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Evaluating laparoscopic ovarian drilling effects on anti-mullerian hormone levels in polycystic ovarian syndrome: Implications for oncological considerations in radiotherapy

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ABSTRACT

Laparoscopic Ovarian Drilling (LOD) diminishes ovarian androgen-producing tissue and decreases minor transformation to estrogens. This study aims to measure the level of Anti-Mullerian Hormone (AMH) before and after laparoscopic surgery among Women with polycystic ovarian syndrome PCOS. Thirty-five PCOS patients underwent LOD after a history of none response to medication and failed to conceive. The serum values of the AMH, testosterone, Luteinizing Hormone (LH), and the number of follicles has been assessed before and after surgery. The average total of AMH serum values was 7.2 ng/ml ± 3.5 ng/ml before the operation and 6.1 ng/ml ± 3.2 ng/ml, 7.7 ng/ml ± 4.5 ng/ml, and 6.4 ng/ml ± 3.3 ng/ml one week, three weeks, and four months subsequently later. The mean serum values of LH were 12.6 IU ± 5.7 IU (p=0.87) before the operation and 12.7 ± 11.1 IU four months later. The mean testosterone hormone levels were 0.9 ng/ml ± 0.7 ng/ml, before and 0.7 ng/ml ± 0.8 ng/ml (p=0.86) after surgery. The reproductive rate was 26.7% per year. Laparoscopic ovarian drilling couldn't alliterate serum AMH, testosterone, and LH in infertile PCOS women, therefore has no opposing effect on the ovarian reserve.

Keywords: laparoscopy ovarian reserve, polycystic ovary syndrome, anti-mullerian hormone, oncology, radiotherapy

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INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is the commonest endocrine condition of women in their reproductive life, distressing around 4% to 12% of women worldwide [1]. It is categorized by androgenic feature (clinical or biochemical), menstrual irregularity, and polycystic ovaries in ultrasound. It is also connected with insulin resistance and fatness. The primary reason for PCOS is indefinite. On the other hand, a genetic base that is both "multifactorial and polygenic" is recognized combination of the disease inside relatives [2].

AMH is an indicator for evaluating the number and action of recruitable follicles at initial development points. Thus, actuality is more consistent for an estimate of ovarian reserve. Women with PCOS have high levels of AMH. Present data concerning extra AMH in PCOS is connected to the augmentation in the quantity of preantral follicles or increased by granulosa cells. However, the rise might result from further causes of PCOS, such as a hyperandrogenic state and increase resistance to insulin [3, 4].

Laparoscopic Ovarian Drilling (LOD) destroys ovarian androgenic - tissue and decreases the peripheral transformation of androgens to estrogens. Exactly, after ovarian drilling, a drop in serum androgens and LH levels and a rise in Follicle-Stimulating Hormone (FSH) were confirmed [5, 6]. The endocrine alterations after the operation are supposed to transform the androgen follicular situation to estrogenic and to reestablish the standard hormonal situation through altering ovarian pituitary response [7].

Meanwhile, previous readings have shown that the serum AMH concentrations could be changed due to laparoscopy, which can assess the destruction of ovarian tissue [8].

Our study aimed to compare the serum value of AMH prior to and after laparoscopic operation and if the ovarian reserve was reduced.

PATIENT AND METHODS

Patients

A cross-sectional study was conducted from May to June 2020 at AL–Shafaa Private Hospital Diyala, Iraq. All patients employed written informed consent forms before going into the study.

Inclusion and exclusion criteria

We included thirty-five PCOS women known with history of resistant to Clomiphene Citrate (CC) and ovulatory dysfunction, aged between 18 years to 35 years, and willing to participate. Moreover, the Rotterdam criteria as ovulatory problems, hyperandrogenic features, and the manifestation of more than twelve follicles (2 mm to 9 mm) in each ovary with ultrasound findings [9]. Patients aged out of (18 years to 35 years), unmarried, anemic or bleeding tendency, and unwilling participate were excluded from the study.

Procedures

Blood tasters were taken from every patient before surgery, about 5 cc blood, and kept up in tubes having "clot activator material". Th e tasters were centrifuged at 2000 rpm, and the serum was saved at 3 ml micro tubes and kept at 20°C freezer up till consequent examination.

Throughout the laparoscopy, the patients had been pierced by monopolar cautery hook from 5 to 8 points in the ovary. We check serum testosterone, LH, AMH levels, and antral follicles. An Enzyme Immunoassay technique measured AMH, serum testosterone, and serum LH. Once LOD has done, the value of serum anti-mullerian hormone was measured in one, three weeks, and Fourth months. Serum testosterone and LH were measured fourth months after the surgical procedure. Additionally, calculation of the conception rate between patients.

Ethical consideration

The study was conducted at the obstetric unit (single-center) of AL –Shafaa private Hospital Diyala, Iraq. The study was structured following the instructions of the Declaration of Helsinki. The ethical committee of the hospital granted approval for the protocol (ID No: SHPH07/011/JAN/2020). Before participating in the study, each patients received detailed explanations about the study's objectives and provided written informed consent.

Statistical analysis

The study was achieved by SPSS form 16. Facts were shown, such as mean ± SD or calculations and proportions. Variances among data were measured with independent samples' T-test to find out the relationship among quantitative variables. $p \leq 0.05$ was measured as significant.

RESULTS

Table 1 shows the data related to age, BMI, period of treatment, number of follicles in ultrasound examination and, period of management with clomiphene citrate.

Tab 1. Sociodemographic and clinical features of respondents (n=35)

Variable	Mean ± SD
Age (N=35)	27.4 ± 2.1
BMI	27.1 ± 1.4
Period of management with clomiphene (Years)	02.7 ± 2.1
Number of follicles	9.6 ± 1.2

Laparoscopic ovarian drilling does not vary significantly in AMH concentrations. After management, fertility frequency per year was informed by 26.7% (8 cases) between patients. There was a significant positive association between base serum anti-mullerian hormone and the number of antral follicles ($r=0.685$, $p \leq 0.05$) (Table 2).

Tab. 2. Shows hormonal assay pre- and post-surgery (n=35)

Variable (ng/ml)	Before surgery	After One week	After Three months	After Four months	p-value
AMH	07.2 ± 3.5	6.1 ± 3.2	7.7 ± 4.5	6.4 ± 03.3	0.7
LH	12.6 ± 5.7	-	-	12.7 ± 11.1	-
Testosterone	0.9 ± 0.7	-	-	00.7 ± 00. 8	0.87

DISCUSSION

Previous studies revealed that women with advancing age show decreased serum AMH levels and found that it is among many signs of "ovarian reserve" [10, 11]. AMH is an informative factor in assessing ovarian reserve in IVF management. Levels of AMH are influenced by decreasing number of antral follicles or ovarian damage [12]. The problem was laparoscopy destroyed and reduced ovarian tissue, leading to decreased ovarian reserve. Many authors investigated the AMH serum levels before and after laparoscopic surgery. They discovered that the serum level of AMH in infertile women with PCOS was statistically insignificant three days after surgery [13].

Regarding this study, AMH levels did not change significantly due to laparoscopy. At the same time, one week after the laparoscopy, serum levels dropped; however, this finding was not statistically significant [14]. Earlier studies revealed that females with PCOS have more than doubled the level of serum AMH due to an increase in the number of small follicles [14, 15]. According to other studies, significant falls in serum AMH levels and AFC were noticed in the early six months after laparoscopic surgery [16]. This could be due to damage to the vessels and parenchyma of the ovary throughout laparoscopy.

The ovarian tissue damage throughout laparoscopy disturbs AMH formed by the antral follicle [17]. In this study, AMH levels fall in the first week after drilling and well again 1 and 3 months after the operation to around 65% of its preoperative value. Many Readings show that laparoscopic ovarian drilling has no opposing effects on the ovarian reserve in those having polycystic ovaries [18, 19].

Meanwhile, the sensitivity of follicles to FSH is less due to the elevation of serum AMH in women with PCOS [20]. AMH also reduces aromatase activity, subsequently, reduces the estradiol production from follicles [21].

In our study, an insignificant decline in AMH levels through FSH starting could be due to the undesirable outcome of the hormone on the level of AMH. Usually, serum AMH levels throughout ovulation induction need a progressive relationship with the number of follicles, while the serum AMH levels throughout the growth of several follicles diminished [22]. Depending on prior readings, it can be assumed that the LOD reduced the AMH a little, which is a significant cause in select of follicles growth. However, the AMH value will not alter prominently. Therefore, LOD has no adverse result on the ovary's blood supply. These results were similar to the outcomes of our study. This research showed a significant optimistic link between the AMH and the number of antral follicles [22]. Amer et al. studied women with PCOS and, after a laparoscopic ovarian puncture, found that the serum value of AMH was reduced later and stayed at an equal level [22].

A decrease in the AMH value may be due to the bilateral puncture procedure. Api et al. [23] presented that ovarian reserve does not alter significantly after a laparoscopic puncture; due to disturbing AMH illustrations, and the patients are typical [23]. Generally, although LOD leads to reduced values of AMH in women with PCOS, these alterations are not statistically significant and do not reduce ovarian blood supply [24].

Due to the inadequate number of readings focused on this subject, more studies must be supported in the forthcoming. Thereby, we recommend more organized revisions with larger size trials.

CONCLUSION

LOD is commended as an operational treatment route in PCOS women who are clomiphene resistant. LOD doesn't decrease ovarian reserve, as revealed by signs of ovarian reserve such as FSH and AMH. Via AMH by way of a dependable indicator of ovarian reserve and determining it before going through LOD may arrange for expecting the outcome of LOD.

REFERENCES

1. Asuncion M, Calvo RM, San Millan JL, Sancho J, Avila S, et al. A prospective study of the prevalence of polycystic ovary syndrome in unselected Caucasian women from Spain. J Clin Endocrinol Metab. 2000;85:2434–2438.
2. Franks S, Gharani N, Waterworth D, Batty S, White D, et al. The genetic basis of polycystic ovary syndrome. Hum Reprod. 1997;12:2641–2648.
3. Pigny P, Merlen E, Robert Y, Cortet-Rudelli C, Decanter C, et al. Elevated serum level of anti-mullerian hormone in patients with polycystic ovary syndrome: relationship to the ovarian follicle excess and to the follicular arrest. J Clin Endocrinol Metab. 2003;88:5957–5962.
4. Laven JS, Mulders AG, Visser JA, Themmen AP, De Jong FH, et al. Anti-Mullerian hormone serum concentrations in normoovulatory and anovulatory women of reproductive age. J Clin Endocrinol Metab. 2004;89:318–323.
5. Armar NA, McGarrigle HH, Honour J, Holownia P, Jacobs HS, et al. Laparoscopic ovarian diathermy in the management of anovulatory infertility in women with polycystic ovaries: endocrine changes and clinical outcome. Fertil Steril. 1990;53:45–49.
6. Greenblatt E, Casper RF. Endocrine changes after laparoscopic ovarian cautery in polycystic ovarian syndrome. Am J Obstet Gynecol. 1987;156:279–285.
7. Aakvaag A, Gjonnaess H. Hormonal response to electrocautery of the ovary in patients with polycystic ovarian disease. Br J Obstet Gynaecol. 1985;92:1258–1264.
8. Iwase A, Hirokawa W, Goto M, Takikawa S, Nagatomo Y, et al. Serum anti-Mullerian hormone level is a useful marker for evaluating the impact of laparoscopic cystectomy on ovarian reserve. Fertil Steril. 2010;94:2846-2849.
9. Asuncion M, Calvo RM, San Millan JL, Sancho J, Avila S,et al. A prospective study of the prevalence of the polycystic ovary syndrome in unselected Caucasian women from Spain. J Clin Endocrinol Metab. 2000;85:2434–2438.
10. Maheshwari A, Gibreel A, Bhattacharya S, Johnson N. Dynamic tests of ovarian reserve: a systematic review of diagnostic accuracy. Reprod BioMed Online. 2009;18:717-734.
11. Thamer Yahyaa B, Ali Altaha M, Abdulhadi Al-Rawi R, Ali Mustafa Al-Samarrai M, Ali Jadoo SA. Knowledge and attitude of Iraqi women in reproductive age group about risk factors in pregnancy. J Ideas Health. 2022;5:673-678.
12. Poujade O, Gervaise A, Faivre E, Deffieux X, Fernandez H. Surgical management of infertility due to polycystic ovarian syndrome after failure of medical management. Eur J Obstet Gynecol Reprod Biol. 2011;158:242–247.
13. Weerakiet S, Lertvikool S, Tingthanatikul Y, Wansumrith S, Leelaphiwat S, et al. Ovarian reserve in women with polycystic ovary syndrome who underwent laparoscopic ovarian drilling. Gynecol Endocrinol. 2007;23:455-460.
14. Sunj M, Canic T, Jeroncic A, Karelovic D, Tandara M, et al. Anti-Müllerian hormone, testosterone and free androgen index following the dose-adjusted unilateral diathermy in women with polycystic ovary syndrome. Eur J Obstet Gynecol Reprod Biol. 2014;179:163-169.
15. Dumesic D, Padmanabhan V, Abbott D. Polycystic ovary syndrome and oocyte developmental competence. Obstet Gynecol Surv. 2008;63:39-48.
16. Elmashad A. Impact of laparoscopic ovarian drilling on anti-Mullerian hormone levels and ovarian stromal blood flow using three-dimensional power Doppler in women with anovulatory polycystic ovary syndrome. Fertil Steril. 2011;95:2342-2346.
17. Yarci Gursoy A, Kiseli M, Pabuccu EG, Caglar GS, Pabuccu R. The impact of gradually increasing energy dose on AMH levels in ovarian drilling. Gynecol Obstet Invest. 2017;82:60-65.
18. Amer S, Li TC, Ledger WL. The value of measuring anti-Mullerian hormone in women with an ovulatory polycystic ovary syndrome undergoing laparoscopic ovarian diathermy. Hum Reprod. 2009;24:2760-2766.
19. Kandil M, Rezk M, Al-Halaby A, Emarh M, El-Nasr IS. Impact of ultrasound-guided transvaginal ovarian needle drilling versus laparoscopic ovarian drilling on ovarian reserve and pregnancy rate in polycystic ovary syndrome: a randomized clinical trial. J Minim Invasive Gynecol. 2018;25:1075-1079.
20. Kandil M, Selim M. Hormonal and sonographic assessment of ovarian reserve before and after laparoscopic ovarian drilling in polycystic ovary syndrome. Obstet Gynecol. 2005;112:1427-1430.
21. Abu Hashim H, Foda O, El Rakhawy M. Unilateral or bilateral laparoscopic ovarian drilling in polycystic ovary syndrome: a meta-analysis of randomized trials. Arch Gynecol Obstet. 2018;297:859-870.
22. Amer S, Li TC, Ledger WL. Ovulation induction using laparoscopic ovarian drilling in women with polycystic ovarian syndrome: predictors of success. Hum Reprod. 2004;19:719-724.
23. Api M. Is ovarian reserve diminished after laparoscopic ovarian drilling? Gynecol Endocrinol. 2009;25:159-165.
24. Paramu, S. Impact of Laparoscopic Ovarian Drilling on Serum Anti-Mullerian Hormone Levels in Patients with Anovulatory Polycystic Ovarian Syndrome. Turk J Obstet Gynecol. 2016;13:203-207.