

# Pregnancy and a Live Birth Following Laparoscopic Ovarian Drilling

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## Abstract

A case of laparoscopic ovarian drilling (LOD) in a 28-year-old nulligravida diagnosed of primary infertility secondary to polycystic ovarian syndrome (PCOS) with clomiphene citrate resistance, letrozole, and gonadotrophin failure is reported. Her husband's seminal fluid analysis was within the normal range. Laparoscopy and dye test showed copious bilateral tubal spillage of dye. LOD was performed, following which pregnancy was achieved. She was delivered of a live female baby that weighed 3.8 kg. Her postpartum period was uneventful. The literature on polycystic ovaries, infertility, and ovarian drilling was reviewed.

**Keywords:** Laparoscopic ovarian drilling, polycystic ovaries, pregnancy, primary infertility

## INTRODUCTION

Polycystic ovarian syndrome (PCOS) affects approximately 10% of women with infertility and is implicated in the majority of infertility due to anovulation.<sup>[1-4]</sup>

A “stepwise approach” is adopted in the therapeutic options of PCOS with lifestyle modification, clomiphene citrate, and Letrozole being the first therapeutic options.<sup>[5]</sup> Laparoscopy with ovarian drilling and gonadotrophins serves as the second-line therapeutic options and is offered when there is clomiphene citrate resistance or failure.<sup>[6]</sup> Clomiphene Citrate resistance can be defined as failure of ovulation after administration of 150 mg of clomiphene citrate for a minimum of three consecutive menstrual cycles. Clomiphene citrate failure is referred to as the inability to achieve conception with clomiphene citrate not minding consecutive ovulation for at least a period of six menstrual cycles.<sup>[6]</sup>

Laparoscopic ovarian drilling (LOD) has comparable effectiveness as gonadotropins with respect to total clinical pregnancy outcome and live birth outcomes; however, it has benefits of spontaneous ovulation of a mature follicle at a time hence reducing or eliminating the demands of repeated ultrasound-guided monitoring and evaluation of

follicular growth and the chances of developing ovarian hyperstimulation syndrome as well as chances of having multiple pregnancies.<sup>[6-8]</sup>

We hereby report a case of LOD after clomiphene citrate resistance, letrozole, and gonadotrophins failure, with resultant pregnancy and successful delivery of a live female baby in a tertiary institution located in Southeast of Nigeria.

## CASE REPORT

Mrs. EC was a 28-year-old nulligravida with a complaint of inability to conceive of two years duration, despite the adequate coital frequency of about three times a week. The patient had irregular menstrual flow with associated oligomenorrhea and hypomenorrhea. She observed increased hair growth on the chest and legs. There was no further abnormality noted in the patient or her spouse.

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She had taken clomiphene citrate, letrozole, and gonadotropin injections for the past two years without achieving conception. She was initially started on 50 mg of clomiphene citrate, which was increased to a maximum of 150 mg with each dosage, starting on any day within the second to the fifth day of her menstrual cycle and continued consecutively for five days in each monthly cycle. There was no evidence of ovulation within the period despite the 150 mg dose given for more than three cycles. Thereafter, she also received letrozole 2.5 mg, follicle-stimulating hormone (FSH) (75 IU), and human chorionic gonadotrophins 5000 IU without achieving conception. Her husband had done semen analyses which was adjudged to be within normal range. Her follicular phase hormone profile showed increased luteinizing hormone (LH) of 24.1 IU/L (1.7–15.0) and normal FSH of 7.47 IU/L (1.4–9.9). Testosterone level was 3.85 nmol/l (0.52–2.43). Fasting blood sugar and thyroid function tests were within the normal range.

Ultrasound showed a uterine size of 3.5 cm by 7.4 cm with an endometrial thickness of 8.5 mm. Both ovaries harbored multiple ovarian follicles of about 15 in number, with follicles measuring 3–10 mm. The ovarian volumes were 28 cm<sup>3</sup> left ovary and 25 cm<sup>3</sup> right ovary. Features were in keeping with polycystic ovaries.

Primary infertility secondary to PCOS with resistant ovaries to ovulation induction was made as working diagnosis.

She was counseled for LOD. This was performed on the June 29, 2017. She was given 6–12 months to try achieving spontaneous conception.

She became pregnant in the third month. Her last menstrual period was on September 4, 2017. The antenatal period was uneventful. She had an elective caesarean section on June 4, 2018, at a gestational age of 39 weeks. The indication was fetal macrosomia in a primigravida with previous infertility. She delivered a live female baby that weighed 3.8 kg with good APGAR scores. Baby and mother did well.

### Laparoscopy and dye test and LOD.

NB findings and Procedure are the subunits.

#### Findings

- Normal-sized uterus
- Normal fallopian tubes with copious dye spillage
- Normal pouch of Douglas
- Polycystic ovaries with the left bigger than the right, drilled at 8 puncture sites
- Estimated blood loss was minimal.

#### Procedure

General anesthesia was administered to the patient with capnograph and multiparameter monitor in place for adequate monitoring.

After routine scrubbing and draping in the modified lithotomy position, a uterine Rubins Cannula was applied through the vagina to the cervix and uterus. A 0° 10 mm laparoscope was connected to a camera, with the light source attached to the

laparoscope. White balancing was done. Carbon dioxide (CO<sub>2</sub>) pneumoperitoneum was created using the Veress needle technique. The infraumbilical region along the midline in a flat and relaxed abdomen under general anesthesia was used. A subumbilical 11 mm primary port was inserted after widening the incision in an upward semilunar pattern (smiley incision) and the laparoscope was introduced into the peritoneal cavity through the subumbilical port. The visualized pelvic and abdominal structures all appeared normal on the panoramic view. Two secondary, 5 mm ports, were then inserted under vision, one in each side of the lower abdomen using the baseball diamond concept. The patient was then positioned in Trendelenburg position by lowering the head of the operating bed. Using atraumatic grasper, the intestines and omentum were moved cephalad to improve vision. A clear inspection of the pelvis was done, revealing the above findings. Diluted methylene blue was injected through the cannula. Bilateral dye spillage was observed.

The monopolar tritome (insulated monopolar needle) was connected to the electrosurgical machine and the current was regulated at 40 W. The ovaries were drilled through the secondary ports. A total of 8 puncture points were drilled on each ovary as the ovarian volume was adjudged increased, with 40 W of current for 4 s. Thereafter, copious irrigation of both ovaries was done, and the pelvic cavity was suctioned. Secondary ports were subsequently removed under vision. The laparoscope was removed and the trocar valve opened to extract CO<sub>2</sub> from the abdominal cavity. The laparoscope was reintroduced via its original port and both laparoscope and cannula were removed simultaneously to prevent herniation of the omentum or bowel. Thereafter, the port site wounds were closed. The surgery was well tolerated by the patient. She had a brisk recovery.

She was counseled and debriefed on the findings and procedure performed. Her Immediate postoperative condition was satisfactory. She was discharged after 24 h, to be followed up for further management, including ovulation monitoring, at the gynaecology clinic.

### DISCUSSION

PCOS is defined as a heterogeneous condition characterized by the possession or appearance of at least two of these outlined criteria: (i) anovulation and/or oligo-ovulation, (ii) clinical and/or biochemical hyperandrogenism, or (iii) ultrasound diagnosed polycystic ovaries having about eight or more ovarian follicles measuring a minimum of 2 mm and a maximum of 9 mm with the ovarian volume of 10 cm<sup>3</sup> or more, with the exclusion of other causes of hyperandrogenism and menstrual abnormalities.<sup>[9]</sup>

Mrs. EC met the above criteria and was diagnosed with PCOS. She had LOD following her inability to conceive after the use of clomiphene citrate, letrozole, gonadotrophin, and human chorionic gonadotrophin treatment. This showed that LOD, which is a surgical procedure, could be effective when the ovaries are resistant to medical treatments from

ovulation induction agents as was seen in this case where the patient did not respond to clomiphene citrate, letrozole, and gonadotrophins.

It has been reported that LOD causes partial disruption and destruction of the multiple ovarian follicles and ovarian stroma, which cumulatively results in the reduction of serum concentration of androgens and inhibins with the resultant increase in FSH and restoration of the ovulation functions.<sup>[1]</sup> LOD has been postulated to also increase ovarian blood circulation with resultant increased delivery of gonadotrophins and postsurgical local growth factors. There have been suggestions that LOD results in an improved and enhanced insulin sensitivity.<sup>[1]</sup> Some authors have also reported that after LOD there is an increased ovulation and pregnancy rate in the magnitude of 80% and 60%, respectively.<sup>[2,6]</sup> Mrs. EC achieved pregnancy within three months of LOD.

There have been recommendations by different colleges of obstetricians and gynecologists, working committees, and groups on the use of LOD for PCOS.<sup>[10,11]</sup> This recommendation states that the use of LOD should be individualized in well-selected cases, especially those with increased or excessive secretion of LH, body mass index within normal range, those with the additional need for laparoscopic assessment of the pelvic organs and cavity or those who may not be compliant with the required regular monitoring of the ovarian follicle growth and development during gonadotropin therapy due to socioeconomic factors.<sup>[10,11]</sup> Mrs. EC had elevated LH, normal body mass index, and needed tubal patency test, as well as the exclusion of any pelvic pathology as a component of infertility, workup and as such she was selected for LOD.

Tritone (insulated monopolar needle) was used in this case and 8 puncture points were done on each ovary as the ovarian volume was adjudged to be increased, with 40 watts of current applied for 4 s. Electrosurgical generation of current passed through an insulated monopolar needle electrode guarded with a sleeve of noninsulated material at the distal end is the most commonly used method as was done in this case, although few authors have reported that bipolar electrosurgically generated current could give similar ovulation and pregnancy rates.<sup>[11,12]</sup> The number ovarian volume determines the number or extent of the ovarian drilling, hence the 8 puncture sites for ovarian volumes of 28 cm<sup>3</sup> for the left ovary and 25 cm<sup>3</sup> for the right ovary.<sup>[11]</sup> Most surgeons recommend and perform four punctures per ovary, each for 4 s at 40 watts (rule of four), delivering approximately 640 Joules of energy per ovary which is adjudged as the lowest effective dose.<sup>[12]</sup> Importantly, clinical response is dose dependent, with increased ovulation and pregnancy rates noticed by increasing the dose of thermal energy up to 600 J/ovary, irrespective of ovarian volume.<sup>[13]</sup> It is worthy to note that regulating the administered energy/current delivery based on ovarian findings (60 J/milliliter) has been reported to result in a better ovulation and pregnancy outcomes with minimized postoperative adhesion formation than when a fixed dose of 600 J/ovary is administered.<sup>[14]</sup>

Even though there is not enough scientific evidence on the preference of drilling both ovaries to drilling one ovary, most gynaecologists still perform bilateral over unilateral drilling though it has increase in the duration of the operation.<sup>[11]</sup> LOD of both ovaries was done in Mrs. EC and the operation site was copiously irrigated with Ringers Lactate to prevent adhesions.

Cumulatively LOD as a surgical procedure is less expensive than medical options of treatments (gonadotropins) because one LOD procedure has a resultant effect of many ovulatory cycles which increases the chances of achieving conception over a long period, whereas one course of medical therapy (gonadotropin) results in single ovulatory cycle with the required repeated ultrasound-guided monitoring of the ovarian follicle growth and development.<sup>[11]</sup> Mrs. EC achieved conception within three months of LOD and had an uneventful pregnancy and successful delivery of a live female baby. The LOD could therefore be said to have been successful. LOD failure is the inability of the ovaries to achieve ovulation within 6–8 weeks of the LOD, or recurrence of anovulation and/or oligo-ovulation after a successful ovulatory response (ovulation), or inability to achieve conception not minding regular ovulation for 12 months.<sup>[6,11]</sup> Mrs. EC did not have laparoscopic ovarian failure hence this report.

In conclusion, LOD can successfully lead to conception in clomiphene resistance and even in letrozole, and gonadotropin failure. LOD procedure offers the opportunity for assessment of pelvic organs and tubal patency test, which are additional valuable attributes. Conception was attained within three months in this case which falls within the recommended time interval of 6–12 months for spontaneous conception after LOD for the management of PCOS.

### Ethical consent

Consent was obtained from the patient.

### Acknowledgment

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### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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