

Surgical management of polycystic ovarian disease

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Introduction

Polycystic ovarian disease (PCOD) is the most common endocrine disorder in women. Its prevalence among subfertile women is around 20%. The etiology of PCOD remains unclear. It has been suggested that PCOD is an X-linked dominant condition¹. Clinical features of PCOD include oligomenorrhoea, hirsutism, acne, obesity, and subfertility. Biochemically serum androgens, luteinising hormone and LH/FSH ratio are elevated. Ultrasonographic features of polycystic ovaries include presence of 12 or more follicles in each ovary measuring 2-9 mm in diameter and/or increased ovarian volume (>10ml).

History of surgical treatment

Stein and Leventhal first reported wedge resection of the ovaries in PCOD associated with subfertility. They observed restoration of regular menstruation in approximately 80% and spontaneous conception in about 50% of the patients so treated. However this procedure was associated with a high percentage of ovarian and periaidnexal adhesions that may even lead to infertility in some patients. Also this procedure is associated with a substantial loss of ovarian tissue which may lead to premature ovarian failure. Therefore this procedure has been abandoned in today's practice after the initial experience for a limited time.

Introduction of laparoscopic ovarian drilling (LOD) reawakened the interest in surgical treatment of PCOD patients unresponsive to clomiphene citrate. Ovarian drilling is the creation of multiple holes through the ovarian capsule using a pointed monopolar or bipolar diathermy electrode or with laser surgery.

Mechanism of action of LOD

Mechanism of action of LOD is unclear. The beneficial effect is apparently due to destruction of

the androgen producing stroma. Following LOD there is a decrease in circulating androgen and free testosterone concentrations. The serum LH rises immediately after the procedure and then decreases. The effect on FSH is variable and less pronounced. These endocrine changes occur rapidly and are sustained for several years resulting in recruitment of new follicles and restoration of ovulation in most of the subjects².

The technique

LOD is considered for patients with polycystic ovaries resistant to treatment with clomiphene citrate. Ovarian drilling can be performed by laparotomy, laparoscopy or transvaginal hydrolaparoscopy. It is recommended to make four drill holes in each ovary using 40 W diathermy applying for 4 seconds for each drill. The electrode should be inserted perpendicular to the ovary to a depth of about 4-5 mm. It is important to hold the ovary away from bowel and tube to avoid thermal damage to these organs. Once the procedure is performed the ovary can be cooled by instilling saline. Ovarian drilling when performed by laparoscopy can be done as an out-patient procedure.

Ovulation and conception after ovarian drilling

Considerable variation exists in the reported outcomes of LOD in patients with PCOD resistant to clomiphene citrate. In a review of ten studies in which cumulative ovulation and pregnancy rates at 12 months after LOD showed 82.7% and 64.8%³. There are additional advantages provided by LOD. Patients who were resistant to clomiphene citrate may respond to this medication after the procedure. Therefore in patients who do not ovulate spontaneously following LOD, treatment should be initiated with clomiphene citrate. In a review of 223 LOD performed by author 22% conceived spontaneously within the first 3 months following surgery. In women who did not conceive ovulation induction was done with clomiphene citrate and intrauterine insemination was performed. Further 16% conceived with 3 treatment cycles.

Also in women undergoing IVF, LOD improves the outcome. In these patients there is more orderly

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growth of follicles, serum estradiol concentrations are lower, the rate of cycle cancellation is less, and the incidence of ovarian hyperstimulation syndrome (OHSS) is reduced⁴.

Comparison with exogenous gonadotrophins

Alternative management strategy to LOD in clomiphene resistant PCOD is the treatment with gonadotrophins. Extensive monitoring is necessary with this treatment due to high sensitivity of polycystic ovaries to exogenous gonadotrophins leading to OHSS. The majority of the studies found no difference in the rates of ovulation, pregnancy and miscarriages between the two modalities of treatment. The multiple pregnancy rates are lower with ovarian drilling than with gonadotrophins. The beneficial improvement in menstrual regularity, reproductive performance, and endocrine effects of LOD may continue for years. Subsequent medical induction of ovulation becomes easier following ovarian surgery.

Prediction of response to LOD

Although high ovulation and pregnancy rates following LOD in patients with clomiphene citrate resistant PCOD have been widely documented, 20-30% of such cases may fail to respond to surgical therapy. Presence or absence of acne, the menstrual pattern, and ovarian volume did not influence the outcome of LOD. A BMI greater than 35 kg/m², serum testosterone concentration greater than 4.5 nmol/l and free androgen index more than 15 are associated with a poor response. The LH/FSH ratio was found to be the strongest predictor of ovarian response after electrocautery⁵. Therefore it is important to advise the obese patients to lose weight by diet and exercise before undergoing surgery.

Complications

Complications can occur due to anesthesia, establishment of surgical access i.e. laparoscopy, laparotomy or transvaginal hydrolaparoscopy, and the drilling procedure itself. Bleeding can occur from the drilling sites, lacerations can occur in the meso-ovarian ligament during grasping to stabilize the ovary for drilling. Using excessive amounts of energy can destroy a large number of follicles leading to decreased ovarian reserve. The use of excessive amounts of energy with an electrode inserted too deeply into the ovary may cause damage to hilar vessels resulting in pre-mature ovarian failure. Post operative adhesions can be a significant complication especially when laparotomy is performed for surgical access.

Conclusions

Ovarian drilling is a treatment option in clomiphene citrate resistant PCOD patients. When performed via laparoscopy this is a relatively simple procedure which can be done on an out-patient basis. This procedure offers several advantages when compared with the alternative mode of treatment which is gonadotrophins administration. Following advantages of LOD are well documented:

- Over 70% of patients ovulate spontaneously following the procedure
- More than 50% conceive without the need of intensive cycle monitoring as necessary when gonadotrophins are used.
- Procedure provides long term effect
- Eliminates the risk of multiple pregnancy
- Eliminates the risk of OHSS associated with gonadotrophins
- It creates a favorable response to stimulation with clomiphene citrate or gonadotrophins if their use becomes necessary

Despite these advantages ovarian drilling is a surgical procedure done under anesthesia and can be associated with complications specially when performed on obese patients. Until more effective and safer new treatment options become available ovarian drilling is strongly considered in the current management of cc resistant PCOD.

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