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ORIGINAL ARTICLE

Assessment of Ovarian Function after Cesarean Hysterectomy at Zagazig University Hospitals

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ABSTRACT

Background: Cesarean hysterectomy is lifesaving process to control bleeding due to increase the rate of cesarean section which leads to increase the incidence of placenta accrete and placenta previa. This study aimed to assess the effect cesarean hysterectomy on ovarian function.

Methods: This case-control study was carried out at Obstetrics and Gynecology Department, Zagazig University Hospitals at the period from January 2019 to July 2019. On 48 patients were classified in to two groups (24 in each group). Group 1 include 24 patients underwent cesarean hysterectomy (case group). Group 2 include 24 patients underwent cesarean section (control group). Measuring level of FSH, LH, Estradiol in serum three months after operation, assessment of resistant index and pulsatility index of ovarian artery and antral follicle count of both ovaries.

Results: There was a significant difference between the cases in mean value of serum FSH (6.9 ± 3.2) when compared to the controls in mean value of FSH (4.8 ± 2.4) and a statistically significant difference in LH mean value of cases (9.3 ± 8.3), when compared to controls mean value of LH (3.2 ± 1.9) with significant P value = 0.01 and P value = 0.005.

Conclusion: There was a significant difference in FSH and LH between cases and controls and no difference in Estradiol serum level with preservation of blood flow to both ovaries by no significant change in resistant index and pulsatility index of ovarian artery.

Keywords: Ovarian function, Cesarean Hysterectomy, cesarean section, Resistant index, Pulsatility index



INTRODUCTION

Increased rate of cesarean section leads to increase the complications such as placenta previa, placenta accrete and hemorrhage which may require cesarean hysterectomy [1]. Cesarean hysterectomy in such cases is a lifesaving process to control bleeding [2]. Hysterectomy is the second most common major surgical procedure. The highest prevalence of hysterectomy is between the ages of 40 and 49 years [3]. One of the most important complications of hysterectomy is decreased ovarian function. The decline in ovarian function can lead to early menopausal symptoms that affect women's health [4,5]. Some studies evaluated ovarian function by measuring serum level of follicle-stimulating hormone and serum

progesterone in patient underwent hysterectomy. These studies found that a menopausal symptom is earlier in women undergoing hysterectomy compared with others without hysterectomy. In these cases there was decreased in the number of follicles and increase in the serum level of (FSH) [6]. The aim of the work was to assess the effect of cesarean hysterectomy on ovarian function.

METHODS

This case-control study was carried out at Obstetrics and Gynecology Department, Zagazig University Hospitals at the period from January 2019 to July 2019 on 48 patients were classified in to two groups (24 in each group). Group 1 include 24 patients underwent cesarean hysterectomy (case group). Group 2 include 24 patients underwent

cesarean section (control group). Informed consent, detailed history taking and full examination, measuring level of FSH, LH, Estradiol in serum three months after operation.

Inclusion Criteria: were patients who underwent cesarean hysterectomy for pregnancy related causes as Placenta previa, Placenta accreta and severe uncontrolled postpartum hemorrhage.

Exclusion Criteria: Hysterectomy for benign gynecological diseases, hysterectomy for malignant pathology, any previous surgery on ovary and chemotherapy or radiotherapy in the past. All cases were subjected to the following:

Careful history taking: Personal history. Present history for menopausal symptoms such as vasomotor instability, vaginal dryness and dyspareunia in patients that underwent cesarean hysterectomy. **Obstetric history** Physical examination included: Complete general examination and calculation of Body Mass Index (BMI). **Abdominal examination** **Hormonal assay:** All hormonal measurements for FSH, LH, E2 were performed in the same reference laboratory. Blood samples were obtained by venipuncture three months post-operative and the sera were extracted by centrifuge. Serum samples were stored at – 20°C. FSH, LH and estradiol levels in serum were measured by electrochemiluminescence immunoassay (ECLIA) using Elecsys Kits (Roche Diagnostics, Mannheim, Germany). **Ethical Clearance:** Written Informed consent was taken from the patient to participate in the study. Approval for performing the study was obtained from Obstetrics and Gynecology Department,

Tables and figures

Table 1. Comparing age, BMI and obstetric history between case and control groups: -

Variable	Case (24) Mean ± SD (Range) Median	Control (24) Mean ± SD (Range) Median	t-test	p-value
Age (years)	30.8±7.1 (22-40) 31	30.4±6.8 (22-41) 31	0.18	0.8
BMI	30.7±3.1 (23.5-36.3) 32.5	30.9±3.8 (23.4-36.05) 32.8	0.19	0.8
Parity	3.2±1.2 (2-6) 3	3.4±1.3 (2-6) 3	M.W 0.3	0.7

M.W= Mann-Witney U test

Zagazig University Hospitals after taking Institutional Review Board (IRB) approval. The work has been carried out in accordance with the code of ethics of the world medical association (Declaration of Helsinki) for studies involving humans

STATISTICAL ANALYSIS

Data were checked, entered and analyzed using SPSS version 23 for data processing. Data were expressed as number and percentage for qualitative variables and mean + standard deviation (SD) for quantitative one. Student's paired t-test for paired samples were used. Significance level is set at 0.05.

RESULTS

Table (1) showed there was no statistically significant difference between the case and control groups in age, BMI and parity. Table (2) showed there was statistically significant difference between the case and control groups in FSH and LH. But regarding E2, there was no statistically significant difference. There was a significant difference between the case and control groups in AFC of the ovaries Figure (1). Table (3) showed there was no statistically significant difference between the case and control groups in RI and PI of the ovaries. Regarding BMI, there was a significant positive correlation between BMI and AFC of the ovaries of the case group. But regarding RI and PI, there was no statistically significant correlation. Regarding FSH, there was a significant positive correlation between FSH and AFC of the ovaries of the case group. But regarding RI and PI, there was no statistically significant correlation Figure (2).

Table 2. Comparing hormonal profile between case and control groups: -

Variable	Case (24) mean ± SD (Range) Median	Control (24) mean ± SD (Range) Median	M.W test	p-value
FSH	6.9±3.2 (2.5-13.9) 5.8	4.8±2.4 (1.82-11.49) 4.6	2.5	0.01*
LH	9.3±8.3 (1.6-38.4) 5.7	3.2±1.9 (23.4-36.05) 2.9	2.9	0.005*
E2	66.3±50.1 (7-229.5) 35.6	76.4±68.6 (8.91-303.8) 46.5	0.4	0.6

* Statistically significant difference ($P \leq 0.05$) M.W= Mann-Witenney U test

Table 3. Comparing RI & PI of the ovaries between case and control groups: -

Variable	Case (24) mean ± SD (Range) median	Control (24) mean ± SD (Range) median	M.W test	p-value
RI	0.67±0.16 (0.37-0.89) 0.7	0.64±0.17 (0.33-0.9) 0.66	0.5	0.6
PI	1.6±0.94 (0.49-3.51) 1.4	1.26±0.58 (0.4-2.44) 1.22	1.7	0.09

M.W= Mann-Witenney U test.

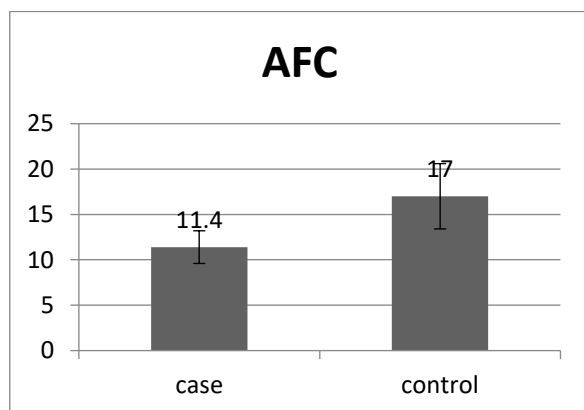


Figure1. Bar chart for comparing AFC of the ovaries between case and control groups

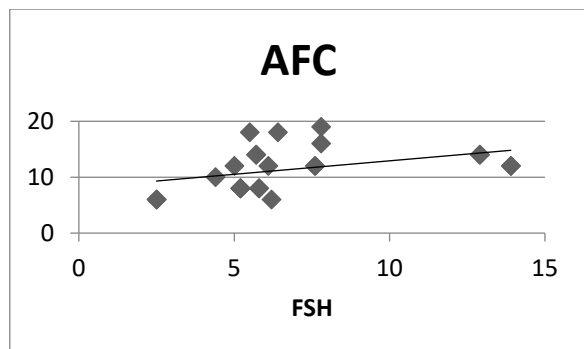


Figure 2. Scatter plot with line chart for correlation between FSH and AFC of the ovaries in the case group

DISCUSSION

Some research indicates an increase in the incidence and severity of menopausal symptoms and ovarian failure following removal of the uterus, despite the ovaries remaining in place. Whereas, others report no decrease in ovarian function [7]. Woodward et al. [8] Reported that the presence of uterus would inhibit follicle depletion or atresia and its surgical removal at reproductive age would accelerate follicular loss, atresia and subsequent accelerated menopause, Abdominal hysterectomy accelerates ovarian dysfunction and women treated with total abdominal hysterectomy are at risk of early menopause. Ayoubi et al. [9] Postulated that increased prevalence of ovarian failure after hysterectomy, is due to stretch and thrombosis of ovarian blood vessels with a subsequent reduction in ovarian blood supply. This study was conducted to know whether cesarean hysterectomy affect ovarian function or not because there is some conflict as to whether removal of the uterus leads to altered or premature ovarian dysfunction. In this study we compared AFC of the two studied groups by trans-vaginal ultrasound and found that there was significant difference between AFC in both ovaries between cases and controls which decreased among women underwent cesarean hysterectomy and this come in agreement with Nyström et al. [10] who postulated that AFC is one of the best markers for assessment of the function of ovaries. In the current study we measured FSH, LH, E2 three months after cesarean hysterectomy and compared them to women underwent cesarean section, we found that there was significant difference between the cases and controls as regard FSH and LH with significant P value = 0.01 and P value = 0.005 for FSH and LH respectively with increased FSH, LH level among cases underwent cesarean hysterectomy which means that there was affection of ovarian function which may lead to increased risk of early menopause between women underwent cesarean hysterectomy.

This result come in agreement with other recent studies that have examined the risk of ovarian failure after hysterectomy as in the study of Hehenkamp et al. [11] who were reporting that there was affection of ovarian function after hysterectomy. This study was in contrast to the studies of Read et al.[12] and Rashid et al., [13] as they found that there was no affection of ovarian function after hysterectomy as the study of Read et al.[12] had no control group while in the study of Hehenkamp et al.[11] and Rashid et al.[13] they compared women with hysterectomy to women with uterine artery embolization so the results were not strictly comparable to our study. Also we found that there was no significant difference between

estradiol level in the two studied groups and this come in agreement with the study of Davis et al. [13] who reported that serum estrogen level didn't affected due to conversion of androgen and testosterone from adrenal gland to estrogen in fat cell and muscle cells, in general it was expected that women with increased body mass index will experience delayed menopause. In this study we assessed ovarian blood flow of both ovaries by trans- vaginal Doppler ultrasound and there was no significant difference in ovarian blood flow indices (resistant index and pulsatility index of ovarian artery) between the two studied groups. This come in agreement with Sezik et al. [14] who assessed ovarian blood flow by Doppler ultrasound and reported that there was no significant change in resistant index six months after hysterectomy. And come in contrast with PetriNahás et al. [15] who reported that there was reduction on pulsatility index after 6 months and 12 months after hysterectomy. Also, Ng et al. [16] reported that reduction in ovarian blood flow may be a late phenomenon, as Doppler indices of vascularity are similar in women aged 30-40 years, but significantly lower in those aged more than 40 years. The study had some limitations including small sample size and patients are needed with longer follow up periods more than 3 months to determine the effect of cesarean hysterectomy on ovarian function

CONCLUSION

There was affection of ovarian function three months post-operative among women underwent cesarean hysterectomy with conserved ovaries by increased level of FSH, LH and decrease AFC but there was no difference in Estradiol serum level with preservation of blood flow to both ovaries by no significant change in resistant index and pulsatility index of ovarian artery.

Conflict of Interest: None.

Financial Disclosures: None.

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