

Comparative Study of Ovarian Function in hysterectomised and Non Hysterectomised women of Reproductive Age Group

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Abstract

Aim: The aim of the study is to determine the effect of hysterectomy on ovarian function in women aged 40 yrs or younger by measuring serum FSH levels and also to find out whether or not hysterectomy leads to an earlier onset of menopause.

Materials and Methods: The study includes a total of 100 women aged 40 yrs or younger attending the gynecology OP Department of Obstetrics and Gynecology of Victoria General Hospital, Visakhapatnam during the period July 2014 to August 2016. They were taken as 50 cases and 50 controls. Cases included 50 women who underwent Hysterectomy (Abdominal/vaginal) done 5 yrs or above for benign diseases of uterus with conservation of one or two ovaries. Controls included 50 women with intact uterus and having regular menstrual cycles. Both were matched with age and BMI.

Observation: Of the 50 cases 35 cases had undergone hysterectomy 6-10 yrs back. By 10 yrs after hysterectomy 100% women had FSH levels greater than 40 IU/L. Out of 36% cases 33.33% of women with hot flushes had FSH levels greater than 40 IU/L. Out of 66% cases 27.3% of women with backache had FSH levels greater than 40 IU/L. Out of 36% cases who had anxiety 16.7% had FSH levels greater than 40 IU/L. Out of 22% cases who had dyspareunia 36.33% of women had FSH levels greater than 40 IU/L. Out of 12% cases who had vaginal discharge 33.33% of women had FSH levels greater than 40 IU/L. Out of 50% cases who had weakness 12% of women had FSH levels greater than 40 IU/L.

Conclusion: Prevalence of ovarian failure is higher in women who underwent TAH (22% of our cases had FSH greater than 40 IU/L) and none of our control group had FSH greater than 40 IU/L. Risk of ovarian function increased with increase in age of women who underwent hysterectomy and duration of hysterectomy. Vasomotor symptoms are insensitive measure of ovarian function.

Keywords: Hysterectomy, FSH, reproductive age

I. Introduction

Hysterectomy is one of the most common operations performed in the developing world. The benefits of hysterectomy have been frequently described and include cessation from abnormal uterine bleeding, relief from monthly symptoms and reduction in depression and anxiety levels. Extensive use of hysterectomy along with absence of pathology in more than 50% women has led to discussions of the merits of the procedure. Concern has also been raised about the possible impact of hysterectomy on ovarian failure and in particular whether or not premature ovarian loss of ovarian function occurs.

Menstrual cycle is brought about by female sex hormones oestrogen and progesterone which are further under the control of LH and FSH which are produced by the anterior pituitary. The menstrual cycle is divided into ovarian cycle and uterine cycle¹. The ovarian cycle in turn consists of follicular phase, ovulatory² and luteal phase. The uterine cycle is divided into menstruation³, proliferative phase⁴ and secretory phase. Ovulation occurs due to a phenomenon called as ovulatory surge⁵. Menopause is the term given to cessation of menstrual cycles⁶ for a period of more than a year in the middle age⁷ group. Before menopause women experience hot flushes which stop in a year or two⁸, sweating, shivering and reddening of skin⁹. Problems which improve after menopause¹⁰ are endometriosis and painful bleeding. The stages of the menopause transition have been classified according to women's reported bleeding pattern, supported by changes in pituitary FSH levels¹¹.

Premature loss of ovarian function is associated with long term health risks including heart diseases and osteoporosis. In particular earlier age of surgical or natural menopause has been shown to correlate with increased risk of cardiovascular mortality. The risk of cardiovascular disease in a large cohort study was doubled for women following oophorectomy. Other studies reported risk of myocardial infarction increased to 50-60% in women following oophorectomy. Cardiovascular disease is the major cause of death in women and given the widespread use of hysterectomy in premenopausal women there would be a major health problem. As long term

use estrogen replacement therapy is no longer recommended and then it is important to know whether hysterectomy has a role in ovarian failure. Measuring Gonadotrophin concentration in women who had hysterectomy and ovarian conservation could provide useful information.

II. Materials And Methods

- ❖ Study includes a total of 100 women aged 40yrs or younger attending the gynecology OP of Dept. of Obstetrics and gynecology, Victoria General Hospital, Visakhapatnam, allocated into two groups. Study period from July 2014 to August 2016.

Inclusion Criteria:

Study group:

- ❖ Study group consists of 50 women who had Hysterectomy done 5yrs or above for benign diseases of uterus.
- ❖ Conservation of one or both ovaries
- ❖ No h/o HRT/radiation/smoking
- ❖ No other endocrine disorders

Control Group:

- ❖ Control group consists of 50 women with
- ❖ Intact uterus
- ❖ Regular menstrual cycles
- ❖ Not using hormonal contraception /HRT
- ❖ Were matched with age, BMI

Exclusion Criteria:

- ❖ Women aged > 40yrs
- ❖ Surgical menopause
- ❖ Women on HRT

History:

Name, age, address, was noted. A complete history of women was taken with reference to age, socioeconomic status, residence, parity, literacy, and associated symptoms like hot flushes, headache, joint pains, backache, vaginal discharge, dyspareunia, etc.

Past medical and surgical history was taken. Women who underwent hysterectomy were enquired about details of hysterectomy like indication for which hysterectomy was done, place of surgery, route of surgery and duration from hysterectomy.

Examination:

General, systemic and gynecological examination was done in a detailed manner.

Investigations

Hematological investigation like HB%, blood grouping and Rh typing, random blood sugar done. Urine examination done for microscopy, albumin, sugar.

Specific investigations:

Pelvic ultrasonography done to confirm presence of ovaries and rule out any ovarian pathology. And then the blood sample drawn and sent to laboratory for estimation of serum Follicle stimulating hormone levels by CLIA after taking informed consent.

III. Results And Observation

Table 1 Distribution of women according to age group:

Age group In yrs	No. of cases	FSH > 40IU/L	%	No. of Controls	FSH > 40IU/L
25-30yrs	7	1	14.28%	7	-
31-35yrs	19	3	15.78%	19	-
36-40yrs	24	7	29.16%	24	-

Of the 50 cases, 14.28% of 7 pts in 25 - 30 yrs age group had FSH > 40IU/L.

15.78% of 19 pts in 31 - 35 yrs age had FSH > 40 IU/L.

29.16% of 24 pts in 36 - 40 yrs age had FSH > 40 IU/L.

There is increase in incidence of FSH > 40IU/L with increase in age.

Of the 50 controls, none of them had FSH > 40IU/L.

Table 2Distribution of women according to BMI.

Bmi	No. Of Cases	Fsh> 40iu/L	%	No. Of Controls	Fsh> 40iu/L
Low	-	-	-	-	-
Normal	17	6	35.29%	17	-
High	33	5	15.15%	33	-
Obese	-	-	-	-	-

Of the 50 cases 17 were of normal BMI, out of them 35.29% had FSH > 40IU/L.

33 Were of high BMI, out ofthem 15.15% had FSH >40 IU/L.

There is no significant relationship between FSH levels and BMI in our study.

Of the 50 controls, none of them had FSH.>40 IU/L.

Table 3:Distribution of cases according to type of hysterectomy:

Type of hysterectomy	No. of cases	FSH>40 IU/L	%
Abdominal Hysterectomy	47	10	21.27%
Vaginal Hysterectomy	3	1	33.33%
Laparoscopic hysterectomy	-	-	-

Of 50 cases, 47 undergone abdominal hysterectomy, Out of them 21.27% had FSH >40 IU/L.

3 undergone vaginal hysterectomy and out of them 1(33.33%) had FSH > 40 IU/L.

There is no significant relationship between FSH levels and type of hysterectomy in our study.

Table 4: Distribution of cases according to duration from hysterectomy:

Duration hysterectomy	No. of cases	FSH>40 IU/L	%
5yrs back	12	1	8.33%
6-10yrs back	35	7	20%
>10yrs back	3	3	100%

Of the 50 cases, 12 undergone hysterectomy 5 yrs back, out of them,8.33% had FSH.> 40 IU/L. 35 undergone hysterectomy 6 - 10 yrs back, out of them,20% had FSH >40 IU/L..3 undergone hysterectomy> 10 yrs back, out of them 100% had FSH > 40 IU/L.

The study shows that there is increase in incidence of FSH levels with increase durationfrom Hysterectomy and 100% had FSH > 40 IU/L by 10 years after hysterectomy.

Table 5: Distribution of women according to FSH levels:

Levels of FSH (IU/L)	No. of cases n (%)	No. of controls n (%)
<10	19(38%)	29(48%)
10-20	11(22%)	14(38%)
21-30	7(14%)	7(14%)
31-40	2(4%)	-
>40	11(22%)	-

Out of 50 cases, about 22% had FSH > 40 IU/L

38% had FSH <10 IU/L

22% had FSH between 10-20 IU/L

14% had FSH between 21 -30IU/L

4 % had FSH between 31-40 IU/L

None of the controls had FSH > 40 IU/L.

Table6Distribution of women according to symptoms:

Symptoms	Cases n (%)	Controls n (%)
Hot flushes	18 (36%)	-
Headache	4 (8%)	2 (4%)
Chest pain/ Palpitations	11 (22%)	2 (4%)
Breathlessness	2 (4%)	-
Weakness	25 (50%)	6 (12%)
Irritability	2 (4%)	-
Depression	-	-

Loss of memory	-	-
Anxiety	18 (36%)	1 (2%)
Loss of self confidence	-	-
Loss of libido	-	-
Dyspareunia	11 (22%)	-
Vaginal bleeding	-	-
Vaginal discharge	6 (12%)	4 (8%)
Vaginal itching	5 (10%)	-
Backache	33 (66%)	2 (4%)
Joint pains	38 (76%)	6 (12%)
Sleep disturbances	10(20%)	2 (4%)
Frequency of urine	3 (6%)	1 (2%)
Night sweats	5 (10%)	-

None of the control had hot flushes or night sweats compared to cases (36% had Hot flushes)

Only 4% of the control had backache compared to 66% of cases

Only 12% of controls had joint pains compared to 76 % of cases.

Only 4% of controls had sleep disturbances compared to 20% of cases.

One of the controls had dyspareunia compared to 22% of cases.

Only 12% of controls had weakness compared to 50% of cases.

Only 2% of controls had anxiety compared to 36% of cases.

About 8% controls had vaginal discharge compared to 12% of cases. 2% of the controls had frequency of micturition.

Table 7: Distribution of cases according to symptoms:

Symptoms	No. of Cases n (%)	FSH>40 IU/L
Hot flushes	18 (36%)	6 (33.33%)
Headache	4 (8%)	-
Chest pain/ Palpitations	11 (22%)	4 (36.36%)
Breathlessness	2 (4%)	-
Weakness	25 (50%)	3 (12%)
Irritability	2 (4%)	-
Depression	-	-
Loss of memory	-	-
Anxiety	18 (36%)	3 (16.6%)
Loss of self confidence	-	-
Loss of libido	-	-
Dyspareunia	11 (22%)	4 (36.36%)
Vaginal bleeding	-	-
Vaginal discharge	6 (12%)	2 (33.33%)
Vaginal itching	5 (10%)	-
Backache	33 (66%)	9 (27.27%)
Joint pains	38 (76%)	11 (28.94%)
Sleep disturbances	10(20%)	1 (10%)
Frequency of urine	3 (6%)	1 (33.33%)
Night sweats	5 (10%)	1 (20%)

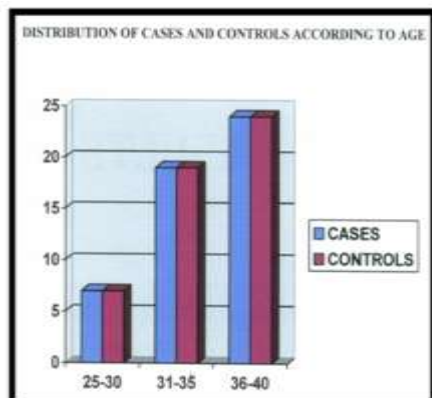


Figure - I

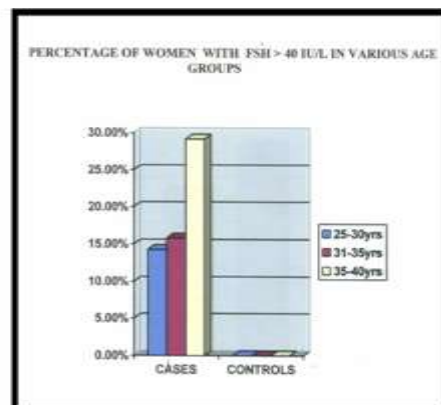


Figure - II

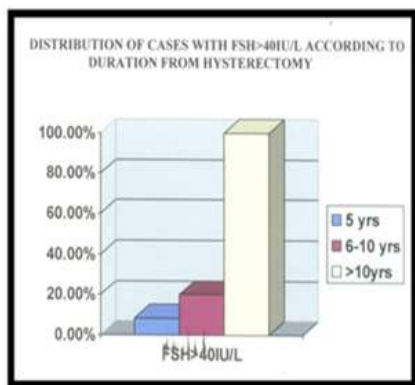


Figure - V

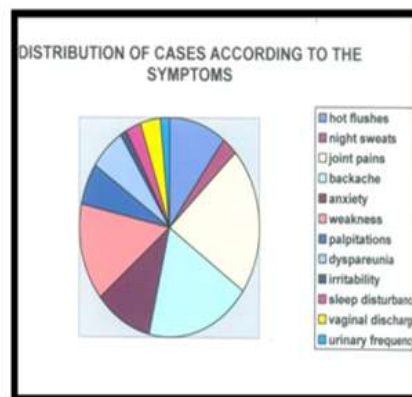


Figure - VI

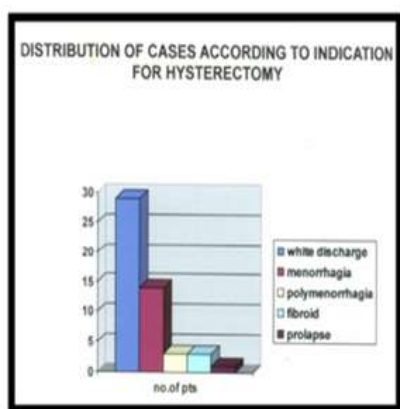


Figure - III

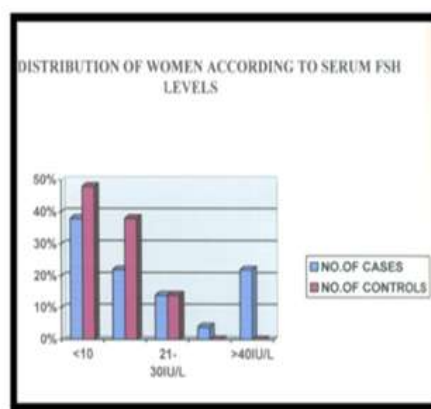


Figure - IV

IV. Discussion

The present study was conducted on 100 women aged 40yrs of younger attending the gynecology OP department of obstetrics and gynecology, Govt. Victoria Hospital, VSP. This is a comparative study about risk of ovarian failure and premature menopause in women who undergone hysterectomy below 35yrs age with conservation of ovaries and compare them with a group of women who were menstruating regularly and not on hormonal contraception.

In the present study, the threshold of serum FSH > 40 IU/L is chosen to indicate menopause. The women in two groups are similar in number of demographic and social characteristics.

In the present study, all women were multipara except two cases who were grand multipara of the 50 cases, 24 cases are between 36-40yrs age group and of them 29.16% of women had FSH levels > 40 IU/L, whereas none of the controls had FSH > 40 IU/L. study shows that there is increased incidence of FSH > 40 IU/L with increase in age

In the present study, of the 100 women, 32 cases and 32 controls attending the OP are low socioeconomic status, as our hospital looks after more for low socioeconomic group.

The study shows that there is no significant relationship between FSH levels and women's residence, BMI, or literacy of the cases 29 were done for white discharge, it being the commonest indication for hysterectomy in our study. 47 cases undergone abdominal hysterectomy and only 3 cases undergone vaginal hysterectomy of the 50 cases, 36 cases were done in urban hospitals. After analyzing the results we found no significant relationship between FSH levels and indication or type or place of hysterectomy.

The 50 cases 35 undergone hysterectomy between 6-10yrs back. By 10yrs after hysterectomy 100% women had FSH > 40 IU/L. None of the controls had FSH levels > 40 IU/L.

There is increased incidence of FSH levels > 40 IU/L with increased duration from hysterectomy.

When analyzing the symptoms of cases and controls, we found that 36% cases had hot flushes and none of the controls reported them. And only 33.33% of women with h/o hot flushes had FSH levels > 40 IU/L. this shows that vasomotor symptoms are insensitive measure of ovarian function.

According to prospective cohort study by Cynthia M Farquhar, Lynn Sadler, out of 257 hysterectomised women, 53 women had FSH > 40 IU/L and only 17 had reported hot flushes.

29% of postmenopausal women in a population based study in US reported no hot flushes around the time menses stopped and 38% of postmenopausal women aged 45-55yrs in Australia reported they had no hot flushes in past 2 weeks.

10% of cases had night sweats and none of the controls complained of night sweats. 20% of the women with night sweats had FSH > 40 IU/L.

Long term diseases like osteoporosis and cardiovascular problems are reported more in cases than in controls. The commonest complaint that the cases reported in our study are joint pains and next being backache. Of the 50 cases, 76/0 had joint pains (28.94% of them had FSH > 40 IU/L), and only 12% controls had joint pains. 66% cases had backache (27.27/0 of them had FSH > 40 IU/L) and only 4% controls had backache. None of the controls with joint pains or backache had FSH > 40 IU/L.

36% cases had anxiety, of them 16.6% had FSH > 40 IU/L and 22% had palpitations., of them 36.36% had FSH > 40 IU/L .whereas only 2% controls had anxiety and 4% had palpitations, and none of them had FSH > 40 IU/L.

22% cases had dyspareunia, of them 36.36% had FSH > 40 IU/L, 12% had vaginal discharge, of them 33.33% had FSH > 40 IU/L. whereas none of the controls had dyspareunia and 8% had vaginal discharge and none of them had FSH > 40 IU/L. Frequency of micturition was complained in 6% of cases compared to 2% of controls.

Of the 50 cases, 50% complained weakness, of them 12% had FSH > 40 IU/L. Only 12/0 controls had weakness and none of them had FSH levels > 40 IU/L.

According to study by Oldenhave A, Jaszmann CJ comparing the severity of typical climacteric complaints (vasomotor and vaginal dryness) and 21 other complaints considered atypical for climacteric, in women with and without uteri, shown that hysterectomised women report more vasomotor complaints, vaginal dryness and atypical complaints.

According to study by Riedel HI-I, Lehmann- Willenbrock, in 30 patients who had been hysterectomised, found to be having increased gonadotropin levels, in particular those who developed climacteric symptoms 2-3 years later.

The study shows that 22% of cases had FSH levels > 40 IU/L and none of the controls had such levels. According to prospective cohort study conducted by Cynthia M. Farquhar, Lynn Sadler, 2005 where 257 women undergoing hysterectomy were compared with 259 without hysterectomy, Women in the hysterectomy group with a preoperative FSH < 10 IU/L reached menopause 3.7 years earlier than women in the comparison group over the five years of study.

In a study conducted by Nahas E Pontes A, in 61 reproductive age group women , 12.9% had FSH > 40 IU/L, compatible with ovarian failure. According to case control study by GLINDA S COOPER, women with hysterectomy without oophorectomy, 24% had FSH > 20 IU/L compared to 12% of women with uteri.

The results in present study are in comparable with those of Cynthia M Farquhar, Lynn Sadler.

V. Summary And Conclusion

Prevalence of ovarian failure is higher in women who undergo total abdominal hysterectomy (22% cases in our study had FSH > 40 IU/L and none of the controls had FSH > 40 IU/L.).

Risk of ovarian failure increases with increase in age of women undergone hysterectomy and duration from hysterectomy. By 10 years after hysterectomy 100% women who underwent hysterectomy had FSH levels > 40 IU/L .The earlier the age at hysterectomy ,the earlier the women have to bear the consequences of ovarian failure compared to women with intact uteri.

There is no significant relationship between FSH levels and women's residence (rural/urban), BMI, or literacy.

There is no significant relationship between FSH levels and indication for hysterectomy or type or place of hysterectomy.

36% cases had Hot flushes, of them only 33.33% had FSH > 40 IU/L and 100/0 cases had night sweats, of them only 20 % had FSH > 40 IU/L and none of the controls had these complaints. Vasomotor functions are insensitive measure of ovarian function.

Hysterectomy might increase the risk of some diseases such as Osteoporosis and coronary artery disease due to ovarian failure and deficiency of estrogens and its benefits. Increased incidence of bone and joint and cardiovascular problems reported in cases than in controls. Joint pains being the commonest complaint reported by the cases (76%) and next complaint being backache (66%). Complaints like anxiety, sleep disturbances, weakness, dyspareunia, vaginal discharge and frequency of micturition were seen significantly more in cases when compared to controls

Bibliography

- [1]. Silverthorn, Dee Unglaub (2013). *Human Physiology: An Integrated Approach* (6th ed.). Glenview, IL: Pearson Education. pp. 850–890.
- [2]. Puttabyatappa M, Al-Alem LF, Zakerkish F, Rosewell KL, Brännström M, Curry TE Jr.
- [3]. *Endocrinology*. 2016 Nov 4;en20161544
- [4]. Sahin M, Sahin S, Sari FN, Tatar EC, Uras N, Oguz SS, Korkmaz MH.
- [5]. *J Voice*. 2016 Nov 9. pii: S0892-1997(16)30211-9. doi: 10.1016/j.jvoice.2016.10.005.
- [6]. Losos, Jonathan B.; Raven, Peter H.; Johnson, George B.; Singer, Susan R. (2002). *Biology*. New York: McGraw-Hill. pp. 1207–09.
- [7]. Crespo D, Goetz FW, PlanasJV. *Sci Rep*. 2015 Sep 16;5:14210.
- [8]. Blake KR, Bastian B, O'Dean SM, Denson TF. *Psychoneuroendocrinology*. 2016 Oct 17;75:91-99
- [9]. Takahashi, TA; Johnson, KM (May 2015). *The Medical clinics of North America*. 99 (3): 521–
- [10]. Decaroli MC, Rochira V. *Virulence*. 2016 Nov 10:0
- [11]. Thurston RC, Chang Y, Barinas-Mitchell E, Jennings JR, Landsittel DP, Santoro N, von Känel R, Matthews KA, Stroke. 2016 Nov .pii: STROKEAHA.116.014674
- [12]. ncebozU, *Womens Health (Lond)*. 2015 Aug;11(5):711-5. doi: 10.2217/whe.15.59
- [13]. Soules, MR; Sherman, S; Parrott, E; Rebar, R; Santoro, N; Utian, W; Woods, N (2001). *Climacteric*. 4 (4): 267–
- [14]. FarquharCM, SadlerC, A prospective study of the short term outcomes of hysterectomy with and without oophorectomy, *AustNZJObstet Gynaecol*.2002May;42(2):197-204
- [15]. OldenhaveA, JaszmannCJ, Hysterectomized women with ovarian conservation report more severe climacteric complaints than do normal climacteric women of similar age. *AmJObstet Gynaecol*.1993Mar;168(3pt1);765-71
- [16]. ReidelHH, Lehman-Willenbrock, Development of clinical picture of ovarian deficiency following hysterectomy and destructive fallopian tube sterilization procedure, *Zentralbl Gynaecol*.1987;109(12):755-70
- [17]. zahasE Pontes A, InhibinB, and ovarian function after Total Hysterectomy in women of reproductive age, *Gynaecol Endocrinol*2003April;17:125-131