

OVARIAN CAPSULAR DRILLING IN THE TREATMENT OF CLOMIPHENE CITRATE RESISTANT POLYCYSTIC OVARIAN SYNDROME: LAPAROSCOPY OR HYDROLAPAROSCOPY.

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ABSTRACT

Background: *Laparoscopic Ovarian Drilling (LOD) is an effective and a well evaluated surgical Treatment of Clomiphene Citrate resistant Polycystic ovarian syndrome. Transvaginal hydrolaparoscopy (TVHL) is a relatively new simple method of exploring the pelvis and has recently been introduced as a transvaginal approach to ovarian capsular drilling and it seems promising.*

Objective: *To explore whether the newly introduced Transvaginal Hydrolaparoscopy (TVHL) will have a significant advantage over the standard laparoscopy (SL) for Laparoscopic Ovarian Drilling (LOD) in Women with polycystic ovarian syndrome.*

Methods: *Published literature in English language was retrieved through searches of Pubmed, Highwire and Google using appropriate controlled vocabulary and key words. The articles that met the review criteria were selected and the relevant references screened.*

Results: *All the studies agreed that Transvaginal Hydrolaparoscopy (TVHL) is as effective as Standard Laparoscopy (SL) for ovarian drilling in polycystic ovarian syndrome. Unlike Standard laparoscopy, TVHL can be performed under local anesthesia as an office procedure. Postoperative adhesions are less in TVHL than SL and pregnancy rate is slightly higher. However, incomplete view of the pelvic structures and the requirement of ultrasound guidance were some setback when compared to the standard laparoscopy.*

Conclusions: *In experienced hands, TVHL is a good alternative to SL. TVHL has the possibility of replacing SL as more Minimal Access Surgeons become more comfortable with the technique.*

Key words: Transvaginal Hydrolaparoscopy, Standard Laparoscopy, Ovarian Drilling,

INTRODUCTION

Polycystic ovary syndrome (PCOS) remains one of the most common female endocrinopathies of unknown aetiology that affects women of reproductive age. The pathogenesis and even the treatment of PCOS is a subject of waging controversies. Despite the gigantic milestones in molecular medicine and genetics, researchers are still searching endlessly for the best approach to the management of this enigmatic syndrome. About 35 years after Stein and Leventhal¹ described polycystic ovarian syndrome, **surgical** ovarian wedge resection was performed as the first documented method of treating women with PCOS². This method of treatment was initially successful as it led to the reversal of the endocrine abnormalities of PCOS marked by the restoration of menstruation and ovulation and they were able to achieve pregnancies². However, this feat did not last

as surgical ovarian wedge resection was abandoned due to the risk of postsurgical adhesions³ and the introduction of medical ovulation induction with clomiphene and gonadotrophins. Clomiphene Citrate (CC) has since remains the first line treatment in induction of ovulation in women with PCOS. However, approximately 25% of patients are diagnosed as clomiphene citrate (CC) resistant after receiving 150mg of clomiphene citrate for six months without ovulation⁴. This category of women required alternative treatment. Laparoscopic

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ovarian drilling (LOD) with electrocautery in the treatment of PCOS was introduced by Gjonnaess in 1984⁵. Studies have shown that the rate of ovulation after LOD varies between 50% and 90% even among CC-resistant women^{6,7}. The increase in the rate of ovulation does not parallel the conception rate and there is a notable disparity between improvement in the endocrine abnormalities due to PCOS and the ovulation rate. Contrary to speculations, these disparities in outcome have not been shown to be due to postoperative adhesion formation^{8, 9}. Except for the cost, there is no significant difference in measured outcome between LOD with laser and electrocautery¹⁰. Laparoscopic ovarian multineedle intervention¹¹ is the latest laparoscopic technique in the treatment of PCOS with the aim of reducing postoperative adhesions. Transvaginal Hydrolaparoscope (TVHL) is a completely new approach to perform ovarian drilling. It was first described by Gordts et al in 1998¹². TVHL has been reported to produce less postoperative adhesions, better access to the ovaries, comparable outcome (ovulation rate and improvement in hormonal imbalance)^{12,13,14}. This approach has been proposed as a good alternative to LOD. This review appraises the merits and demerits of these two approaches for ovarian drilling.

SURGICAL VERSUS MEDICAL MANAGEMENT

Surgical bilateral wedge resection of the ovaries was the first established treatment for PCOS². This modality of treatment was later abandoned largely due to postoperative adhesion formation. The introduction of Clomiphene citrate further obviates the need for surgical wedge resection⁵. Apart from Weight loss, exercise, and lifestyle modifications which have been shown to be effective first line option in restoring ovulation and achieving pregnancy in overweight women with PCOS, Clomiphene citrate (CC) is the acceptable first-line therapy of ovulation induction¹⁵. Clomiphene citrate therapy is associated with an ovulation rate of 60–85% and a pregnancy rate of 30–40%¹⁶. This discrepancy is presumed to be due to the anti-oestrogenic effects of clomiphene citrate at the endometrial and an ovarian level, added to this is the development of hostile cervical mucus. Metformin and newer insulin-sensitising agents have proven to be effective in the treatment of the metabolic disturbances and anovulation due to PCOS¹⁷. There is no added benefit when metformin was added to

clomiphene citrate in therapy naive women¹⁸. However, meta-analysis has shown that there is a significant response when metformin is added to Clomiphene citrate in the CC-resistant PCOS patient¹⁹.

The second line therapy recommended for CC-resistant anovulatory PCOS patients include gonadotropin stimulation and laparoscopic ovarian drilling (LOD)¹⁵. To date, all available randomized controlled trials have demonstrated similar pregnancy and live birth rates for the two treatment approaches¹⁰. However, ovarian stimulation with Gonadotrophins has been shown to be associated with increased risk of ovarian hyperstimulation syndrome and multifetal pregnancies¹⁵. Other associated complications associated with gonadotropin ovarian stimulation in anovulatory PCOS women include; prematurity, low and very low birth weight, need for neonatal intensive care unit admission, high cost and need for close monitoring¹⁵. Therefore, it has been suggested that ovulation induction by LOD may improve the overall outcomes of pregnancies in PCOS patients. Although, it remains speculative whether LOD might prevent pregnancy complications in women with PCOS, Laparoscopic ovarian drilling may be considered as second line therapy in women with clomiphene-resistant PCOS, particularly when there are other indications for laparoscopy. The recommended third line therapy when the other modalities of treatment have failed is In-vitro fertilization¹⁵.

TECHNIQUES OF OVARIAN DRILLING

The advent of laparoscopy renewed interest in surgical approaches. The advantages of laparoscopic surgery include avoidance of hyperstimulation, multiple pregnancy and the lowered costs which make ovarian surgery an attractive alternative to gonadotrophins²⁰. **Traditionally, the choice of technique for ovarian drilling was either electrocautery or laser vaporization.** The two techniques have good effects on ovulation induction in PCOS women and none of the two methods had any obvious advantages over another method²¹. It has also been observed that there is no difference in ovulation rate, pregnancy rate and improvement in hormonal imbalance between unilateral and bilateral ovarian drilling. Unilateral ovarian diathermy has slightly lower rate of adhesion formation than the bilateral ovarian drilling²². A new technique; laparoscopic

ovarian multi-needle intervention (LOMNI) has been described¹¹. This technique has the prospect of replacing ovarian drilling with diathermy or laser. LOMNI, although limited studies are available, may be a safe, cheaper, and effective procedure for the treatment of CC-resistant anovulation in patients with PCOS. It seems to preserve the beneficial effects and probably omits unwanted effects (such as adhesion formation) of LOD. However, more studies are needed to be able to draw a conclusion.

ABDOMINAL OR VAGINAL APPROACH

Telescopic approach into the abdominal cavity through the anterior abdominal wall (laparoscopy) has remained the 'gold standard' for ovarian drilling since it was introduced in the 1970s. Although, culdoscopy, a telescopic approach into the pouch of Douglas via the posterior fornix was earlier introduced to gynaecological practice in 1941²³, this method was abandoned in the 1970s as laparoscopy provided a panoramic view of the pelvis and was shown to be superior for tubal sterilization²⁴. Recently a refined method of vaginal approach, using narrow instruments and saline irrigation has been reintroduced and carried out under local anaesthesia.^{12,14} Transvaginal Hydrolaparoscopy (TVHL) allows for clear visualization of the pouch of Douglas and tubo-ovarian structures because the access from the caudal pole with aquafloation, allows inspection of the organs in their normal position without manipulations. Acceptance of a new technique into clinical practice requires a rigorous assessment of every feature of the technique. The attempts to clinically validate Transvaginal Hydrolaparoscopy have shown that this technique is safe, reproducible, cost-effective, patient friendly and has high diagnostic accuracy^{12,14,25,26,27}. TVHL obviates the need for pneumoperitoneum with its attendant complications, There is no need for additional port and it can be combined with hysteroscopy for uterine and tubal assessment. The inherent danger of this technique include rectum perforation, pararectal saline application, uterine perforation particularly with retroverted uterus, difficult or failure of entry through a cul-de-sac adhesions or when endometriosis involves the pouch of Douglas. To reduce these potential complications, ultrasound guided Hydrolaparoscopy was introduced. Studies have shown that ultrasound guided entrance through the posterior fornix reduced bowel and uterine perforation significantly²⁸.

CONCLUSION

Laparoscopic ovarian drilling is still the gold standard in the surgical management of CC-resistant PCOS. Operative Hydrolaparoscopy is still under development but seems promising. It is an effective and less invasive alternative to standard laparoscopic procedure in the management of CC-resistant PCOS.

REFERENCES

1. Stein I, Leventhal M. Amenorrhea associated with bilateral polycystic ovaries. *Am J Obstet Gynecol.* 1935;29:181.
2. Stein IF. Duration of infertility following ovarian wedge resection. *West J Surg.* 1964;72:237.
3. Balen AH, Laven JSE, Tan SL, Dewailly D. Ultrasound assessment of the polycystic ovary. Int Consensus Definitions. *Human Reprod Update* 2003; 505–14
4. Franks S, Mason HD, Polson DW, et al. **The mechanism and management of ovulatory failure in women with polycystic ovary syndrome.** *Hum Reprod* 1988,3:431-434.
5. Gjonnaess H: **Polycystic ovarian syndrome treated by ovarian electrocautery through the laparoscope.** *Fertil Steril* 1984,41:20-25.
6. Amer SA, Li TC, Metwally M, et al. Randomized controlled trial comparing laparoscopic ovarian diathermy with clomiphene citrate as a first-line method of ovulation induction in women with polycystic ovary syndrome. *Human Reprod* 2009;24:219–225.
7. Malkawi HY, Qublan HS, Hamaideh AH. Medical vs. surgical treatment for clomiphene citrate-resistant women with polycystic ovary syndrome. *J Obstet Gynaecol* 2003;23:289–293.
8. Greenblatt E, Casper R. Adhesion formation after laparoscopic ovarian cautery for polycystic ovarian syndrome: lack of correlation with pregnancy rates. *Fertil Steril* 1993;60:766–77
9. Api M. Is ovarian reserve diminished after laparoscopic ovarian drilling? *Gynecol Endocrinol* 2009;25:159–165.
10. Farquhar C, Lilford RJ, Marjoribanks J, et al. Laparoscopic "drilling" by diathermy or laser for ovulation induction in anovulatory polycystic ovary syndrome. In: *The Cochrane Library*, Issue 4, 2009. Chichester, UK: John

- Wiley & Sons, Ltd
11. Kayal H, Sezik M, Ozkaya O. Evaluation of a new surgical approach for the treatment of clomiphene citrate-resistant infertility in polycystic ovary syndrome: laparoscopic ovarian multi-needle intervention. *J Minim Invasive Gynecol.* 2005;12(4):355-8.
 12. Gordts S, Campo R, Rombauts L, Brosens I. Transvaginal Hydro-laparoscopy as an outpatient procedure for infertility investigation. *Hum Reprod* 1998;13: 99-103
 13. El-Shalakany A, Ismaeel A, Ali MS, Mahmoud HA. **Transvaginal hydrolaparoscopy: an advance or a gimmick!** *J Middle East Fertility Society.* 2006; **11(1): 53–58.**
 14. Gordts S, Gordts S, Puttemans P, Valkenburg M, et al. Transvaginal Hydrolaparoscopy in the Treatment of Polycystic Ovary Syndrome. *Obstet Gynecol Surv* 2009; 64(10): 669 -670.
 15. Thessaloniki ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. Consensus on infertility treatment related to polycystic ovary syndrome. *Fertil Steril* 2008;89:505–522.
 16. Badawy A, Elnashar A. **Treatment options for polycystic ovary syndrome.** *Int J Womens Health.* 2011; 3: 25–35
 17. Katsiki N, Hatzitolios AI. **Insulin-sensitizing agents in the treatment of polycystic ovary syndrome: an update.** *Curr Opin Obstet Gynecol.* 2010 Dec;22(6):466-476.
 18. Johnson NP, Stewart AW, Falkiner J, Farquhar CM et al PCOSMIC: a multi-centre randomized trial in women with Polycystic Ovary Syndrome evaluating Metformin for Infertility with Clomiphene. *Hum. Reprod.* (2010) 25 (7): 1675-1683.
 19. Lord JM, Flight HKI, Norman RJ. Metformin in polycystic ovary syndrome: systematic review and meta-analysis *BMJ.* 2003; 327(7421): 951.
 20. **Farquhar CM.** An economic evaluation of laparoscopic ovarian diathermy versus gonadotrophin therapy for women with clomiphene citrate-resistant polycystic ovarian syndrome. *Current Opinion in Obstetrics & Gynecology* 2005; 17(4): 347-35
 21. Aflatoonian N, Asgharnia M, Tayebi N. **Comparison of laparoscopic drilling by diathermy and laser for ovulation induction in clomiphene citrate-resistant women with polycystic ovary syndrome.** *J Middle East Fertility Society* 2007;12(2): 133-139
 22. Al-Mizyen E, Grudzinskas JG. Unilateral laparoscopic ovarian diathermy in infertile women with clomiphene citrate-resistant polycystic ovary syndrome. *Fert Ster* 2007; 88(6): 1678–1680
 23. Decker A, Decker W, Milowsky J. *Anesthetic technique for culdoscopic examination; preliminary report.* *Am J Obstet Gynecol* 1950; 59: 455–457.
 24. McCann MF, Cole LP. Risks and benefits of culdoscopic female sterilization. *Int. J. Gynaecol. Obstet.*, 1978-1979; **16(3): 242–247.**
 25. Shibahara H, Hirano Y, Suzuki M. Transvaginal Hydrolaparoscopic Ovarian Drilling for Infertile Women with Polycystic Ovary Syndrome. *Curr Women's Health Reviews*, Volume 2, Number 1, February 2006, pp. 91-95.
 26. Gordts S, Gordts S, Puttemans P, Valkenburg M, et al. **Transvaginal hydrolaparoscopy in the treatment of polycystic ovary syndrome.** *Fertil Steril.* 2009; 91(6):2520-6. .
 27. Watrelot A, Nisolle M, Chelli H, Hocke C, et al Is laparoscopy still the gold standard in infertility assessment? A comparison of fertiloscopy versus laparoscopy in infertility: Results of an international multicentre prospective trial: The 'FLY' (Fertiloscopy-Laparoscopy) study* *Human Repro* 2003; 18 (4): 834–839.
 28. Sobek A jnr, Hammadeh M, Vodicka J, Sobek A. **Ultrasonographically guided transvaginal hydrolaparoscopy.** *Acta Obstet Gynecol Scand.* 2008; 87(10):1077-80.