
UNILATERAL OVARIAN DRILLING IN POLYCYSTIC OVARY SYNDROME, DOES IT WORK?

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ABSTRACT

Objective: To evaluate the effect of unilateral and bilateral ovarian drilling by electrocautery in PCOS patients who failed to ovulate by medical therapy.

Design: A prospective randomized clinical study.

Setting: Department of Obstetrics and Gynecology and fertility care unit, faculty of medicine; Mansoura University Hospital, from January 2003 to December 2006.

Participants: Eighty-seven patients with failure of ovulation as a result of polycystic ovarian syndrome were randomly allocated to either unilateral (Group A= 43 patients) or bilateral (Group B= 44 patients) laparoscopic ovarian drilling by electrocautery

Outcome measures: The mean pretreatment and post- treatment FSH, LH, and testosterone concentrations were the primary outcome. Ovulation, pregnancy, miscarriage rates during one year of follow up period were the secondary outcome.

Results: The average time for unilateral ovarian drilling was shorter than bilateral drilling. In patients who ovulate after drilling, there was a significant fall in serum LH concentration (Group A: $P < 0.05$, Group B: $P < 0.05$). Ovulation, pregnancy and the miscarriage rates were nearly the same in both groups.

Conclusion: Unilateral Ovarian Drilling in PCOS was effective, less time consuming and probably associated with less complications.

Key words: PCOS, Unilateral Ovarian Drilling, Ovulation rate, Pregnancy and miscarriage rates.

INTRODUCTION

Anovulation is estimated to cause 40% of female infertility. In most cases, it is related to polycystic ovary syndrome (PCOS). PCOS is a common endocrinopathy affecting approximately 5-7% of women of reproductive age. The definition of the syndrome has been much debated. ⁽¹⁾ At a joint consensus meeting of the American Society for Reproductive Medicine and the European Society of Human Reproduction and Embryology (ASRM/ESHRE) a refined definition of the PCOS was agreed upon, namely the presence of two out of the following three criteria:

- Oligo- and/or anovulation.
- Hyperandrogenism (clinical and/or biochemical).
- Polycystic ovaries.

with the exclusion of other etiologies. ⁽²⁾

When infertility is the main problem affecting a patient suffering from PCOS, ovulation induction is necessary. Weight loss is important to improve the prospects of both spontaneous and drug-induced ovulation. Anovulation can be treated medically in some cases with an antiestrogen, but a proportion of patients fail to respond, and of those who ovulate, the pregnancy rate is low and the miscarriage rate and the risk of multiple pregnancy are high. ⁽³⁾

Given the drawbacks of clomiphene and the

reported effectiveness of insulin sensitizing agents as metformin in the induction of ovulation, its first-line use may potentially reduce the number of clomiphene cycles to which women with PCOS are exposed. The therapeutic options for cases who are resistant to anti-estrogens are either parenteral gonadotropin therapy or laparoscopic ovarian diathermy.⁽⁴⁾ Gonadotropin therapy may be more successful, but it is expensive, and there is a significant risk of ovarian hyper-stimulation and multiple pregnancy. Therapy with luteinizing hormone-releasing hormone (LHRH) has been used, but the results have been disappointing and the miscarriage rate has also been high.⁽⁵⁾ Laparoscopic ovarian diathermy has taken the place of wedge resection of the ovaries (which resulted in extensive periovarian and tubal adhesions) and carries a reduced risk of multiple pregnancy compared with gonadotropin therapy in the treatment of clomiphene-insensitive cases.⁽⁶⁾ This prospective study was designed to determine the efficacy of ovarian cauterization, with particular attention to unilateral ovarian drilling.

MATERIALS & METHODS

Eighty-seven patients with failure of ovulation as a result of PCOS were randomly allocated to either unilateral or bilateral laparoscopic ovarian drilling by electrocautery.

The criteria for inclusion were the following infertility secondary to anovulation, as indicated by amenorrhea or oligomenorrhea, elevated serum LH levels and normal-to-low serum FSH levels, clinical evidence of androgen excess (acne, hirsutism), and slightly elevated androgen levels. The clinical characteristics of the 87 patients are as shown in Table I.

Weight reduction and insulin sensitizing drugs were tried first for 3 months. Both groups had been

treated medically with clomiphene citrate and gonadotropins for anovulation, but the treatments had been unsuccessful. They received clomiphene citrate 50 mg daily for five days, from the third to the seventh day, if there was no response, the dosage was increased up to 150 mg daily for five days. Transvaginal folliculometry was performed; If there was still no response, human menopausal gonadotropin (HMG) was used to stimulate ovulation. Human chorionic gonadotropin (HCG) was used between the 14th and 18th day, according to the follicular size. Failure of ovulation was confirmed by a combination of ultrasound scan and low luteal-phase progesterone (day 21).

Forty three women (Group A) received unilateral laparoscopic ovarian drilling, and another 44 (Group B) had bilateral ovarian drilling. Laparoscopy under general anesthesia was carried out after obtaining a written consent from both groups; The pelvic organs were inspected and tubal assessment was confirmed by transcervical injection of methylene-blue dye.

The ovary was lifted up and sited away from any bowel, and was cauterized at 4 points each for 4 seconds at 40 watts with mixed current. Cooling of the ovary was achieved by irrigation with Ringer lactate solution, and 250 mL of the solution was left in the peritoneal cavity at the end of the operation to minimize the risk of adhesions.

On the day of the operation, blood samples were taken from the patients and every 2 weeks for eight weeks. Pelvic ultrasound scan was performed at each visit to the clinic.

All the procedures were done without complications, and the average surgical time was calculated. The patients were followed up for 1 year for ovulation, pregnancy and miscarriage rates.

Statistical analysis

Results of the study were reported as arithmetical mean \pm SD. Statistical analysis were performed using

student *t*-test and Person correlation test for comparison between both groups. A probability of ≤ 0.05 was taken as the limit of statistical significance.

RESULTS

The average time for unilateral ovarian drilling was 18.3 ± 3.5 min. and for the group (B) was 23.5 ± 2.5 min. The mean pretreatment and post-treatment FSH, LH, and testosterone concentrations are shown in Table II and III.

There was no significant statistical difference between the hormonal level in serum FSH and testosterone when pretreatment and post-treatment levels were compared in both responders (table II) and non responders (table III). However, in the responders, there was a significant fall in serum LH concentration after ovarian drilling (Group A:

$P < 0.05$, Group B: $P < 0.05$) (table II), whereas in the nonresponders there was no significant difference in LH concentration before and after treatment (table III).

As regards ovulation, pregnancy, and miscarriage rates, Sixty eight of the 85 patients (80%) ovulated within 6 months of laparoscopic ovarian drilling, but the remaining 17 patients failed to ovulate. Thirty four of the 43 patients (79.1%) who received unilateral ovarian drilling group (A) ovulated from both ovaries. Thirty four of the 44 patients (77.3%) who received bilateral ovarian drilling group (B) ovulated from both ovaries. Ovulation was assessed by ultrasound scan and serum progesterone at mid-luteal phase. During one year of follow up period the pregnancy and the miscarriage rates were 60.5%, 15.4 for group (A) and 56.8, 16% for group (B) table IV.

Table I: The demographic data of 87 patients undergoing Laparoscopic ovarian drilling by electrocautery.

Varibale	Group A (N = 43)	Group B (N = 44)
Age (years)	31.1 ± 4.2	29.8 ± 3.7
Infertility duration (years)	9.2 ± 1.1	10.4 ± 1.8
Body mass index	26.1 ± 1.9	25.74 ± 1.8

Table II: Pretreatment and post treatment serum level of hormones in responders.

Varibale	Unilateral		Bilateral	
	Pretreatment	Post-treatment	Pretreatment	Post-treatment
LH (IU/L)*	12.9 ± 3.8	7.2 ± 2.1	13.1 ± 2.9	8.9 ± 2.8
FSH (IU/L)	6.3 ± 1.3	6.1 ± 1.2	6.8 ± 1.4	6.2 ± 1.3
Testosterone (nmo/L)	2.4 ± 1.9	2.3 ± 1.2	2.6 ± 1.8	2.2 ± 1.3

*Group A: $P < 0.05$, *Group B: $P < 0.05$

Table III: Pretreatment and post treatment serum levels of hormones in nonresponders .

Varibale	Unilateral		Bilateral	
	Pretreatment	Post-treatment	Pretreatment	Post-treatment
LH (IU/L)*	14.2 ± 4.8	11.8 ± 4.3	13.9 ± 3.8	11.2 ± 4.1
FSH (IU/L)	8.8 ± 2.3	6.2 ± 3.1	6.1 ± 2.2	5.9 ± 2.9
Testosterone (nmo/L)	3.8 ± 1.4	3.5 ± 2.2	3.7 ± 1.5	3.1 ± 1.2

Table IV: The clinical outcomes of 87 patients undergoing Laparoscopic ovarian drilling by electrocautery.

Varibale	Group A (N = 43)	Group B (N = 44)
Ovulation rate	(34/43) 79.1 %	(34/44) 77.7 %
Pregnancy rate	(26/43) 60.5 %	(25/44) 56.8 %
Miscarriage rate	(4/26) 15.4 %	(4/25) 16 %

DISCUSSION

The polycystic ovary syndrome (PCOS) is associated with chronic anovulation and infertility. In most cases ovulation can be induced with weight reduction, insulin sensitizing drugs and clomiphene citrate (CC) but approximately 25% of patients fail to ovulate and require alternative treatment.⁽⁷⁾ HMG have been used with the risk of hyperstimulation and multifetal gestation. A variety of surgical options for the treatment of PCOS have been applied during laparoscopy (biopsy, cauterization, laser surgery).⁽⁸⁾ The reported ovulation rate after Laparoscopic ovarian drilling (LOD) varies between 50% and 90%.^(9, 10, 11)

Since the introduction of LOD by Gjonnaess (1984) in the early 1980s, It has become widely accepted as a second line treatment for induction of ovulation in women with PCOS after failure of clomiphene citrate. (12) Not only does LOD produce high ovulation (>80%) and pregnancy (60%) rates,

but it also corrects the underlying endocrine abnormalities associated with the disease, such as raised serum concentrations of LH and androgens. In addition, ovarian drilling may render the ovaries more sensitive to clomiphene citrate⁽⁶⁾.

Regarding the adverse effects of ovarian cauterization, whether by electrocautery or laser, periovarian adhesion is the main problem. An additional concern is the possibility of ovarian destruction leading to ovarian failure in up to 5.2% after Bilateral ovarian Wedge Resection (BOWR) and laparoscopic surgery⁽¹⁴⁾.

For these reasons, some authorities advocate a strategy of minimizing the number of holes in each ovary, with the intention of reducing the periovarian adhesions and ovarian destruction, and they even suggest the cauterization of only one ovary. It has been reported that ovulation took place from both ovaries in patients who had only one ovary treated with laser beams⁽³⁾.

Balen and Jacobs (1994) compared unilateral with

bilateral ovarian diathermy in 10 patients with anti-estrogen-resistant PCOS. They reported a 75% ovulation rate in women who underwent unilateral ovarian diathermy applying four punctures. They also found that unilateral ovarian diathermy resulted in ovulation from the contralateral ovary in the first cycle and then alternatively from each ovary.⁽¹³⁾ Although the numbers in this study are small, it clearly indicates that the effects of LOD depend on the destruction of a certain amount of ovarian tissue, whether this is inflicted on one ovary or divided between the two ovaries. It is therefore possible that the optimal amount of energy could be delivered to one ovary only without compromising the success rates.⁽⁶⁾

It has been proposed that the degree of ovarian destruction should be determined by the size of the ovary. However in our study there was no relationship between the response to surgery and size of the ovaries.

The correct dose of any therapy is the lowest one that works. Furthermore, combined approach may be suitable for some women where low dose diathermy is followed by low dose medical ovarian stimulation. In this study, ovulation took place from both ovaries in patients who had only one ovary treated. Ovulation, pregnancy, and miscarriage rates are nearly the same in both groups.

CONCLUSION

Unilateral ovarian drilling in PCOS is effective, less time consuming and probably is associated with less complications.

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