

EFFICACY OF LAPAROSCOPIC OVARIAN WEDGE RESECTION IN RESISTANT POLYCYSTIC OVARIAN SYNDROME

Fessy Louis Thalakkattoor¹, Raghavendra Prasad², Ramesh Parameswara Iyer³, Parasuram Gopinath⁴, Gopinathan Kannoly Karunakaran⁵

¹Senior Consultant, Department of Reproductive Medicine and Surgery, Amrita Institute of Medical Sciences, Kochi, Kerala.

²Consultant, Department of Reproductive Medicine and Surgery, Sunrise Hospital, Kanhangad, Kerala.

³Resident, Department of Reproductive Medicine and Surgery, Amrita Institute of Medical Sciences, Kochi, Kerala.

⁴Consultant, CIMAR, Edappal Hospitals Pvt. Ltd., Malappuram, Kerala.

⁵HOD and Unit Director, CIMAR, Edappal Hospitals Pvt. Ltd., Malappuram, Kerala.

ABSTRACT

BACKGROUND

Poly Cystic Ovarian Syndrome (PCOS) is the most frequently encountered endocrinopathy in women, occurring in 4-7% of population. Many treatment options have been described including surgical methods. Wedge resection which was once the procedure of choice lost popularity from the 1990s after the advent of ovarian drilling.

The objective of the study is to assess whether laparoscopic ovarian wedge resection is effective in resistant cases of polycystic ovarian syndrome.

MATERIALS AND METHODS

We did a prospective study involving 35 PCOS patients with history of failed medical therapy or ovarian drilling. All of them underwent ovarian wedge resection and were subjected to ovulation induction from next cycle. They were followed up for cycle improvement and/or conception in the following 6-month period.

RESULTS

Cycle improvement and ovulation was seen in 91% of the patients within 6 months following wedge resection. The conception rate was 29% in 6 months. Those who had previous failed drilling, 27% conceived after wedge resection. Eighty percent of those who conceived had altered LH: FSH ratio.

CONCLUSION

Laparoscopic ovarian wedge resection is a good alternative procedure for patients resistant to conventional methods of medical and surgical ovulation induction. It gives a good ovulation rate and reasonably good pregnancy rate.

KEYWORDS

PCOS, Ovarian Drilling, Wedge Resection, Gonadotropin, Clomiphene Resistance.

HOW TO CITE THIS ARTICLE: Thalakkattoor FL, Prasad R, Parameswara Iyer R, et al. Efficacy of laparoscopic ovarian wedge resection in resistant polycystic ovarian syndrome. J. Evid. Based Med. Healthc. 2018; 5(43), 3048-3051. DOI: 10.18410/jebmh/2018/622

BACKGROUND

Poly cystic ovarian syndrome (PCOS) has been the major culprit of anovulation and its discovery dates back to as early as 1935 by Stein and Leventhal. It is the most frequently encountered endocrinopathy in women, occurring in 4-7% of population.¹⁻³ It is a multi-system disorder which if left unattended may affect a woman from menarche to menopause and further. The major symptom complex of PCOS are oligo or amenorrhoea associated with

hyperandrogenic features like hirsutism, acne etc. Infertility secondary to oligo-ovulation is commonly present. The treatment of PCOS has reached a cafeteria approach with clomiphene citrate, Letrozole, metformin, gonadotrophins and surgical treatment involving initially ovarian wedge resection, etc. This later was replaced with laparoscopic ovarian drilling while wedge resection lost popularity.

LH or LH to FSH ratio is elevated 70% of the time in PCOS.⁴ Women who are anovulatory have been primarily treated with clomiphene citrate as the first line of therapy. Clomiphene citrate induces ovulation in approximately 70 - 85% of patients although only 40-50% conceive.⁵ Reviews concerning the safety of clomiphene citrate with respect to congenital anomalies indicate that there is no increased risk.⁶ Gonadotrophin therapy is indicated for women with anovulatory PCOS who have been treated with anti-oestrogens and if they have failed to ovulate with clomiphene.⁷ Wedge resection of the ovaries was initially described by stern and Leventhal 1935 at the time that PCO

Financial or Other, Competing Interest: None.

Submission 26-09-2018, Peer Review 30-09-2018,

Acceptance 10-10-2018, Published 22-10-2018.

Corresponding Author:

Dr. Ramesh P,

#JKS 47, Amrita Jyoti,

Elamakkara P. O.,

Kochi, Kerala- 682026, India.

E-mail: drrameshp07@gmail.com

DOI: 10.18410/jebmh/2018/622



was diagnosed during laparotomy and it was found that biopsies taken to make the diagnosis led to subsequent ovulation. In the study reported by Stein of 108 cases 95% of patients resumed normal menstrual cycles and 87% of the patients ovulated.⁸ A review of data on pregnancy rates after laparotomy bilateral ovarian wedge resection by Donesky & Adashi showed a cumulative pregnancy rate of 58%.⁹ Gjonnaess proposed the use of laparoscopic multi electro cauterization in PCOS. The ovulation rate in the study was 92% pregnancy rate of 69%.¹⁰ After this, the concept of wedge resection lost its popularity and laparoscopic ovarian drilling became the preferred procedure. This had many disadvantages, but enough evidence is lacking regarding which is a better option and whether there is any role for ovarian wedge resection in the present era. Our objective was to evaluate the role of ovarian wedge resection in a group of patients who failed to respond to medical management as well as a subgroup of those who failed to respond to the ovarian drilling.

Aim of the Study

The aim of the study was to assess whether laparoscopic ovarian wedge resection is effective in resistant cases of polycystic ovarian syndrome.

MATERIALS AND METHODS

This was a prospective study involving 35 women including both primary and secondary infertility registered in the infertility OPD. We included those couples with duration of infertility more than 2 years. A detailed history with respect to nature and duration of infertility was taken. Female partners were diagnosed as having PCOS as per the Rotterdam criteria.¹¹ All had previous history of failed induction of ovulation with clomiphene citrate or letrozole for at least 3 cycles or had a previous history of laparoscopic ovarian drilling. At least one cycle of Gonadotropin administration was there either alone or in combination with oral ovulogens. Those with other co-existing conditions like severe male factor infertility or endometriosis or tubal factor were excluded.

Base line trans vaginal ultrasound was done using P6 ultrasound machine (GE Inc.) with a 7.5 MHz vaginal transducer.

- Based on the TVS findings, PCOM was diagnosed by
1. >12 follicles of diameter 2-10mm.
 2. Ovarian volume of >10mm³ in at least one ovary.

Ovarian volume was calculated by measurement of the length, width and thickness and using the formula.

$$\text{Volume} = L \times B \times T \times 0.523$$

A base line thyroid profile (T₃, TSH), serum prolactin, FSH and LH measurements were done as part of standard institutional protocol. All the subjects underwent Laparoscopic ovarian wedge resection. It was done after holding the ovary with a grasper. Wedge was taken away from the hilar region on the inferolateral aspect of the ovary with the help of monopolar cutting current of 40W. Around

one third of the ovarian tissue was removed in the wedge. This was repeated on the opposite ovary as well. Immediate saline irrigation was given to reduce the chance of post-operative adhesions.

After the surgery, the patients were started on clomiphene citrate 100mg for 5 days (D2 – D6) and HMG 75 IU (D7 – D9) in the next cycle itself and these patients were followed up for a minimum period of 6 months during which they were evaluated in response to ovulation and pregnancy.

RESULTS

There were 35 infertile women diagnosed as having PCOS who met the inclusion criteria underwent laparoscopic ovarian wedge resection and they were followed up for a minimum period of 6 months and evaluated in relation to their ovulation rates and pregnancy outcome.

The basal parameters are described in Table 1. More than 50% of the patients are having an age of less than 27 years. Majority (30%) were having infertility duration of 2-4 years. In the total no of 35 women who underwent laparoscopic ovarian wedge resection 27 were women with primary infertility and there were 8 cases of secondary infertility. A total of 8 patients had history of previous failed laparoscopic ovarian drilling.

Parameter	Mean	S.D.
Age	26.85	3.28
Duration of infertility (yrs.)	6.25	2.89
BMI	27.3	3.64
Cycle length (months)	4.54	2.33

Table 1. Basal Parameters

It was observed that 80% of the patients had reversal of LH: FSH ratio. Only 7 of the 35 patients had near normal LH values.

The fasting insulin level was not found to be having any correlation with BMI (r= 0.26). Only 5 of 31 patients showed increase insulin levels with increase in BMI. The average G/I (Glucose/ Insulin) ratio in the patients with BMI of 21-25 was 5.76, 25-30 was 5.35 and BMI > 30 was 4.68. This showed a decrease in G/I ratio when the BMI increased.

Parameter	Cycle	Number	Percentage
Cycle improvement	1 st cycle onwards	32	91
	1 st cycle	14	40
Ovulation	2 nd cycle	7	20
	3 rd cycle	8	22
	No ovulation	3	9
Conception	1-6 cycles	10	29

Table 2. Outcome following Wedge Resection

A total of 10 (29%) out of the total 35 women conceived within the first 6 months of induction (Table 2). One pregnancy ended up in miscarriage.

Of the 35 cases, 8 had undergone laparoscopic ovarian drilling previously as a treatment for PCOS.

27% of cases who underwent drilling conceived after wedge resection. 64% of cases had improvement in cycles but did not conceive. Only 9% showed lack of improvement. In the group of patients who had no previous history of drilling, 29% conceived and 63% had improvement in cycles but did not conceive. Overall, only 8% of cases did not have improvement.

Thus, the proportion of patients who had improvement after wedge resection taking both the groups was > 90%. Of the 10 conceptions, 80% (8 patients) had an elevated LH:FSH ratio as well suggesting that this subgroup may be more benefitted by the wedge resection.

DISCUSSION

Laparoscopic ovarian wedge resection done in 35 infertile women diagnosed as anovulatory PCOS, attending our infertility unit, who had previous history of anovulation with either clomiphene citrate, HMG, Letrozole or combination of any of these with HMG for atleast 3-6 cycles, showed a good ovulation rate of about 90% and a reasonable pregnancy rate of around 29%. It is an uncomplicated, bloodless and

an easy procedure to perform in experienced hands. This type of therapy is ideal for a selected group of women with no responsiveness to oral ovulation induction drugs like clomiphene. It is easy to perform with the advantage of attaining menstrual cyclicity and ovulation much quicker than the conventional methods. It may be of particular use in those with raised BMI or those with raised LH:FSH ratio.

The overall incidence of post-operative complications was also less. The adhesion chances may also be less because the inferolateral surface of the ovary is resting in the ovarian fossa, reducing the chance of adhesions with intestine and omentum. The chance of ovarian failure is also less as we work quite away from the ovarian hilum. These complications might be more in cases of ovarian drilling where we put multiple punctures over the surface of ovary. The drilling causes more chances of peri ovarian adhesions as well as a potential chance for ovarian failure if the puncture involves the area of vessels near hilum. The efficacy of the wedge resection in previous failed drilling cases in our data also establishes its superiority.

The results of wedge resection is been compared with other studies in table 3.

Author	Method	Ovulation (%)	Pregnancy (%)
Kojima et al ¹²	Nd:YAG, wedge resection	83	58
Ostrzenski et al ¹³	CO ₂ laser wedge resection	100	75
Balen and Jacob ¹⁴	Laparoscopic diathermy	NA	50
Lunde et al ¹⁵	Ovarian wedge resection	NA	76
Yildirim et al ¹⁶	Mini lap, ovarian wedge resection	NA	78
Duleba et al ¹⁷	Laparoscopic wedge	NA	67
Present Study	Laparoscopic ovarian wedge resection	90	28.2

Table 3. Effectiveness of Wedge Resection - A Comparison

All of the previous studies have not evaluated the ovulation rates after wedge resection. The majority of the literature describes a high pregnancy rate (50-78%) after wedge resection. But most of these were not done in patients who had failed ovarian drilling or failed Gonadotropin therapy. Hence the outcome of our study in terms of pregnancy rate (28.2%) seems to be reasonable in the short follow up period. The strict selection criteria also might have contributed to the lower pregnancy rate compared to the literature. However, this magnitude of patients has conceived without resorting to advanced modalities like assisted reproductive techniques like IVF/ICSI. So the role of laparoscopic ovarian wedge resection seems to be positive in resistant cases of PCOS.

CONCLUSION

Laparoscopic ovarian wedge resection seems to be a good alternative procedure for patients resistant to conventional methods of medical and surgical ovulation induction. It gives a good ovulation rate and reasonably good pregnancy rate.

REFERENCES

- [1] Carmina E, Lobo RA. Polycystic ovary syndrome (PCOS): arguably the most common endocrinopathy is associated with significant morbidity in women. J Clin Endocrinol Metab 1999;84(6):1897-1899.
- [2] Asuncion M, Calvo RM, San Millan JL, et al. A prospective study of prevalence of the polycystic ovary syndrome in unselected Caucasian women from Spain. J Clinical Endocrinol Metab 2000;85(7):2434-2438.
- [3] Knochenhaur ES, Key TJ, Aziz R, et al. Prevalence of the polycystic ovary syndrome in unselected black and white women of the southeastern United States: a prospective study. J Clinical Endocrinol Metab 1998;83(9):3078-3082.
- [4] Lobo RA, Kletzky OA, Campeau JD. Elevated bioactive luteinizing hormone in women with the polycystic ovary syndrome. Fertility Sterility 1983;39(5):674-678.
- [5] Crosignani PG, Rubin BL. ESHRE Capri Workshop Group meeting, Capri, 7-8 September 1997: Male infertility update. Human Reproduction 1998;13(7):2025-2032.

- [6] Shoham Z, Zosmer A, Insler V. Early miscarriage and fetal malformations after induction of ovulation (by clomiphene citrate and/or human menotropins), in vitro fertilization, and gamete intra-fallopian transfer. *Fertil Steril* 1991;55(1):1-11.
- [7] Balen AH, Braat DDM, West C, et al. Cumulative conception and live birth rates after treatment of anovulatory infertility: safety and efficacy of ovulation induction in 200 patients. *Hum Reprod* 1994;9(8):1563-1570.
- [8] Stein IF. Duration of fertility following ovarian wedge resection--stein leventhal syndrome. *West J Surg Obstet Gynecol* 1964;72:237-242.
- [9] Donesky BW, Adashi EY. Surgically induced ovulation in the polycystic ovary syndrome: wedge resection revisited in the age of laparoscopy. *Fertil Steril* 1995;63(3):439-463.
- [10] Gjonnaess H. Polycystic ovarian syndrome treated by ovarian electrocautery through the laparoscope. *Fertil Steril* 1984;41(1):20-25.
- [11] Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. *Fertil Steril* 2004;81(1):19-25.
- [12] Kojima E, Yanagibori A, Otaka K, et al. Ovarian Wedge resection with contact Nd:YAG laser irradiation used laparoscopically. *J Reprod Med* 1989;34(7):444-446.
- [13] Ostrzenski A. Endoscopic carbon dioxide laser ovarian wedge resection in resistant polycystic ovarian disease. *International Journal of Fertility* 1992;37(5):259-299.
- [14] Balen A, Jacobs H. A prospective study comparing unilateral laparoscopic ovarian diathermy in patients with PCOS. *Fertility Sterility* 1992;62:921-925.
- [15] Lunde O, Djøseland O, Grøttum P. Polycystic ovarian syndrome: a follow-up study on fertility and menstrual pattern in 149 patients 15-25 years after ovarian wedge resection. *Hum Reprod* 2001;16(7):1479-1485.
- [16] Yildirim M, Noyan V, Bulent Tiras M, et al. Ovarian wedge resection by minilaparotomy in infertile patients with polycystic ovarian syndrome: a new technique. *Eur J Obstet Gynecol Reprod Biol* 2003;107(1):85-87.
- [17] Duleba AJ, Spaczynski RZ, Olive DL, et al. Divergent mechanisms regulate proliferation/survival and steroidogenesis of theca-interstitial cells. *Molecular Human Reproduction* 1999;5(3):193-198.