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**Nehad Eid Shreef**  
Department of Obstetrics and  
Gynecology, Faculty of Medicine,  
Tanta University, Tanta, Egypt

**Mohamed Mohsen Al-Namory**  
Department of Obstetrics and  
Gynecology, Faculty of Medicine,  
Tanta University, Tanta, Egypt

**Manal Abd Al -Raouf Farhat**  
Department of Obstetrics and  
Gynecology, Faculty of Medicine,  
Tanta University, Tanta, Egypt

**Tarek Mohamed Al-Sabaa**  
Department of Obstetrics and  
Gynecology, Faculty of Medicine,  
Tanta University, Tanta, Egypt

**Corresponding Author:**  
**Nehad Eid Shreef**  
Department of Obstetrics and  
Gynecology, Faculty of Medicine,  
Tanta University, Tanta, Egypt

## Predictors of success of ovarian drilling or redrilling in polycystic ovary syndrome

**Nehad Eid Shreef, Mohamed Mohsen Al-Namory, Manal Abd Al -Raouf Farhat and Tarek Mohamed Al-Sabaa**

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### Abstract

**Background:** Polycystic ovary syndrome (PCOS) is defined using the Rotterdam criteria. PCOS affects 5%–15% of females of reproductive age and is the first cause of infertility due to anovulation. The aim of this work was to predict success of laparoscopic ovarian drilling (LOD) or redrilling in PCOS.

**Methods:** This observational study was carried out on 50 female cases in childbearing with BMI range from 18-28Kg/m<sup>2</sup>, infertility > 3 years, irregular menstrual cycles and aged from 20-35years old. All cases were subjected to pelvic examination except in virgins, ultrasound examination, determine baseline level of anti-Mullerian hormone (AMH) and 3-dimensional color Doppler.

**Results:** AMH had a significant decline after first and second drilling as compared to before first and second drilling respectively ( $p < 0.001$ ). Follicle count in right ovary had a significant decline after first and second drilling as compared to before first and second drilling respectively ( $p < 0.001$ ). Ovarian volume in right ovary had a significant decline after first and second drilling as compared to before first and second drilling respectively ( $P = 0.002$  and  $< 0.001$  respectively).

**Conclusions:** In infertile females with PCOs, laparoscopic ovarian re-electro-cautery increased rate of spontaneous pregnancy and the majority of changes in ovarian reserve biomarkers reported following drilling may be viewed as normalisation of the function of the ovary instead of a decline in ovarian reserve.

**Keywords:** Ovarian drilling, redrilling, polycystic ovary syndrome

### Introduction

In 1935, Stein and Leventhal characterised the polycystic ovarian syndrome, which included polycystic ovaries (PCOS), oligo-anovulation, and hirsutism. PCOS is characterised by the Rotterdam criteria <sup>[1]</sup>. PCOS affects 5–15% of females of reproductive age and is the leading cause of anovulation-related infertility <sup>[2]</sup>.

Medical therapy with clomiphene citrate (CC) is the first-line treatment for infertility due to PCOS <sup>[3]</sup>. 75%–80% of females are ovulated by CC. Predictive variables for the failure of CC <sup>[4]</sup> include hyperandrogenism, obesity, large ovarian volume, and anovulation.

In infertility resistant to CC, there is no standard treatment. Aromatase inhibitors have been demonstrated to be more successful than CC in recovering ovulation and conception <sup>[5]</sup>. Compared to placebo (OR 3.17, 95% CI 0.12–83.17) or LOD (OR 1.19, 95% CI 0.76–1.88), it has not demonstrated its effectiveness for CC-resistant infertility <sup>[6]</sup>. The two primary available alternatives are medicinal therapy with gonadotropin or surgical management with LOD <sup>[3]</sup>. There is no substantial difference between these two choices in terms of birth rate. Drilling the ovary reduces the incidence of multiple births (OR 0.21, 95% CI 0.08–0.58) <sup>[7]</sup> and prevents hyperstimulation syndrome <sup>[3]</sup>.

Due to the low-dose regimen, biological and ultrasound follow-ups for medical therapy can be continued over an extended length of time. A hydrolaparoscopic or laparoscopic transvaginal drilling requires surgery and anaesthesia. Unknown is the length of time required for LOD to restore ovulation and result in a spontaneous pregnancy in cases of isolated PCOS. There are little published data on the effectiveness of repeated LODs <sup>[8]</sup>. Long-term effectiveness, which permits several pregnancies by restoring spontaneous ovulation, may be a considerable benefit over medical therapy. The prospect of repeating this operation in a few months or years should also be evaluated <sup>[9]</sup>.

This study aimed to predict the effectiveness of laparoscopic LOD or redrilling in cases with PCOS.

### Patients and Methods

This observational study was carried out on 50 female cases in childbearing with BMI range from 18-28Kg/m<sup>2</sup>, infertility > 3 years, irregular menstrual cycles and aged from 20-35years old. All cases were attending outpatient clinic and/or inpatient department of obstetrics and gynecology at Tanat University Hospital in the period from January 2020 till the end of the study.

The study was done after approval from the Ethical Committee Tanta University. An informed written consent was obtained from the patient or relatives of the cases.

Exclusion criteria were history of previous ovarian surgery and previous LOD.

All cases were subjected to complete history taking, general examination, pelvic examination except in virgins, ultrasound examination, determine baseline level of anti-Mullerian hormone (AMH) and 3-dimensional color Doppler.

### Statistical analysis

SPSS v25 performed the statistical analysis (IBM Inc., Chicago,

IL, USA). The same group's quantitative data were given as mean and standard deviation (SD) and compared using the paired Student's t-test. The frequency and percentage (%) of qualitative characteristics were displayed. A two-tailed P value 0.05 was deemed statistically significant.

### Results

Table 1 shows patient characteristics of the studied cases.

**Table 1:** Patient's characteristics in all studied patients

	Patients (n = 50)
Age (years)	27.16 ± 4.05
BMI (kg/m <sup>2</sup> )	23.74 ± 2.93
Duration of infertility (years)	4.84 ± 0.77

Data are presented as mean ± SD, BMI: Body mass index

Table 2 shows spontaneous pregnancy after first and second drilling

**Table 2:** Spontaneous pregnancy after 1st and 2nd drilling

Spontaneous pregnancy after 1st drilling (n = 50)	17 (34%)
Spontaneous pregnancy after 2nd drilling (n = 33)	15 (45.5%)

Data are presented as frequency (%)

AMH had a significant decline after first and second drilling as compared to before first and second drilling respectively (P <0.001). Table 3

**Table 3:** AMH (ng/mL) in all studied patients

	Before 1st drilling (n = 50)	After 1st drilling (n = 50)	Before 2nd drilling (n = 33)	After 2nd drilling (n = 33)
AMH (ng/mL)	10.06 ± 3.10	5.84 ± 3.62	7.9 ± 3.42	4.1 ± 3.58
P value	<0.001*		<0.001*	

Data are presented as mean ± SD, AMH: Anti-Müllerian hormone, \*significant as p value <0.05

Follicle count in right ovary had a significant decline after first and second drilling as compared to before first and second drilling respectively (p <0.001). Ovarian volume in right ovary

had a significant decline after first and second drilling as compared to before first and second drilling respectively (P = 0.002 and <0.001 respectively). Table 4

**Table 4:** Ultrasound examination (antral follicle count and ovarian volume) in right ovary

	Before 1st drilling (n = 50)	After 1st drilling (n = 50)	Before 2nd drilling (n = 33)	After 2nd drilling (n = 33)
Antral follicle count	15.58 ± 2.69	13.06 ± 3.97	15.09 ± 2.23	11.55 ± 3.97
P value	0.001*		<0.001*	
Ovarian Volume (cm <sup>3</sup> )	11.21 ± 1.45	9.81 ± 2.73	11.54 ± 1.43	8.95 ± 2.75
P value	0.002*		<0.001*	

Data are presented as mean ± SD, \*Significant as p value <0.05

### Discussion

Medical therapy with clomiphene citrate is the first-line treatment for PCOS-related infertility (CC). There is no gold standard for managing CC-resistant infertility. There are few published studies on the effectiveness of repeated LODs<sup>[9]</sup>.

Regarding rate of spontaneous pregnancy; statistical analysis of current results showed that there were 17 (34%) cases with spontaneous pregnancy after 1st drilling and 15 (45.5%) cases in the 2nd drilling.

Our research agreed with Amer and his colleagues<sup>[10]</sup> who stated that after LOD, 54/110 females (49%) conceived spontaneously during the first year and 42 (38%) during medium- and long-term follow-up. This retrospective research was done to study the late effects of LOD. The study Included 116 non-ovulatory PCOS females who underwent LOD and non-ovulatory PCOS females diagnosed during the same period but who had not undergone LOD.

Our research concurs with Nada and his colleagues<sup>[11]</sup> that LOD for PCOS cases prior to ICSI-ET increases the clinical pregnancy rate. The study comprised 212 clomiphene-resistant PCOS cases with at least one year of infertility and was done in Egypt between 2015 and 2017. The study group was the drilling

group that underwent LOD and subsequently ICSI-ET, whereas the control group underwent neither LOD nor ICSI-ET. The incidence of clinical pregnancy per ET cycle was significantly greater in the drilling group (51%) than in the control group (37%; p = 0.046).

Current research concurred with Jaafar and Alsakkal's<sup>[12]</sup> assertion that LOD is a way for improving hormones, restoring menstruation, and raising ovulation and conception rate. Over the course of two years, 169 individuals with ovulatory infertility who underwent LOD were the subject of a prospective research. The overall rate of pregnancy within six months increased by 26%.

Regarding ovarian reserve parameters "AMH (ng/mL), antral follicular count and ovarian volume"; statistical analysis of current results showed that AMH had a significant decline after first and second drilling as compared to before first and second drilling; 10.06 ± 3.10 and 7.9 ± 3.42 versus 5.84 ± 3.62 and 4.1 ± 3.58 respectively (p <0.001). Follicles count in right ovary had a significant decline after first and second drilling as compared to before first and second drilling respectively (p <0.001). Ovarian volume in right ovary had a significant decline after first and second drilling as compared to before first and second

drilling respectively ( $P = 0.002$  and  $<0.001$  respectively). Follicle count in left ovary had a significant decline after first and second drilling as compared to before first and second drilling ( $P = 0.002$  and  $<0.001$  respectively). Ovarian volume in left ovary had a significant decline after first and second drilling as compared to before first and second drilling ( $P = 0.002$  and  $<0.001$  respectively).

Current study agreed with Jaafar and Alsakkal<sup>[12]</sup> who stated that there was a significant decline in the mean of AMH three months after laparoscopy compared with the mean of one week after laparoscopy  $4.75 + 1.23$  vs.  $5.89 + 1.42$  ( $p < 0.001$ ).

on the same manner, Mohamed and his colleagues<sup>[13]</sup> stated that the mean AMH level before the operation was  $6.9 \pm 1.4$  ng/ml and  $8.2 \pm 1.4$  ng/ml for the cases who conceived and those who did not get pregnant, respectively. While the mean AMH level after 3 months post-operative was  $5.1 \pm 1.1$  ng/ml and  $6.3 \pm 1.4$  ng/ml for the cases who conceived and those who did not get pregnant, respectively. Lower preoperative AMH levels and after 3 months postoperatively were associated with increased pregnancy rates in cases who conceived compared to those who did not conceive ( $p=0.004$ ) preoperative versus ( $p=0.003$ ) postoperative. It was a prospective comparative clinical trial study. Serum AMH was done before and after LOD in forty eight PCO females.

Limitations: COVID 19 pandemic, side effects of surgical interventions and relatively small sample size regarding accuracy of study outcomes.

### Conclusions:

In infertile females with PCOs, laparoscopic ovarian re-electrocautery increased rate of spontaneous pregnancy the majority of changes in ovarian reserve biomarkers reported following drilling may be viewed as normalisation of the function of the ovary instead of a decline in ovarian reserve.

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**Conflict of Interest:** Nil

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