CLINICAL ASSISTED REPRODUCTION

Ovarian Endometriomas Do Not Adversely Affect Pregnancy Success Following Treatment with In Vitro Fertilization

JOHN D. ISAACS, Jr.,^{1,2} RANDALL S. HINES,¹ VICTORIA M. SOPELAK,¹ and BRYAN D. COWAN¹

Submitted: July 14, 1997

Accepted: July 18, 1997

Purpose: Ovarian endometriomas have an uncertain impact on outcome following in vitro fertilization (IVF). Some authors describe a poor response to ovulation induction, and others observe decreased pregnancy success rates. Conversely, IVF outcomes similar to those of patients undergoing IVF for tubal-factor infertility have also been reported. To determine the impact of ovarian endometriomas on pregnancy success in our IVF program, we identified patients with endometriosis and compared outcomes that were stratified by the presence or absence of an endometrioma at the time of follicular aspiration.

Methods: One hundred eight patients with a diagnosis of endometriosis treated with IVF were identified, retrospectively. In this group, 24 patients completed 29 cycles in which an ovarian endometrioma was aspirated at the time of oocyte retrieval, and 84 patients without endometriomas completed 147 cycles. The cycles from these two groups were compared for differences in peak estradiol, number of mature follicles, number of oocytes, number of embryos transferred, and clinical pregnancies.

Results: There were no significant differences between the two groups with respect to peak estradiol, mature follicles, number of oocytes, number of embryos transferred, or clinical pregnancies.

Conclusions: From this retrospective observational analysis it appears that aspiration of an endometrioma at the time of oocyte retrieval has no adverse effect on outcome. This

information may prove helpful when faced with the decision to cancel an IVF treatment cycle in patients with this uncommon complication.

KEY WORDS: endometriosis; female infertility; in vitro fertilization; pregnancy.

INTRODUCTION

Ovarian endometriomas are an infrequent finding in patients with endometriosis. The impact of this diagnosis on outcome following treatment with in vitro fertilization (IVF) is controversial, and available data are scarce. When patients with endometriomas have been examined as a subset of patients with endometriosis, conflicting outcomes have been reported. Some authors have shown no effect of endometrioma on IVF outcome (1), whereas others report that endometriomas adversely affect pregnancy outcome (2).

The purpose of this study was to review our experience with patients undergoing IVF with an ovarian endometrioma. These patients were compared to patients undergoing IVF with a diagnosis of endometriosis not associated with an endometrioma.

MATERIALS AND METHODS

Patients treated with IVF between January 1, 1993, and January 1, 1997, were identified from our database. One hundred eight patients with a diagnosis of endometriosis initiated 210 cycles. We have not routinely denied treatment to patients based on age or a previous poor response to therapy if after consultation they chose to proceed. Follicular stimulation for IVF was

¹ Division of Reproductive Endocrinology, Department of Obstetrics and Gynecology, University of Mississippi Medical Center, Jackson, Mississippi 39216.

² To whom correspondence should be addressed c/o Ob-Gyn Publication Office, Department of Obstetrics and Gynecology, University of Mississippi Medical Center, 2500 North State Street, Jackson, Mississippi 39216-4505.

accomplished using either gonadotropin-releasing hormone down-regulation followed by human menopausal gonadotropin or a flare protocol when appropriate. At the time of oocyte retrieval normal follicles were aspirated initially, and at the conclusion of the procedure a single puncture was made in the suspected endometrioma. If typical chocolate-appearing fluid was aspirated, the diagnosis was confirmed. This material was kept separate from the oocytes collected and every effort was made to avoid contamination of the culture medium with this material.

Twenty-four patients who had an ovarian endometrioma aspirated at the time of oocyte retrieval in 29 cycles were identified. Of 181 initiated cycles in patients without endometriomas, 34 cycles were canceled because of poor follicular responses, leaving 147 cycles that resulted in oocyte retrieval. By default, there could be no cancellations in the endometrioma group.

Patients in these two groups were compared with respect to age, peak estradiol, number of mature follicles, number of oocytes obtained, number of embryos transferred, and total number of clinical pregnancies. In addition, patients were followed expectantly for the occurrence of adverse events following aspiration of the ovarian endometrioma.

The groups were compared with the Mann-Whitney *U* test and chi-square analysis as appropriate.

RESULTS

Eighty-four patients with a diagnosis of endometriosis underwent 147 oocyte retrievals. This group was compared to the endometrioma group of 24 patients that completed 29 oocyte retrievals. The mean age in these two groups was 35.1 and 35.7 years, respectively (Table I). Twenty-one percent of the patients in each group were older than 39 years of age.

Cycle stimulation characteristics were similar in the two groups, and no significant differences were observed in the peak estradiol level achieved, number of mature follicles present, or number of oocytes obtained (Table I). Additionally, there were no reports of adverse outcome following aspiration of endometriomas. The total number of embryos available for transfer was likewise similar between the two groups, and a comparable number of patients conceived following therapy in each group.

Table I. Study Population and IVF Cycle Outcome

	Endometriosis	Endometrioma	<i>P</i>
Patients	84	24	
Cycles	181	29	
Retrievals	147	29	
Embryo transfers	114	24	
Age (yr) ^a	35.1 (24–43)	35.7 (27–43)	0.46
Peak estradiol ^b	1373 ± 74	1339 ± 153	0.89
Mature follicles ^b	11.6 ± 0.6	11.3 ± 1.5	0.79
Oocytes ^b	6.9 ± 0.4	7.3 ± 1.1	0.96
Embryos transferred ^b	3.3 ± 0.2	2.8 ± 0.5	0.08
Clinical pregnancies	16	5	0.35

^a Mean (range).

^b Mean ± SE.

DISCUSSION

In vitro fertilization is now a standard therapy for many forms of infertility. Patients with endometriosis who do not conceive following other forms of therapy are often candidates for IVF. It appears that endometriosis does not adversely affect pregnancy outcome when patients with endometriosis are compared with those undergoing IVF for other indications (3). This important information facilitates counseling patients with endometriosis regarding IVF.

Ovarian endometriomas are potentially serious complications of endometriosis. The literature suggests that IVF outcome is compromised by the presence of an endometrioma (2,4). Accordingly, patients found to have an ovarian endometrioma during the course of an IVF treatment cycle are often canceled and surgical excision of the endometrioma is recommended. Enhancing our understanding of the natural course of ovarian endometriomas and their effect on IVF outcome would greatly facilitate this clinical decision.

Recently, it has been suggested that severe endometriosis and ovarian endometriomas may have minimal impact on success following therapy with IVF (1,3,5). This encouraging finding led us to review our experience with patients undergoing IVF with a diagnosis of ovarian endometrioma. We chose patients undergoing IVF with endometriosis as a comparison group to control for unique affects of endometriosis on IVF outcome. A comparison of these two groups reveals that in our program we could demonstrate no appreciable differences with regard to IVF cycle outcome or pregnancy success rate.

Definitive therapy for ovarian endometriomas requires surgical excision. Some authors have reported resolution of as many as 50% of endometriomas following simple aspiration alone (6). Aspiration of endo-

metriomas at the time of oocyte retrieval might allow permanent resolution of these potentially progressive ovarian tumors and help avoid surgical therapy. This must of course be balanced against the potential for serious adverse consequences following aspiration (7,8), which have not been seen in our experience.

This study has several limitations. First, as a retrospective review, it has all the weaknesses inherent in studies of this type. Second, many patients with endometriomas were diagnosed before IVF treatment initiation and were treated surgically. Thus, the existence of endometriotic disease in these patients during IVF treatment cannot be confirmed. Third, the power of our study was low (less than 10%), with an observed difference between the two groups of only 3% conceptions per retrieval. Even if we presumed scientifically interesting differences of 20% between the groups (14 vs 34%), the power is still less than 10%. Presumption of higher differences between the two groups is unreasonable, and we must conclude that our chance of finding an important difference is low with these small numbers. With larger numbers a difference between groups might become apparent. Fourth, the possibility of mistaken identification of corpus luteum cysts as ovarian endometriomas could complicate our analysis. Other authors have reported that as many as 25% of ovarian cysts felt to represent ovarian endometriomas clinically are, in fact, corpus luteum cysts when examined histologically (9). This seems unlikely because the diagnosis of endometrioma was applied only when typical "chocolate" fluid was obtained, an uncommon finding in corpora luteal cysts.

CONCLUSIONS

Ovarian endometriomas may be discovered unexpectedly during the course of an IVF treatment cycle. When these structures are identified, it does not appear that cycles have an outcome different from that of cycles in which patients are treated for endometriosis

alone—provided that other measures of adequate follicular response are present. This important information may be used by clinicians to aid their clinical decision making and their counseling of patients.

ACKNOWLEDGMENTS

This work was supported in part by the Vicksburg Hospital Medical Foundation, Vicksburg, Mississippi.

REFERENCES

1. Olivennes F, Feldberg D, Liu HC, Cohen J, Moy F, Rosenwaks Z: Endometriosis: A stage by stage analysis—the role of in vitro fertilization. *Fertil Steril* 1995;64:392–398
2. Wardle PG, McLaughlin EA, McDermont A, Mitchell JD, Ray BD, Hall MGR: Endometriosis and ovulatory disorder: Reduced fertilization in vitro compared with tubal and unexplained infertility. *Lancet* 1985;2:236–239
3. Geber S, Paraschos T, Atkinson G, Margara R, Winston RM: Results of IVF in patients with endometriosis: The severity of the disease does not affect outcome, or the incidence of miscarriage. *Hum Reprod* 1995;10:1508–1511
4. Dicker D, Goldman JA, Feldberg D, Ashkenazi J, Levy T: Transvaginal ultrasonic needle-guided aspiration of endometriotic cysts before ovulation induction for in vitro fertilization. *J In Vitro Fert Embryo Transfer* 1991;8:286–289
5. Pagidas K, Falcone T, Hemmings R, Miron P: Comparison of reoperation for moderate (stage III) and severe (stage IV) endometriosis-related infertility with in vitro fertilization-embryo transfer. *Fertil Steril* 1996;65:791–795
6. Nezhat C, Winder W, Nezhat F: Is endoscopic treatment of endometriosis and endometrioma associated with better results than laparoscopy? *Am J Gynecol Health* 1988;2:10
7. Yaron Y, Peyser MR, Samuel D, Amit A, Lessing JB: Infected endometriotic cysts secondary to oocyte aspiration for in-vitro fertilization. *Hum Reprod* 1994;9:1759–1760
8. Padilla SL: Ovarian abscess following puncture of an endometrioma during ultrasound-guided oocyte retrieval. *Hum Reprod* 1993;8:1282–1293
9. Koninckx PR, Muyldermans M, Moerman P, Meuleman C, Deprest J, Cornille F: CA-125 concentrations in ovarian "chocolate" cyst fluid can differentiate an endometriotic cyst from a cystic corpus luteum. *Hum Reprod* 1992;7:1314–1317