Patients

The present study evaluated 330 infertile couples who underwent COH for oocyte retrieval and IVF/ET between July 1, 1987 and April 30, 1990. The aetiologies for their infertility included organopelvic disease 204 (62%), male factor 85 (26%), cervical factors and/or female anti-sperm antibodies 21 (6%) and unexplained 20 (6%). All women underwent vaginal sonographic assessment of their endometrial lining in the later proliferative phase, 2 days prior to oocyte retrieval. This patient cohort was subsequently divided into subgroups for analysis of factors affecting endometrial development.

One-hundred-and-ninety women were judged as normo-ovulatory on the basis of basal body temperature charts, cycle length and mid-luteal phase evaluation of endometrial biopsy samples and serum progesterone concentrations. This group was subdivided on the basis of age into 123 women of less than 41 years and 68 women of between 41 and 45 years, in order to evaluate the effect of age on endometrial development. One-hundred-and-eight of the normo-ovulatory women had undergone ultrasound endometrial evaluations during a natural unstimulated cycle and a subsequent cycle(s) of COH for IVF/ET. This group was assessed with regard to the potential for evaluating natural cycle endometrial development as a means of predicting endometrial development during subsequent cycles of COH for IVF/ET.

Endometrial sonographic evaluation

Endometrial sonographic evaluation was accomplished utilizing a General Electric 3600 ultrasound (GE, California) with a 5 or 7 MHz vaginal transducer. The patients were assessed in natural cycles within 1 day of a documented colour change using a self-selected ovulation predictor kit. Patients undergoing IVF/ET were evaluated on the day of administration of human chorionic gonadotrophin (HCG, Everready Drugs, New York) 36–48 h prior to oocyte retrieval.

The ultrasound endometrial sonogram was graded on the basis of echogenic pattern into Grades I and II respectively. Grade I was characterized by the presence of a homogenous echo-dense pattern while Grade II was diagnosed by the presence of peripheral echogenicity with a central dark area of reduced echogenicity (‘halo pattern’). Endometrial thickness was classified as Grades A and B. Grade A comprised cases where the widest diameter of the endometrium, measured as the distance between the outer margins of the ‘halo pattern’ was equal to or greater than 9 mm in thickness. Grade B represented cases where endometrial thickness was less than 9 mm (See Table I, Figs 1A, 1B, 2A and 2B). Grades IA, IB and IIB were subsequently categorized as ‘poor’, while Grade IIA was considered ‘optimal’. This terminology and classification is used throughout this paper.

IVF/ET

COH was achieved with the administration of human menopausal gonadotrophin (HMG, Pergonal-Serono Laboratories) in combination with follicle stimulating hormone (FSH, Metrodin-Serono Laboratories) for 7–14 days. In 219 cycles, patients received the gonadotrophin releasing hormone agonist (GnRHa) leuprolide acetate (Lupron, Tapp Pharmaceuticals) prior to initiating COH. One milligram of Lupron was administered from the mid-luteal phase of the cycle until spontaneous menstruation occurred, whereupon a vaginal ultrasound examination was performed to exclude ovarian cysts and plasma oestradiol concentration (E₂) was measured. As soon as the E₂ level was <30 pg/ml, in the absence of sonographic evidence of ovarian cysts, a combination of gonadotrophin therapy with 0.75 mg of Lupron was initiated with daily injections. The dose of gonadotrophin therapy was calculated on the basis of plasma FSH concentration measured on the first or second day of a preceding
natural cycle and ranged between 150 and 600 International Units (IU) per day for 7–12 days. In 192 cycles, patients received gonadotrophin therapy alone initiated on the second day of the menstrual cycle. The dose ranged between 150 and 600 IU per day for a period of 7–9 days.

All patients underwent serial daily E2 and vaginal sonographic evaluations commencing 7 days after the initiation of gonadotrophin therapy. Once the E2 exceeded 550 pg/ml and there were two or more follicles with mean diameters > 18 mm, gonadotrophin therapy and GnRHa therapy were discontinued. Ten thousand units of HCG was administered with a staggered 'coasting period' based on the total number of days on gonadotrophin therapy. Oocyte retrieval was performed through transvaginal aspiration under ultrasound guidance. All patients received 50 mg of progesterone i.m., daily from the day of oocyte retrieval (luteal phase day, LP-1). Embryo transfer was performed 48–55 h following oocyte retrieval. Plasma HCG concentrations were determined on LP-11 and LP-13 respectively, at which time progesterone administration was discontinued. Patients demonstrating a progressive rise in serum HCG concentration subsequently received 5000 units of HCG i.m. three times a week for an additional period of 3 weeks in an effort to support the corpus luteum of early pregnancy. An ultrasound to confirm a viable intrauterine pregnancy was performed at ~6 weeks gestation.

Data were analysed and patient groups compared using the Z-test for the comparison of proportions. Significance was defined as \( P < 0.01 \).

**Results**

The important relationship between endometrial development as assessed ultrasonographically and outcome following a completed cycle of IVF/ET can be clearly seen in Table II. This group of 320 cycles in women <41 years of age demonstrates a poor outcome in cases where ultrasound endometrial assessment showed 'poor' endometrial development. Those cycles in which a Grade IIA endometrial lining was detected was associated with a 33% clinical pregnancy rate and a 25% live birth rate per embryo transfer in 248 completed IVF/ET cycles. In contrast, in those cycles associated with a Grade IIB endometrium, there was only a 7% pregnancy rate and a 4% live birth rate per embryo transfer. No pregnancies were established in cases where the endometrium was assigned a Grade I. It was on this basis that the term 'poor' was used to describe Grades IA, IB and IIB, while 'optimal' was applied to Grade IIA.

![Fig. 2. (A) Example of a Grade IIA lining. Observe the dense (white) periphery and the central 'darker' sonoluscent region which is characteristic of a Grade II. The endometrium measures 11 mm in thickness. (B) Example of a Grade IIB lining. Observe the dense (white) periphery and the central 'darker' sonoluscent region which is characteristic of a Grade II. The endometrium measures 8 mm in thickness.](https://academic.oup.com/humrep/article-abstract/6/2/232/663433)

**Table II.** Endometrial grade versus outcome in 320 completed cycles of IVF/ET performed in women <41 years of age

<table>
<thead>
<tr>
<th>Endometrial grade</th>
<th>Total number of embryo transfers</th>
<th>Clinical pregnancies(^a)</th>
<th>1st trimester abortions (^b)</th>
<th>2nd trimester abortions and perinatal deaths (^c)</th>
<th>Live births and pregnancies ongoing beyond 12 weeks (^c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade IA + B</td>
<td>23</td>
<td>0 (0%)</td>
<td>0</td>
<td>0</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Grade IIB</td>
<td>67</td>
<td>5 (7%)</td>
<td>2 (40%)</td>
<td>0</td>
<td>3 (4%)</td>
</tr>
<tr>
<td>Grade IIA</td>
<td>248</td>
<td>83 (33%)</td>
<td>21 (25%)</td>
<td>2(^b)</td>
<td>60 (24%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>327</td>
<td>88 (27%)</td>
<td>23 (26%)</td>
<td>2</td>
<td>63 (19%)</td>
</tr>
</tbody>
</table>

\(^a\)Abortion from Down's Syndrome.

\(^b\)Perinatal death due to prematurity.

\(^c\)Z-tests comparing clinical pregnancies between the two major groups (i.e. 5/79 versus 83/248) was \(-4.729, P < 0.01\).

Comparing birth rates (i.e. 3/79 versus 60/248) was \(-3.953, P < 0.001\)
To control for the known benefits of transferring multiple embryos, a cohort of 260 embryo transfers in which at least four embryos were transferred was evaluated. Not a single clinical miscarriage occurred in this cohort of patients following 22 embryo transfers performed in cycles where the endometrial grade was IA or IB and only six clinical pregnancies occurred following 59 embryo transfers (10%) in cycles where the endometrial grade was IIB. In contrast, 75 clinical pregnancies occurred following 179 embryo transfers (42%) performed in cycles associated with Grade IIA. When these results were grouped according to the categories of optimal versus poor endometrial grades, the statistical difference in pregnancy rates was highly significant (P ≤ 0.001).

To evaluate the effects of age on endometrial development during COH, a cohort of 191 normo-ovulatory women who underwent IVF/ET was evaluated. As depicted in Table III, only six of 123 (5%) women under the age of 41 years had ‘poor’ endometrial grades. In contrast, 17 of 68 (25%) of women between 41 and 45 years of age, had ‘poor’ endometrial grades.

In 108 normo-ovulatory women who subsequently underwent COH for IVF/ET, endometrial grading was also accomplished during an antecedent natural cycle. Twenty-seven of the 108 women (25%) had ‘poor’ endometrial grades during natural cycles. However, during COH for IVF/ET, 15 of these 27 (55%) women demonstrated an improvement of endometrial grade from poor to optimal. Seventy-eight of the 81 (96%) women with optimal endometrial grades during natural cycles maintained optimal endometrial grades during subsequent cycles of COH.

Table IV presents endometrial grades in seven women who were followed sequentially during a natural cycle as well as during subsequent cycles of COH for IVF/ET. These patients reflect some of the diagnostic categories of women who were evaluated for endometrial development. The table demonstrates that optimal endometrial development during a natural cycle usually is followed by optimal endometrial development during COH for IVF/ET. Similarly, repetitive cycles of COH are associated with predictably consistent endometrial grades.

After recognizing prior diethylstilboestrol (DES) exposure as producing a potential negative impact on endometrial development, a number of other uterine pathologies were evaluated. As shown in Table V, 204 women were identified who underwent IVF/ET for adnexal disease. Fifty-nine of these women had the following associated uterine pathologies: multiple myomas (23), severe uterine synechiae (16), DES uterine anomalies (10) or adenomyosis confirmed on biopsy or magnetic resonance imaging (MRI) (10). The uterine synechiae had been treated at least once prior to the cycle of COH for IVF/ET. The incidence of poor endometrial grades in women with adnexal disease and associated uterine pathology was 86% compared with an incidence of 11% for women who had adnexal disease without uterine pathology.

Finally, 42 women were retrospectively identified as having had endometrial biopsies during the luteal phase of the same natural cycle during which endometrial development was graded. Twenty-seven of these women had Grade IIA and 15 had Grade IIB endometrial patterns. Two of the 27 (7%) with Grade IIA endometrial linings had subsequent evidence of inadequate luteal phase endometrium using histological criteria of a >2-day lag in endometrial development. In contrast, 2 of 15 (13%) women with Grade IIB endometrial linings had similar histological evidence of inadequate luteal phase endometrial development.

**Discussion**

While fertilization and embryo transportation to the endometrial cavity are obvious prerequisites for the initiation of pregnancy, it is implantation and placentation which ultimately determine intrauterine nutrition and thereby the health and well-being of the fetus. To promote optimal implantation and placentation, the endometrium must undergo precise and specific maturational development. This includes differentiation and proper proliferation during the follicular phase of the cycle followed by carefully orchestrated secretory changes in the glandular elements during the luteal phase and subsequent decidualization of the endometrial stroma. These events are directly influenced by the prevailing steroid environment in the natural menstrual cycle as well as in cycles of COH with fertility agents.

Methods used to assess the endocrine response in the menstrual cycle have in large part focused on the timing of ovulation through the use of sonography, basal body temperature charts, docu-

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**Table III.** The influence of age on endometrial grade during COH in 191 normo-ovulatory women

<table>
<thead>
<tr>
<th>Ultrasound endometrial grade</th>
<th>&lt;41 years (n = 123)</th>
<th>41-45 years (n = 68)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade IA + B</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Grade IIB</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Grade IIA</td>
<td>117</td>
<td>51</td>
</tr>
</tbody>
</table>

Z-test comparing ages (i.e. 6/123 versus 17/68) was -4.094, P < 0.001.

**Table IV.** The endometrial grade in seven women during a natural cycle and in subsequent consecutive cycles of COH in preparation for IVF/ET

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Indications for IVF/ET</th>
<th>Endometrial grade in natural cycle</th>
<th>Endometrial grade in IVF cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>Tubal disease</td>
<td>IIA (12 mm)</td>
<td>Cycle 1 IIA (11 mm) IIA* (10 mm)</td>
</tr>
<tr>
<td>40</td>
<td>Tubal disease</td>
<td>IIA (11 mm)</td>
<td>Cycle 1 IIA (10 mm) IIA* (9 mm)</td>
</tr>
<tr>
<td>29</td>
<td>DES uterine anomaly</td>
<td>IB (6 mm)</td>
<td>Cycle 1 IB (4 mm) IIA* (7 mm)</td>
</tr>
<tr>
<td>38</td>
<td>Male factor</td>
<td>IIA (9 mm)</td>
<td>Cycle 1 IIA* (9 mm) Donor</td>
</tr>
<tr>
<td>38</td>
<td>Female sperm antibodies</td>
<td>IIA (11 mm)</td>
<td>Cycle 1 IIA* (9 mm) Cancell IIA*</td>
</tr>
<tr>
<td>37</td>
<td>Male factor</td>
<td>IIB (7 mm)</td>
<td>Cycle 1 IIB (8 mm) IIB (8 mm)</td>
</tr>
<tr>
<td>32</td>
<td>Endometriosis</td>
<td>IIA (9 mm)</td>
<td>Cycle 1 IIA* (10 mm) IIA* (11 mm)</td>
</tr>
</tbody>
</table>

*aOngoing pregnancy.

*bMiscarriage in 1st trimester DES, Diethylstilboestrol.
imentation of the luteinizing hormone (LH) surge in both natural and clomiphene citrate (CC) stimulated cycles, as well as mid-luteal or late-luteal histological endometrial dating, with or without measurement of plasma progesterone concentrations. Hitherto, little clinical attention has been afforded endometrial changes in the proliferative phase of patients with infertility and/or reproductive failure. This is in spite of the fact that hormones of the corpus luteum (progesterone and oestrogen), in order to effect optimal secretory changes, require a proliferative endometrium optimally ‘primed’ by oestrogen. There is likewise, a relative paucity of information regarding the endometrial end-organ response to oestrogen in the proliferative phase of women undergoing COH and the manner in which this influences conversion to a secretory pattern.

Improved ultrasound resolution has allowed a new non-invasive method of endometrial assessment. As previously noted, several studies have attempted to correlate endometrial thickness and/or texture patterns with success rates during cycles of IVF/ET. The different conclusions among these authors may in part be secondary to differences in techniques, i.e. vaginal versus abdominal ultrasound scanning, clomid versus pergonal stimulation agents, or techniques and/or criteria of assessment. We have used vaginal ultrasound for optimal resolution, gonadotrophic therapy to avoid potential effects of CC on the endometrium and measured the widest endometrial diameter to provide maximum intergroup discrimination.

The present study indicates that women with sonographically poor endometrial patterns in the late proliferative phase (grades IA, IB and IIB) experience a poor clinical pregnancy rate of < 8% per embryo transfer, while women with an optimal pattern (grade IIA) achieved a clinical pregnancy rate of > 33%. Increasing the number of embryos transferred improved the clinical pregnancy rate substantially (33—42%) for patients with optimal endometrial linings, but had no effect on pregnancy rates in patients with poor endometrial linings (7%).

Age significantly influenced the late proliferative sonographic endometrial grade. Twenty-five per cent of women aged 41—45 years who underwent COH in preparation for IVF/ET had poor sonographic endometrial grades, whereas this category occurred in only 5% of women < 41 years of age (Table III). This might help explain the relatively low pregnancy and high miscarriage rates that occur in women > 40 years of age who conceive following IVF/ET. Similarly, the existence of uterine pathology profoundly influenced the sonographic endometrial grade.

Women with uterine pathology due to multiple myomas, severe uterine synechia, DES anomalies and adenomyosis had a high incidence (87%) of poor sonographic endometrial grades in the late proliferative phase while women with healthy uteri had a low incidence (11%) (Table V). Perhaps advancing age (beyond 40 years) as well as intrinsic uterine pathology compromises the vascular supply to the basal layer of the endometrium resulting in a reduced potential for endometrial proliferation.

The results of both human and animal studies strongly suggest that prenatal exposure to DES at the time of Mullerian development adversely influences oestrogen receptors (Turner et al., 1989; Bern et al., 1987). This could explain the prevalence of poor endometrial grades in women with DES-related uterine anomalies. Anecdotally, we have observed four women who received clomiphene citrate (CC) monthly for more than three consecutive cycles and subsequently presented with sonographic evidence of reduced endometrial thickness. The endometrium improved once CC therapy was discontinued for at least one full cycle. Perhaps CC exerts its effect on endometrial oestrogen receptors in an adverse, antioestrogenic manner which after three or more consecutive cycles begins to inhibit proliferation. This phenomenon might help to explain the fact that the vast majority of pregnancies occur during the first three cycles of CC stimulation. The potential negative effects of CC on endometrial development especially when administered in high doses (100—200 mg daily), might adversely affect studies evaluating the relationship of endometrial thickness to successful pregnancies during IVF/ET cycles (Fleischer et al., 1984; Imoedemhe et al., 1987; Lenz Lindenberg, 1990).

The present study illustrates that sonographic endometrial grading in the immediate preovulatory phase of natural cycles is predictive of the subsequent response to gonadotrophins during COH. Ninety-six per cent of normo-ovulatory women with optimal endometrial grades during a natural cycle produced optimal endometrial grades in subsequent COH cycles. Further, 55% of women with poor endometrial grades during a natural cycle were able to improve to optimal endometrial grades with COH. In contrast, only 4% of women who had optimal endometrial grades in natural cycles demonstrated subsequent conversion to a poor endometrial grades following COH. This information could be of great assistance in counselling IVF/ET candidates with regard to the likelihood of their conceiving and the advisability of undergoing COH and/or proceeding to oocyte retrieval when confronted with a poor endometrial grade. Women with optimal sonographic grades in natural cycles should be assured that the grade is likely to remain optimal during ensuring COH cycles. Women with poor sonographic grades in natural cycles have a 55% chance that the lining will improve following COH with gonadotrophins. However, they should be counselled regarding the risks of proceeding to embryo transfer should their endometrial grades fail to improve following COH. Options for management might include zygote/embryo cryopreservation as some women with persistently poor endometrial grades may benefit from exogenous oestrogen/progesterone therapy in an attempt to improve the endometrial grade in preparation for the transfer of thawed embryos. We have observed a very few cases where such an approach has been beneficial. However, most of our preliminary observations suggest that the vast majority of

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Table V. The influence of uterine pathology on ultrasound endometrial grading in 204 women with irreparable adnexal disease

<table>
<thead>
<tr>
<th>Uterine pathologies</th>
<th>Ultrasound endometrial grading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade IA</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>Multiple myomas</td>
<td>3</td>
</tr>
<tr>
<td>Severe uterine synechiae</td>
<td>2</td>
</tr>
<tr>
<td>DES uterine anomalies</td>
<td>4</td>
</tr>
<tr>
<td>Adenomyosis</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>
women do not improve their endometrial grades following exogenous oestrogen administration or in subsequent cycles of COH, regardless of the dosage of gonadotrophins administered or of peak preovulatory plasma oestradiol concentrations. Surrogate parenting may represent the only remaining option for many of these women.

Once informed that they have poor endometrial grades and a 45% chance of this recurring in a subsequent cycle of COH, some women might elect not to proceed with the IVF/ET cycle of treatment, while others may choose to defer this decision until the time of sonographic endometrial assessment, 2 days prior to egg retrieval. On the other hand, women who achieve optimal endometrial grades following gonadotrophin stimulation can anticipate that this trend will be sustained in subsequent cycles.

Although we observed a doubling (7% versus 13%) in the incidence of inadequate endometrial development by histological criteria among women with Grade IIA versus Grade IIB endometrial linings, the number of observations is not adequate to draw any firm conclusions. It was interesting to us that only a small percentage of women with Grade IIB endometrial linings demonstrated histologically poor endometrial development. This observation suggests that endometrial thickness in the luteal phase may be a better prognostic factor for achieving healthy implantation and subsequent placentation. We are currently conducting a prospective study of mid-luteal phase sonographic thickness in patients undergoing IVF/ET to assess the clinical utility of this parameter.

This study strongly suggests that there is a direct correlation between the quality of the late proliferative phase endometrium and the likelihood of subsequent implantation following IVF/ET. It is probable that a similar association exists in a wide variety of infertility and reproductive problems. Perhaps conditions such as recurrent early and late pregnancy loss, prematurity and intrauterine growth retardation may in part be causally related to poor preparation of the endometrium for implantation. The authors are convinced that assessment of the late proliferative phase endometrial grade in both natural and COH cycles will continue to emerge as important tools in the management of reproductive failure.

References


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