A Comparison of Psychological Functioning in Women at Different Stages of In Vitro Fertilization Treatment Using the Mean Affect Adjective Check List

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Purpose: The objectives were to identify the stage/s of IVF treatment where a woman is most vulnerable to psychological stress, and to assess the Mean Affect Adjective Check List (MAACL) as a measure of psychological functioning during IVF treatment, which has hitherto not been reported.

Methods: Thirty-seven women undergoing IVF treatment according to the long protocol of controlled ovarian stimulation completed the MAACL questionnaire at the following stages: (a) before treatment (visit 1), (b) before embryo transfer (visit 2), and (c) before pregnancy test (visit 3).

Results: Apart from anxiety scores for visit 2, the hostility, depression, and state anxiety scores for visit 3 were higher than the corresponding scores for visits 1 and 2 ($P < 0.001$). Anxiety scores for visits 2 and 3 were similar.

Conclusions: Psychological counseling should be targeted at women after embryo transfer and leading up to the pregnancy test. The MAACL is a useful method for measuring psychological stress in women during IVF treatment.

KEY WORDS: In vitro fertilization; Mean Affect Adjective Check List (MAACL); anxiety; psychological stress.

INTRODUCTION

Couples who embark on in vitro fertilization (IVF) treatment are taking on a major life event that is

associated with increased levels of anxiety, depression, and stress (1,2). Anxiety often is identified as the major difficulty facing women during IVF treatment, while couples whose treatment was unsuccessful are instead at risk of depression. Psychosocial counseling and therapeutic measures such as anxiety management and teaching the correct stress coping techniques can significantly reduce psychological morbidity in these patients.

We set out to determine the mood and mental state changes that occur in women at different stages of an IVF cycle. The aim was to identify the stage/s where they are most vulnerable to psychological dysfunction and therefore allows counseling and support to be targeted at the stage/s of treatment where it would be most beneficial. The Mean Affect Adjective Check List (MAACL) has been extensively used, is well validated, and shows good sensitivity to transient stressful conditions (3,4). While it has been used to assess psychological stress in many clinical situations such as pre-operative anxiety (5) and in cancer patients (6), there are no published data on its use in the IVF context. In addition, the MAACL assesses not only anxiety but other aspects of psychological well-being in one simple questionnaire. We therefore chose the MAACL to assess its usefulness in measuring psychological functioning in women during IVF treatment.

MATERIALS AND METHODS

Subjects

The subjects were women who have been accepted for IVF treatment at the Edinburgh Assisted Concep-

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tion Unit. Forty women gave their informed consent to participate in this study between February and July 1999. Each woman completed the MAACL questionnaire at three critical points in the IVF cycle: (a) prior to starting treatment, at the visit where a baseline ultrasound scan is performed (visit 1), (b) just before embryo transfer (visit 2), and (c) just before pregnancy test (visit 3). Thirty-seven women completed the questionnaire at the three specified time points. Three women did not complete all the questionnaires as they did not proceed to embryo transfer because of the risk of ovarian hyperstimulation syndrome.

Methods

Controlled ovarian stimulation was performed according to the long protocol using gonadotropin injections (Metrodin HP® or Gonal-F®) and a gonadotropin-releasing hormone analogue (Buserelin or Nafarelin). Follicular growth was monitored with transvaginal ultrasound scans and serum estradiol levels. Oocyte recovery was carried out 35 hr after injection of human chorionic gonadotropin (hCG) (Profasi®) and embryo transfer took place 2 days after oocyte recovery. The women returned to the unit for a pregnancy test (serum β hCG) 12 days after embryo transfer. Clinical pregnancies were confirmed by ultrasonography at 6 to 7 weeks gestation showing fetal cardiac activity.

At the three time points, the psychological functioning of the women was assessed with a self-administered MAACL questionnaire. They were given adequate time to complete the checklist but none took longer than 10 min. The MAACL contains a list of 132 words and the women checked adjectives that best described their mental/emotional state at that moment. The adjectives are grouped into five categories, namely, sensation seeking, positive affect, hostility, depression, and state anxiety, but are presented in random order. A numerical score for each category is obtained with the higher scores indicating greater levels of symptomatology in those categories.

Statistical Analysis

The data were analyzed with the matched-pairs Wilcoxon signed rank test and Mann-Whitney *U*-test, with statistical significance taken at $P < 0.05$. Bonferroni correction was applied to P values on account of the large number of comparisons made.

RESULTS

The mean ($\pm$ SD) age of the women was 35.1 ± 3.4 years and the mean ($\pm$ SD) duration of infertility was 77.5 ± 34.2 months. For most of the women ($n = 14$), it was their first IVF attempt. Seven women had one previous embryo transfer, while 16 had two or more previous transfers. The majority of women were nulliparous ($n = 32$) and nine of them had the opportunity for embryo cryopreservation. Nine (24%) women had a clinical pregnancy, while two had a biochemical and one an ectopic pregnancy.

The median MAACL state scores for visits 1, 2, and 3 are presented in Fig. 1. Apart from anxiety scores for visit 2, the hostility, depression, and anxiety scores for visit 3 were significantly higher than the corresponding scores for visits 1 and 2 ($P < 0.001$). Anxiety scores for visits 2 and 3 were not significantly different. The positive affect scores were lower in visit 3 than visits 1 and 2, while sensation seeking scores for visits 2 and 3 were lower than visit 1. The differences were statistically significant ($P < 0.001$).

Comparisons with respect to age, parity, duration of infertility, number of previous transfers, and opportunity for embryo cryopreservation did not show any statistically significant differences and therefore failed to identify any at-risk subgroups, but the numbers here were too small to draw any firm conclusions. There were no significant differences in the anxiety, depression, and hostility scores between the pregnant and nonpregnant group at all three visits (Fig. 2).

DISCUSSION

Our results show that women undergoing IVF treatment experience the highest levels of psychological stress at the stage of pregnancy test. This finding is congruent with the observations made in several studies that report that women rank the period spent waiting for the outcome of treatment and a negative pregnancy result as the most stressful events (1,7,8). Connolly *et al.* (7) employed the IVF Stress Inventory and found that women ranked the following in their order of perceived stressfulness: waiting to hear outcome of embryo transfer, waiting to hear whether fertilization had occurred, and at oocyte retrieval. Interestingly, Merari *et al.* (9), using the State Trait Anxiety Inventory, reported that women experienced the highest level of anxiety just before oocyte retrieval. It also recorded the lowest anxiety scores

at embryo transfer. The authors agreed, however, that given the small sample size their results could be accounted for by other variables.

In our study, anxiety scores before embryo transfer were similar to those before pregnancy test. These anxiety scores were comparable to those obtained in female surgical patients in the immediate preoperative period (5). Johnston *et al.* (10) also showed that at oocyte retrieval and embryo transfer, women experienced anxiety levels similar to those having major gynecological surgery.

Although several studies have suggested that psychological factors may, at least partly, influence IVF outcome (8,11), the general body of evidence remains contradictory. We found no significant differences in the psychological stress experienced by the pregnant group versus the nonpregnant group.

While it is common practice to offer psychosocial counseling and therapy to women in the pretreatment phase of IVF, these services usually are not actively

made available during the treatment cycle itself. Research has shown that a significant number of patients would have availed themselves of such services if it had been provided during treatment (12). Moreover, several studies have indicated that couples feel “reassured” to know that such services exist even if they do not use them (2,13). As our study identifies the period leading up to the pregnancy test as the most vulnerable, it would be timely to reiterate to women after their embryo transfer that psychological support is readily available to them. At this stage, it would be helpful to identify women who may require close psychological support.

Our study reports for the first time the use of the MAACL in IVF patients. The questionnaire was patient-friendly; it was readily accepted, easily understood, and completed correctly in a short time by all the women in the study. This study shows that the MAACL is a useful subjective measure of psychological functioning in women during IVF treatment.

Fig. 1. Median MAACL (Mean Affect Adjective Check List) state scores at visit 1 (before IVF treatment; $n = 37$), visit 2 (before embryo transfer; $n = 37$), and visit 3 (before pregnancy test; $n = 37$). Statistically significant differences are denoted by “a” ($P < 0.001$; matched pairs Wilcoxon signed rank test).

Fig. 2. MAACL state anxiety scores in the pregnant (P) versus nonpregnant (NP) group at visit 1 (before IVF treatment), visit 2 (before embryo transfer) and visit 3 (before pregnancy test), with median scores represented by a horizontal bar. There were no statistically significant differences in anxiety scores between the pregnant and nonpregnant group at the three visits (Mann–Whitney *U*-test).

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REFERENCES

1. Baram D, Tourtelot E, Muechler E, Huang K: Psychosocial adjustment following unsuccessful in vitro fertilization. *J Psychosom Obstet Gynaecol* 1988;9:181–190

2. Leiblum SR, Kemmann E, Lane MK: The psychological concomitants of in vitro fertilization. *J Psychosom Obstet Gynaecol* 1987;6:165–178

3. Zuckerman M, Lubin B: Manual for the Multiple Affect Adjective Check List Measure of Anxiety. San Diego, CA: Educational and Industrial Testing Service, 1965

4. Lubin B, Zuckerman M: Bibliography for the Multiple Affect Adjective Check List. Unpublished, 1982

5. Badner NH, Nielson WR, Munk S, Kwiatkowska C, Gelb AW: Preoperative anxiety: Detection and contributing factors. *Can J Anaesth* 1990;37:444–447

6. Kreitler S, Chaitchik S, Rapoport Y, Algor R: Psychosocial effects of level of information and severity of disease on head-and-neck cancer patients. *J Cancer Educ* 1995;10:144–154

7. Connolly KJ, Edelmann RJ, Bartlett H, Cooke ID, Lenton E, Pike S: An evaluation of counselling for couples undergoing treatment for in vitro fertilization. *Hum Reprod* 1993; 8:1332–1338

8. Boivin J, Takefman JE: Stress level across stages of in vitro fertilization in subsequently pregnant and non-pregnant women. *Fertil Steril* 1995;64:802–810

9. Merari D, Feldberg D, Elizur A, Goldman J, Modan B: Psychological and hormonal changes in the course of in vitro fertilization. *J Assist Reprod Genet* 1992;9:161–169

10. Johnston M, Shaw R, Bird D: “Test tube baby” procedures: Stress and judgements under uncertainty. *Psychol Health* 1987;1:25–38

11. Demyttenaere K, Nijs P, Evers-Kiebooms G, Koninckx PR: Coping and the ineffectiveness of coping influence the outcome of in vitro fertilization through stress responses. *Psychoneuroendocrinology* 1992;17:655–665

12. Daniluk JC: Infertility: Intrapersonal and interpersonal impact. *Fertil Steril* 1988;49:982–290

13. Mazure CM, Greenfield DA: Psychological studies of in vitro fertilization/embryo transfer participants. *J Vitro Fert Embryo Transfer* 1989;6:242