

## LAPAROSCOPIC OVARIAN DRILLING A SURGICAL PROCEDURE IN WOMEN WITH POLYCYSTIC OVARIAN SYNDROME CLINICAL OUTCOME

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### **ABSTRACT:**

The polycystic ovarian syndrome is associated with an ovulation and infertility. In most of the cases ovulation can be induced with clomphene citrate but approximately 25% fail to ovulate and require alternative treatment. Bilateral wedge resection of ovaries was abandoned due to peri-ovarian adhesion formation. The renewed interest in laparoscopic Ovarian drilling was less invasive technique and less chances of multiple Pregnancy and ovarian hyper stimulation . The aim of the present study was to evaluate the effectiveness of laparoscopic ovarian drilling in polycystic ovarian syndrome. And to note the clinical outcomes like ovulation and pregnancy rates ,hormonal, and ultrasonographic changes, predictors of success and economic evaluation of the procedure. Methods: Search strategy: med line , pub med engine Google

Selection criteria: Trials were eligible for inclusion if treatment consisted of laparoscopic ovarian drilling to induce ovulation in women polycystic ovarian syndrome and compared with control group. And those patients were followed for clinical outcomes.

Results: All studies are agreeing that laparoscopic ovarian drilling was safe, cost effective treatment in patients in with polycystic ovarian syndrome. Spontaneous ovulations were observed with in 2-3 months, and maximum conceptions with in 6- 9 months of treatment.

Conclusions: Laparoscopic ovarian drilling is a minimally invasive, safe procedure. It has significant advantages A single treatment results in uni follicular ovulation. Women can lead normal life without intensive monitoring. It is free of risks of multiple pregnancy and ovarian hyper stimulation. There was insufficient evidence regarding an ovulation after laparoscopic ovarian drilling. Long term trials are required to find out the possible of cause of an ovulation after laparoscopic ovarian drilling. Key words: laparoscopic ovarian drilling, polycystic ovarian syndrome,

### **INTRODUCTION**

Polycystic ovarian syndrome is a relatively common endocrine disorder in women of reproductive age group. It is associated with anovulation, androgen excess, obesity and infertility and hyper secretion of leutenizing hormone. Increased leutenizing hormone reduces the chance of conception and increase miscarriage. The preferred treatment has been ovulation induction with clomphene citate , with rates of ovulation reported at 70% after first treatment . Women who do not ovulate after treatment with clomphene are described as clomphene citrateresistant. 1935, Stein Leventhal proposed wedge resection of the ovaries as a treatment option for clomphene resistant polycystic ovarian syndrome. It was the only treatment for quodite a long time. This treatment was abandoned because of post operative peri- ovarian adhesions.

With trends towards minimally invasive endoscopic surgery different laparoscopic techniques were developed to induce ovulation in clomphene citrate resistant polycystic ovarian syndrome. A revived surgical approach to patients with polycystic ovarian syndrome was laparoscopic ovarian drilling proposed by Gjonaess in 1984. In the past few years different techniques (biopsy, cauterization, multi electro coagulation, laser etc.) were used. It has been recognized the laparoscopic ovarian drilling is an effective treatment for clomphene citrate anovulatory infertility associated with polycystic ovarian syndrome.

The aim of this study was to determine the efficacy of laparoscopic ovarian drilling and to note the hormonal changes ovulation rate , pregnancy rates and predictors of success, and economic evaluation.

## **METHODS:**

Criteria for diagnosing polycystic ovarian syndrome

The presence of at least three of the following criteria

1. Menstrual irregularities and ovulation
2. Clinical and biochemical evidence of hyper androgenaemia.
3. Presence of characteristics of polycystic ovarian syndrome on ultrasound examination.
4. Elevated leutenizing hormone (LH)
5. L H: FSH : ratio>2

Patients polycystic ovarian syndrome who received laparoscopic ovarian drilling were enrolled in this study .their hormonal levels were assessed preoperatively and clinical outcomes were followed .

USG evidence of PCOD

Ovarian stromal hypertrophy and multiple small (6-8) follicle arrange in the periphery .

Ovarian volume is calculated as using the formula  $0.523 \times \text{length} \times \text{width} \times \text{thickness}$  of each ovary

Technique of laparoscopy ovarian drilling

- Laparoscopy ovarian drilling was done under general anesthesia .the pneumo peritoneum was created with veress needles.
- 10 mm infra umbilical port and two 5mm lateral ports in lower abdomen just above the anterior superior illac spine lateral to inferior epigastric vessels
- The laparoscope introduced through the infra umbilical port ancillary ports were placed after charting the vessels by trans illumination.
- Inspection of the pelvis was carried out to rule out other factors of infertility. Chromotubation was done by trans cervical injection of methlene blue dye.
- A good uterine manipulator was used to stretch the ovarian ligament. The ovary was lifted by suction cannula and placed over the cervico- uterine junction which forms a platform and easy to carry out the puncture.
- The mono polar needle was introduced at right angle to the ovary avoiding injury to the hilum .50 watts current was used making 4 holes each lasting 4 sec at a dept of 3-4 mm to only one ovary. This can start bilateral ovarian activity.
- A thorough suction irrigation should be done now. Hydro flotation with 500ml ringer lactate can minimize post operative adhesion.

Mechanism of Action L.O.D.

Mechanism of action of this surgical procedure in PCOD is still mysterious. Stein Levental proposed bilateral wedge resection as a method of choice for the induction of ovulation in clomphene resistant PCOD. He explained that it decreases the mechanical crowding of the cortex by cysts which can enable the process of normal graffian follicle movement to the surface of the ovary. Gjonness in his study postulated that ovulation is either by non specific stromal cause or extensive capsular destruction with the discharge of contents of a number of follicular cysts or the local capsule of one specific but unidentified capsule.

Abdel and Alboiz in their study found a decreased concentration of LH after LOD, the effect of this procedure on FSH is variable. The FSH concentrations are increased rapidly and demonstrate a cyclical rise in keeping with restoration of ovarian function.

Hormonal Changes after LOD

Mustafa Kercuk in their found decrease in serum LH and testosterone concentration after LOD. The changes in serum prolactin and FSH level was similar before and after ovarian drilling. Therefore LH/FSH ratio was significantly lower in women with PCOD after the procedure. The hormonal changes in women achieving ovulation and an ovulation were evaluated after the

procedure. The levels of testosterone in ovulating women were significantly decreased. In women who failed to ovulate the levels of testosterone was not significantly decreased. Mohammed E Parsangezhad performed a randomized control trial of LOD versus diagnostic laparoscopy. They reported reduced testosterone and LH levels in 55.6% of patient with LOD and 10% in control. Serum prolactin level remained elevated for 6-10 weeks after operation in 27.8% PCOS and 6.7% of control group. In patient who remained an ovulatory in spite of decreased level of testosterone and LH, PRL remained normal than normal limits. Ammer J Banee followed the patient long time after LOD. They found lowered FSH/LH ratio, LH and androgen level. This endocrine changes seem to last for longer period up to 9 yrs. They confirmed that these changes are produced by LOD rather than advancing age. Since the concentration of LH and androgen were lower than those of comparison group at corresponding period of LH. They reported decreasing serum androgen levels with increasing number of years after LOD possibly due to advancing age. Similar trends were seen in the comparison group. This indicates the safety of the procedure

### Ovulation and Pregnancy

Gjonaess with his multi electro cauterization in PCOD achieved an ovulation rate of 92% and pregnancy rate of 69%. And the abortion rate was 15%. He proposed electro cauterization as the primary treatment for women with PCOD undergoing laparoscopy for any reason irrespective of their fertility status.

Amar and lachelin followed patients PCOS treated with LOD for a period of 3 years. They applied diathermy to each ovary for 4sec at a time in four places .86% ovulated within an average time period of 23days. 66% women became pregnant.

Gadire.al regard the laparoscopic cauterization of ovaries to be most effective treatment for PCOS. The ovulation rates was higher in electro-cauterization group.

Kovacs treated patients with PCOS with electro cauterization at separate points on each ovary. 70% of women ovulated and 20% became pregnant.

Balen Jocsin compared unilateral and bilateral diathermy. Unilateral diathermy resulted in ovulation from both ovaries. 50% of the patients responded to diathermy and those who responded had a significantly greater fall in serum LH concentrations than those who failed.

Farhi. Et al performed a study to evaluate the effect of ovarian electro cauterization and ovarian response to gonadotrophin stimulation and Pregnancy rate in clomphene citrate resistant PCOS. Reduced basal serum LH concentration and normal cyclity in 41% patients recorded.

Comparison of gonadotrophins stimulated cycle before and after electro cauterization revealed higher rates of ovulation and pregnancy after pregnancy as well as significant reduction of gonadotrophin ampoules. This shows increase in ovarian sensitivity of ovary to gonadotrophins after LOD.

Tulandi et- al reported effect of ovarian drilling on the ovarian volume as measured by three dimensional ultrasound. They found that ovarian drilling resulted in a transient increase followed by a significant reduction in ovarian volume from a pre operative volume of 12.2ml to 6.9ml in three weeks after surgery.

Amer studied the long term impact of ovarian drilling on sonographic findings. There was significant reduction in ovarian volume and the effect was sustained for long time, 9years. A reduction in ovarian volume after ovarian drilling was 11 to 8.5ml

### Pregnancy Outcome:

Eftekhari H.A.I.Ojamii compared pregnancy neonatal outcomes in women with PCOS and women with PCOS. There was no significant difference in neonatal outcomes and premature deliveries between the two groups they found the risk of insulin glucose tolerance, gestational

diabetes and hypertensive disorders of pregnancy in PCOS who conceived after laparoscopic ovarian drilling the risk seemed to be independent of maternal obesity.

#### Predictors of Success

S.A.K. Amer carried out a study to identify the factors that may help to predict the outcome of LOD. He found women with body mass index  $>15 \text{ kg/m}^2$  serum testosterone concentration  $>4.5 \text{ nmol/l}$ , free androgen index  $>15$  and duration of infertility  $>3$  years seems to be poor responders to LOD. LOD responders serum LH levels  $>10 \text{ IU/ml}$  appeared to be associated with higher pregnancy rates, long duration of infertility marked hyperandrogenism, marked obesity in women with PCOS seem to predict resistance to LODS.

In LOD responders serum LH levels  $>10 \text{ IU/ml}$  appeared to be associated with higher pregnancy rates. Long duration of infertility, marked hyperandrogenemia, marked obesity in women with PCOS seems to predict resistance to LOD. High levels in LOD responders appear to predict higher probability of pregnancy versus gonadotrophin therapy.

#### Economic Evaluation of LOD

Cynthia Met.al took a cost minimizing study comparing LOD versus gonadotrophin therap. The found cost of a live birth was one third lower in the group that underwent laparoscopic ovarian diathermy compared to who received gonadotrophins. This economic status shows treating PCOS women with LOD results in significant reduction in both direct and indirect costs.

#### **DISCUSSION:**

20 to 30% of ovulatory PCOS women fail to respond to LOD. It may be due to the amount of LOD is not sufficient to produce an effect in patients. But studies revealed that LOD increases the endogenous FSH and only a minimal amount of thermal energy is required. Another possible explanation may be failure to respond is an inherent resistance ovary to the effects of drilling. Another cause may be hyperprolactinaemia observed in some patients after LOD. It is important to monitor the patients for prolactin levels after LOD. The drawback with LOD is to quantify the dose of diathermy to a particular patient. It is difficult to decide the dose for a particular patient without knowing the dose response. There is a need to optimize the dose of LOD in response to ovarian size.

However the predictors of success of LOD depends on the body index, serum testosterone concentration, free androgen index and duration of infertility, these predictors will help in selection of cases for LOD. Patients with infertility more than 3 years, high testosterone levels are advised to take gonadotrophin therapy and IVF.

#### **CONCLUSIONS:**

LOD is a safe and cost effective procedure. A single treatment results in uni-follicular ovulation. No need of continuous monitoring as seen with hormonal treatment. No fear of multiple births and ovarian hyper stimulation. Correction of hormonal levels prevents miscarriages. LOD increase the sensitivity to gonadotrophins. And it is as effective as gonadotrophins in PCOS. Because of ease of the procedure and safety it can be used as first line of treatment in PCOS.

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