



## AN INITIAL STUDY TO EVALUATE THE ROLE OF LAPAROSCOPIC OVARIAN DRILLING (LOD) IN AN OVULATORY WOMAN WITH POLYCYSTIC OVARIAN SYNDROM (PCOS)

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Conflicts of Interest: Nil

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### Abstract:

The aim of this study was to evaluate the role of laparoscopic ovarian drilling (LOD) in correcting anovulation and failure of conception in women with polycystic ovarian syndrome (PCOS). An initial study to evaluate the role of laparoscopic ovarian drilling (LOD) in an ovulatory woman with polycystic ovarian syndrome (PCOS) [1]. Laparoscopic ovarian drilling (LOD) has evolved into a safe and effective surgical treatment for an ovulatory, infertile women with polycystic ovary syndrome (PCOS), unresponsive to clomiphene citrate [2]. The investigation was undertaken at a tertiary referral unit in K.S.A, Saudi German Hospital, Aseer (Laparoscopic unit). The participants comprised of 150 women between 20-30 years old and BMI between 20-30, treated with clomiphene citrate but failed to ovulate or get pregnant. During the period from November 2015 to July 2017, 150 patients of PCOS who underwent LOD were included in this study. The diagnosis of PCO was based on Rotter-dam criteria which necessitate two of the following three features to be present for diagnosis one of them was Oligomenorrhea and / or amenorrhea, second one was Clinical and/ or biochemical signs of hyperandrogenism and the third and the last one was Ultrasonic confirmation of polycystic ovaries. Using the role of 4, four punctures for 4 seconds at 40 Watts for each ovary using the diathermy needle (4mm diameter and 4 mm depth), per ovary were applied during laparoscopy as standard technique for LOD. Follow-up of the patient was 1 year. A total of 150 patients with an ovulatory infertility associated with PCOS who underwent LOD were included in this study. Among the 150 patient included in these study 78 (52%) ovulates spontaneously after LOD & a further 31 patients ovulated after giving them clomiphene citrate in a dose of 100mg/day for 5 days starting from the 3rd day of their menses, giving an overall ovulation rate of 109 out of 150 (72%). One patient conceived with twins and 6 ended in early first trimester miscarriage & two were ectopic pregnancies. LOD is successful in PCOS patients who failed to ovulate on clomiphene citrate. LOD is more cost-effective than gonadotropins as a single treatment results in several mono-ovulatory cycles, thus allowing multiple attempts at conception whereas one course of gonadotropin therapy yields a single ovulatory cycle with the inherent need for intensive monitoring. LOD is currently recommended as a safe, efficacious & cost-effective alternative to gonadotropins for induction of ovulation in infertile, an ovulatory clomiphene citrate - resistant PCOS women without the risk of ovarian hyper stimulation syndrome or multiple gestation. It improves ovarian responsiveness to successive ovulation induction agents. Its favorable reproductive and endocrinal effects are sustained long.

### 1. Introduction

Since its introduction in 1984, laparoscopic ovarian drilling (LOD) has evolved into a safe and effective surgical treatment for an ovulatory, infertile women with polycystic ovary syndrome (PCOS), unresponsive to clomiphene citrate (in a dose 150mg/day for 3 successive months). It is as effective as gonadotropins in terms of pregnancy & live birth rates, but without the risk of ovarian

hyper stimulation syndrome and multiple pregnancies. It improves ovarian responsiveness to successive ovulation induction agents [3]. Its favorable reproductive and endocrinal effects are sustained long. In this treatment of LOD Laser or Electro cautery is carried out it is the process in which resistant metal wire electrode containing alternating current or direct current passing through it, generates heat which is then applied to the living tissues to obtain tissue destruction or to

destroy the parts of the ovaries (outer surface layer). Laparoscopic ovarian drilling (LOD) is usually done by a small incision (Laparoscopy) after general anesthesia. The surgeon performs this small surgery by a small incision (cut) in the abdomen at the belly button [6]. After that surgeon puts tube to escalate or inflate the abdomen with a small quantity of carbon dioxide gas and thus inserts the laparoscope instrument carefully so that no any internal organs can damage. This laparoscopy is often termed as "Band Aid Surgery". After the procedure of Laparoscopic ovarian drilling (LOD), the individual is likely able to go home and can perform the daily routine within 24 hours. The return of performing the normal routine is depends on how quickly and rapidly the individual recover from the surgery [2], this will take as long as few weeks or may be few days to get recover and get to normal routine. Laparoscopic ovarian drilling (LOD) is necessarily used for women having polycystic ovary syndrome (PCOS) who are not ovulating yet instead of after completing weight loss and fertility medicines or drugs. Regular or routine menstrual cycle and fertility may restore after destruction of ovarian outer thicker surface layer. Laparoscopy is more favorable also for the women who are unresponsive to the treatment with medicines, such as Clomiphene citrate [2]. Laparoscopic ovarian drilling (LOD) is as more affective as gonadotropins; Luteinizing hormone (LH) and Follicle stimulating hormones (FSH) [7]. Therefore Laparoscopic ovarian drilling (LOD) is responsible to directly affects the hormonal level and perform its function to get the body to its normal and regular hormonal level to produce eggs and stay fertile and boosts up to trigger ovulation without the risk or attempt of ovarian hyper stimulation syndrome and prevent multiple pregnancies or higher order pregnancies.

## 2. Materials and Methods

Polycystic ovary syndrome (PCOS) is a frequent and common condition. During the period from November 2015 to July 2017, 150 patients of having polycystic ovary syndrome (PCOS) who underwent Laparoscopic ovarian drilling (LOD) were included in this study. The diagnosis of polycystic ovary syndrome (PCOS) was necessarily based on Rotterdam criteria, which was the most widely accepted for the diagnosis purpose. A Rotterdam criterion necessitates two of the following three

given features for diagnosis, these are the diagnostic criteria for Rotterdam diagnosis of polycystic ovary syndrome (PCOS), and the features are given below:

➤ **Oligomenorrhea/ oligo anovulation and/ or amenorrhea**

➤ **Hyperandrogenism**

1. **Clinical (hirsutism or cutaneous hirsutism equivalents / or rarely make pattern alopecia)**

2. **Biochemical (raised FAI or free androgen more likely testosterone)**

➤ **Ultrasonic confirmation of polycystic ovaries or polycystic ovaries on ultrasound**

### 2.1. Indications:

The main indication for laparoscopic ovarian drilling is clomiphene citrate resistant polycystic ovarian syndrome (PCOS). It is a second line therapy for anovulation infertile polycystic ovarian syndrome (PCOS) cases and conditions. Specifically it is effective and work as an alternative to gonadotropins. College of Obstetricians and Gynecologist, American College of Obstetricians and Gynecologist, society of Obstetricians and Gynecologist, Canada and the recent polycystic ovarian syndrome (PCOS) consensus and departments working, researching and investigation groups; all recommended its use in cases specifically in those who are passing through with the conditions of hyper secretion of luteinizing hormone (LH), mass body index is normal, those whose conditions required laparoscopic assessment of the pelvis or those who live far away from the hospital for the intensive monitoring required during the period of gonadotropins therapy. Laparoscopic ovarian drilling (LOD) may called as superior to clomiphene citrate if one concern about its theoretical advantages. The laparoscopic ovarian drilling (LOD) technique implies to the patients having abnormal and increased number of secretion of luteinizing hormone (LH) concentrations and hyperstimulation. However, laparoscopic ovarian drilling (LOD) consider as an efficient and effective method and treatment and its affects are sustained for long-lived.

## **2.2. Laparoscopy ovarian drilling (LOD) surgical technique:**

In 1984, Jonnies introduced the surgical technique of laparoscopic ovarian drilling. This was the first laparoscopic approach on ovarian drilling [8]. This technique is comprises of drilling several holes around the ovarian surface or the holes may be approximately up to 40 for each ovary. Various instruments have been designed and are being used for this purpose so far, such as monopolar diathermy, bipolar electrocauterisation, laser systems (i.e. CO<sub>2</sub>, argon, etc.), and various simple incisions as well.

## **2.3. ELECTROCAUTERISATION:**

A technique known as diathermy probe with a distal stainless steel needle, specially designed having the measuring length of about 4 mm and diameter of about 4 mm, introducing from an insulated solid cone of diameter about 6 mm maximum. With a power of 40 watt, monopolar coagulation was reached and 4 punctures were created on the surface of each ovary, each hole measured about 4 mm in diameter and 4 mm in depth.

## **3. Research Observation**

The investigation performed on 150 women having age of 20-30 years old and BMI between 20-30. This investigation was undertaken by a Saudi German Hospital, Aseer, at a tertiary referral unit in K.S.A. (referral unit). The research observations were done on 150 women participants. The investigation was designed as retrospective study. The aim of this investigation and research was to evaluate the role and importance of laparoscopic ovarian drilling (LOD) in preventing anovulation and to help to increase the birth rates. This research was comprises of 150 women participants. Laparoscopic ovarian drilling (LOD) treatment was working on those women too who already treated with clomiphene citrate and were being unresponsive to clomiphene citrate. Therefore, laparoscopic ovarian drilling (LOD) is favorable for its reproductive and endocrine effects that sustained long.

## **4. Research discussion**

The investigation and research was undertaken at a tertiary referral unit in K.S.A, Saudi German Hospital, Aseer (Laparoscopic unit). Study shows

that the participants were comprised of 150 women who are in between 20-30 years old and BMI between 20-30, who previously had treated with clomiphene citrate but failed to ovulate or get pregnant. During the period from November 2015 to July 2017, 150 women patients of having polycystic ovarian syndrome (PCOS) who underwent Laparoscopic ovarian drilling (LOD) were included in this investigation or study. The diagnosis was performed and it was based on Rotter-dam criteria for polycystic ovarian syndrome (PCOS). Rotterdam criteria for polycystic ovarian syndrome (PCOS) are being used in a wide range of researchers and professionals of medical. The Rotterdam criteria are the most widely accepted for diagnosis. The Rotterdam criteria or consensus requires the presence of both hyperandrogenism and polycystic ovaries on ultrasound and oligo/anovulation. Several holes were created on the ovarian surface of each ovary and each ovary contain hole approximately up to 40. This was laparoscopic ovarian drilling (LOD) surgical technique that was performed. The next technique was based on electrocauterisation. In this technique or procedure, penetration of the ovarian capsule was done. Electrode was pressed on the ovarian surface and it was reached to the surface of ovaries and penetration was created or made, 200-300 watt power was being used for 2-4 seconds. The hole which was penetrated on the ovarian surface has a diameter of about 3mm and has a depth of about 2-4 mm. Approximately three to eight holes were created on the ovarian surface of each ovary. The diathermy probe having a distal stainless steel needle, measuring the length of about 4 mm and diameter of about 4 mm, introducing into an insulated solid cone of diameter about 6 mm maximum. A 3-10 punctures were created on the surface of each ovary with the help of a power of 30 watt, each and every hole approximately measured about 4 mm in diameter and 4 mm in depth. After electrocauterisation has performed the next technique which were performed was the laser technique. This was the technique based on the implementation and introduction of the instruments through gases. Mostly Nd:YAG laser beam is widely used in this purpose, this laser beam opens about 10-30 sub capsular small follicles in each ovary. Nd:YAG laser beam was equipped with a sterile quartz glass fiber of about 0.6 mm in

diameter, 30-60 watt of power was applied during this procedure. This laser was used very carefully so that it can't touch the ovarian surface. It was at the distance of 5-10 mm from the ovarian surface. This laser is able to coagulate the tissue without any damage and does not cause vaporization. The penetration depth was dependent on energy applied by the system. After the treatment of laparoscopic ovarian drilling (LOD), among 150 patients included in this study 78 (52%) of them ovulates spontaneously and remaining 31 patients ovulated after giving them clomiphene citrate in a dose of 100mg/day for 5 days starting from the 3rd day of their menses, giving an overall ovulation rate of 109 out of 150 (72%).

### 5. Research conclusion

Laparoscopic ovarian drilling (LOD) is presently and currently recommended as a safe, inexpensive and efficacious alternative to gonadotropins for the women having infertility, anovulatory, clomiphene citrate-resistant polycystic ovarian syndrome (PCOS) without having the risk of ovarian hyper stimulation syndrome or multiple gestations. Singleton pregnancy is mostly and usually the goal of treatment for the women having infertility condition. Laparoscopic ovarian drilling (LOD) is currently recommended as a safer, most effective and inexpensive method for the treatment of polycystic ovarian syndrome (PCOS)

### 6. Research results

Laparoscopic ovarian drilling (LOD) has evolved into a safe and effective surgical treatment for anovulatory, infertile women having suffered from the disease polycystic ovarian syndrome (PCOS) and who are unresponsive to clomiphene citrate as well. It is as efficient as gonadotropins therapy in terms of that it can improve conceptions and live birth rates and it does not have the risk of hyperstimulation syndrome and multiple pregnancies. It is responsible to improve ovarian responsiveness to successive ovulation. And its favorable and endocrinal effects are sustained for long-term. A total of about 150 patients having anovulatory infertility associated with polycystic ovarian syndrome (PCOS) who underwent with the treatment of laparoscopic ovarian drilling (LOD) were included and they were the basis of this research study and investigation. After the

treatment with laparoscopic ovarian drilling (LOD), among 150 patients included in this research study 78 (52%) of them approximately triggered ovulation spontaneously and the further 31 patients triggered ovulation after treatment with clomiphene citrate, they were provided by clomiphene citrate in a dose of 100mg/day for 5 days starting from the third day of their menstrual cycle. The overall ovulation rate observed was about 109 women out of 150 women. The estimated result was about (72%). Furthermore the studies evaluated the results that are; one patient conceived with twins and there were 6 women patients who ended in early of their first trimester miscarriage and 2 women patients were ectopic pregnancies. This was the basic initial study that was performed to evaluate the suspected results of the role of laparoscopic ovarian drilling (LOD) in anovulatory women having polycystic ovarian syndrome (PCOS). The basic goal for this research investigation and study was to elucidate the role of laparoscopic ovarian drilling (LOD) in correcting anovulation, making ovaries able to trigger ovulation and correcting and maintaining the failure of conception in women who are suffering from the polycystic ovarian syndrome (PCOS). In discussion with the treatment by laparoscopic ovarian drilling (LOD) technique, researchers elucidate that laparoscopic ovarian drilling (LOD) increases the number of live birth rates and reduction in miscarriage cases and in multiple gestations or conceptions. The endocrinal and its clinical response to laparoscopic ovarian drilling (LOD) is governed by a dose-response association. Four punctures per ovary using a power setting of 40 watts applied for 4 seconds. Among the 150 patient included in these study 78 (52%) ovulates spontaneously after LOD & a further 31 patients ovulated after giving them clomiphene citrate in a dose of 100mg/day for 5 days starting from the 3rd day of their menses, giving an overall ovulation rate of 109 out of 150 (72%). One patient conceived with twins and 6 ended in early first trimester miscarriage & two were ectopic pregnancies. Hence, the study concludes that laparoscopic ovarian drilling (LOD) is an appropriate and successful approach for the PCOS patients whereas is cost-effective that allows patients to have multiple attempts at conception. LOD is considerably recommended safe and effective as a

treatment without the risk of ovarian hyperstimulation syndrome or multiple gestations.

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### Appendix

Presently laparoscopic ovarian drilling (LOD) has been in used as surgical treatment for ovulation in women having suffered from polycystic ovarian syndrome (PCOS), however its mechanism and its outcome are still not that clear.