International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Singh S et al. Int J Reprod Contracept Obstet Gynecol. 2022 Apr;11(4):1185-1190
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20220902

Original Research Article

Effect of bilateral salpingectomy with hysterectomy on ovarian reserve

Shakun Singh, Rudavath Bhavana*, Rachna Chaudhary, Vandana Dhama

Department of Obstetrics and Gynaecology, LLRM Medical College, Meerut, Uttar Pradesh, India

Received: 12 February 2022
Accepted: 14 March 2022

***Correspondence:**
Dr. Rudavath Bhavana,
E-mail: Bhavanabhavs375@gmail.com

ABSTRACT

Background: Aim of the study was to evaluate the effect of salpingectomy with hysterectomy on ovarian reserve.
Methods: This prospective case control study was done in the department of obstetrics and gynaecology from June 2020 to May 2021 on patients who underwent hysterectomy with or without salpingectomy were included in the study. Patients then divided into two groups of 30 in each group. In group A hysterectomy without salpingectomy were included. In group-B patients who underwent hysterectomy with salpingectomy were included, and then both groups were followed through Si-anti-Mullerian hormone (AMH), luteinizing hormone (LH), follicle stimulating hormone (FSH) and ovarian volume.
Results: Baseline AMH levels were 1.20 ng/mL for group-A, 1.29 ng/mL for group-B with no statistical significance. It was seen that AMH levels for across the group but of no statistical significance at any given follow up-line point. Baseline LH levels were 7.22 IU/L and 7.27 IU/L for group-A and group-B patients respectively with no statistical significance. The average LH levels seen to increase in the follow up period in both groups, but it was of no statistic significant at any given follow up time point. Baseline FSH levels were 7.58 IU/L and 6.84IU/L for group A and group-B respectively with no statistical significance. The average FSH levels were seen to increase is the follow up period in both groups.
Conclusions: The hysterectomy coupled with bilateral salpingectomy (BS) had minimal or no statistically significant impact on the ovarian reserve. Depends on patients' profile and states of fallopian tube we should take decision of salpingectomy during surgery.

Keywords: Ovarian reserve, Hysterectomy, Salpingectomy

INTRODUCTION

Hysterectomy is one of the most common surgeries worldwide, it is done by following routes abdominally, vaginally and laparoscopy.[1] The most important complication associated with hysterectomy is decreased ovarian function.

Previous studies have shown that women undergoing hysterectomy experience menopausal symptoms faster and compared with other women have lower number of follicles, lower serum levels and higher levels of FSH.[2] It seems that preserving ovarian function after hysterectomy is very important.

Hysterectomy preserving both ovaries and tubes through preserve blood supply to the mesosalpinx of ovaries.[3] Many gynaecologists refuse to perform salpingectomy at the time of hysterectomy as salpingectomy leads to blocking of uterine blood flow to the ovaries and disrupting its function.[4] There is no clear-cut evidence on the effect of salpingectomy on ovarian function, and some recent studies revealed the devastating results of salpingectomy.[5] Interestingly, findings of previous study on ovarian function have shown that the primary source of ovarian cancer is fallopian tubes and if hysterectomy is along with salpingectomy done, cancer progression may be prevented.[6] The preferred surgery is removing tubes associated with hysterectomy in women who have high risk of uterine cancer.[7]

The aim of my study is to evaluate the effect of salpingectomy on ovarian function by measuring the serum levels of anti-Mullerian hormone. Therefore, the mean AMH was compared between the study group of hysterectomy and hysterectomy with salpingectomy, post and pre-operatively.

Salpingectomy can be done for variety of benign reasons, including surgical treatment of ectopic pregnancy and infections in fallopian tubes.

Patients who had undergone hysterectomy without salpingectomy are at higher risk of hydrosalpinx, due to the closure of both sides of fallopian tubes, in comparison to those who had undergone hysterectomy with bilateral salpingectomy (h-BS).[8]

Due to the common origin of blood supply for both ovaries and fallopian tubes, many surgeons prefer preserving ovaries in a hysterectomy. Especially for benign reasons, to conserve ovarian function based on this fact; various studies have been conducted for evaluating the effect of salpingectomy on ovarian function.

In the case of confirmation that salpingectomy may not affect ovarian function negatively, gynaecologists can perform salpingectomy during hysterectomy.

The controversial reasons for bilateral salpingectomy during hysterectomy for benign indications, we have decided to conduct the current study. In this study, we also assessed the effect of follicle stimulating hormone (FSH) and luteinizing hormone (LH) change in patients who underwent salpingectomy and those in which tubes were saved.

METHODS

The prospective case control study on ovarian reserve who underwent hysterectomy with or without salpingectomy was conducted in the department of obstetrics and gynaecology, in collaboration with department of pathology in S.V.B.P hospital L.L.R.M medical college Meerut from June 2020 to May 2021. Informed consent was obtained. Ethical clearance was taken from the institutional ethical committee.

Inclusion criteria

Women who visited outpatient department of obstetrics and gynaecology of age less than 45 years who was operated for benign indication for hysterectomy with no history of malignancy, absence of menopausal symptoms and baseline FSH value less than 10 IU/ml.

Exclusion criteria

Women with age more than 45 years with presence of menopausal symptoms, baseline FSH value >10 IU/ML, History of pelvic surgery, cystic ovaries >10 MM, or any solid ovarian mass in transvaginal ultrasound, Not the accessibility of hormone measurement before or after operation due to any reason, postsurgical pathology of malignancy, hormone replacement therapy and or hormonal contraception for the last 6 months and present or past smoking history.

Detailed history, general physical and gynaecological examination followed by baseline investigations like complete blood count, differential blood count, FSH, LH and AMH levels, HIV testing, ultrasonography, chest X-ray and pre anaesthetic check-up was done and fitness for surgery was taken. Blood samples was sent to the department of endocrinology for estimation of FSH, LH and AMH levels. Patient profile, history, investigations, per op findings, blood biochemical test and finally their result was recorded. This is to be analyzed later subjects were randomized in 1:1 ratio into two groups.

Group-1 (n-30) pre-operatively serum AMH, FSH, LH and ovarian volume estimation by USG was done. Post-operatively patients who undergone hysterectomy without salpingectomy for benign conditions serum AMH, FSH, LH and ovarian volume estimation by USG was done at 3 months and 6 months after surgery.

Group-2 (n-30) pre-operatively serum AMH, FSH, LH and ovarian volume estimation by USG was done. Post-operatively patients who undergone hysterectomy with salpingectomy for benign conditions serum AMH, FSH, LH and ovarian volume estimation by USG was done at 3 months and 6 months after surgery.

The statistical analysis of results was done by using SPSS (Statistical package for social science) versions 16 statistical analysis software.

Follow up

All subjects were followed 3 months and 6 months after surgery.

Outcome of results

The following outcome parameters were evaluated.

Primary outcome

FSH and LH levels at 3 months after hysterectomy, FSH and LH levels at 6 months after hysterectomy, AMH levels, surgery related adverse events and ovarian volume.

Secondary outcome

Incidence of ovarian cancer after bilateral salpingectomy, total duration of surgery, estimated total blood loss during surgery, conversion rate to open surgery (applicable only to laparoscopic and vaginal approaches), menopause related symptoms and quality of life.

RESULTS

The study was performed at the department of obstetrics and gynecology at the Lala Lajpat Rai medical college and hospital, Meerut, UP. A total of 60 patients who underwent surgical interventions with (30) or without Bilateral salpingectomy (30) were included in the study. The data was analyzed, and results presented as follows

Age related parameters

Average age for 2 groups was similar with no statistically significant difference (39.43 vs 40 years, p=0.4069).

Table 1: Age related parameters among both study groups.

Age related parameters	With BS	Without BS	P value
Mean age (Years)	39.43	40.00	0.4069
SD	2.75	2.53	
Minimum	34.00	36.00	
Maximum	44.00	45.00	

Parity

The mean parity levels were similar for the two groups (4.10 vs 4.30, p=0.5385).

Table 2: Parity among both study groups.

Parity	With BS	Without BS	P value
Mean parity	4.10	4.30	0.5385
SD	1.32	1.18	
Minimum	2.00	2.00	
Maximum	8.00	7.00	

Indication for surgery

Most common indication for surgery across both the groups was fibroid with no significant difference in terms of distribution (p>0.05).

Table 3: Indication for surgery and its correlation among both study groups.

Indication for surgery	With BS	Without BS	P value
AUB	8 (26.67)	6 (20)	0.5447
Chronic PID	8 (26.67)	8 (26.67)	>0.999
Fibroid	10 (33.33)	9 (30)	0.7834
Uterine prolapse	4 (13.33)	7 (23.33)	0.3209
Grand total	30	30	

Surgery type

Most common surgery type across both the groups was TAH with no significant difference statistically (p>0.05).

Table 4: Type of surgery and its parameters among both study groups.

Surgery type	With BS	Without BS	P value
Non descent vaginal hysterectomy (NDVH)	9 (30)	8 (26.67)	0.7766
Total abdominal hysterectomy (TAH)	17 (56.67)	15 (50)	0.6076
VH	4 (13.3)	7 (23.33)	0.3209
Grand total	30	30	

Operative time

The mean operative time was 53.50±5.64 minutes for the patients with BS and 51.03±5.98 minutes for the patients without BS. The difference was not significant statistically p=0.1052).

Table 5: Operative time parameters among both study group.

Operative time	With BS	Without BS	P value
Mean time (min)	53.50	51.03	0.1052
SD	5.64	5.98	

Blood loss

The average blood loss was 95.2±6.85 ml for the BS group of patients and 94±9.46 ml for patients without BS. There was no significant difference statistically (p=0.5758).

Table 6: Blood loss among both study group.

Blood loss (ml)	With BS	Without BS	P value
Mean blood loss	95.2	94	0.5758
SD	6.85	9.46	

AMH levels

A comparison of the AMH levels at the preoperative baseline and follow up 3 months and 6 months was done. It was seen that there was no significant difference between the two groups at any of the time points (p>0.05).

Table 7: Comparison of preoperative and post operative AMH levels among both study group.

AMH levels	With BS	Without BS	P value
Pre-op (mean)	1.20	1.29	0.2524
SD	0.33	0.27	
3 months (mean)	1.00	0.98	0.8709
SD	0.56	0.37	
6 months (mean)	0.92	0.93	0.9275
SD	0.50	0.33	

LH levels

A comparison of the LH levels at the preoperative baseline and follow up 3 months and 6 months was done for the two groups of patients. It was seen that there was no significant difference between the two groups at any of the time points (p>0.05). The average LH levels were seen to increase in the follow up period across both the groups.

Table 8: Comparison of pre-operative and post-operative LH levels among both study group.

LH levels	With BS	Without BS	P value
Pre-op (mean)	7.22	7.27	0.9277
SD	2.12	2.13	
3 months (mean)	10.64	10.79	0.5540
SD	1.02	0.93	
6 months (mean)	15.32	16.22	0.1219
SD	2.17	2.27	

FSH levels

A comparison of the FSH levels at the preoperative baseline and follow up 3 months and 6 months was done for the two groups of patients. It was seen that there was no significant difference between the two groups at any of the time points (p>0.05). The average FSH levels were seen to increase in the follow up period across both groups.

Table 9: Comparison of pre-operative and post-operative FSH levels among both study group.

FSH levels	With BS	Without BS	P value
Pre-op (mean)	7.58	6.84	0.1321
SD	0.89	2.50	
3 months (mean)	10.50	11.26	0.1647
SD	1.01	2.78	
6 months (mean)	11.06	11.82	0.2153
SD	2.96	1.51	

Ovarian volumes

The ovarian volumes were comparable for the two groups of patients across all the time points with no significant difference statistically (p>0.05).

Table 10: Comparison of pre operative and post operative ovarian reserve among both study group.

Ovarian volumes	With BS	Without BS	P value
Pre-o (mean)	12.26	12.06	0.2241
SD	0.61	0.65	
3 months (mean)	12.26	12.06	0.2241
SD	0.61	0.65	
6 months (mean)	12.26	12.06	0.2241
SD	0.61	0.65	

DISCUSSION

The effect of salpingectomy on ovarian reserve when done along with hysterectomy, has been evaluated in detail. But the available literature presents heterogenous contradictory findings with very limited information specific to the Indian subset of patients. Therefore, to evaluate this in detail and gain further understanding on the impact of bilateral salpingectomy on the ovarian reserve, we conducted this study at the department of obstetrics and gynaecology at the Lala Lajpat Rai medical college and hospital, Meerut, UP.

This was performed on 60 patients who underwent hysterectomy in the department. We divided the study population into two groups based on whether the bilateral salpingectomy has been performed or not. 30 patients were allocated to each group.

The major findings of the study were- The average age for the two groups was 39.43 vs 40 years with no statistically significant difference (p=0.4069).

Yuan et al in their study on the effects of hysterectomy with bilateral salpingectomy on ovarian reserve showed that the median age of 84 women included in the study was 41.61±0.62 years. This was like the finding in our study.[10]

Most of the patients were from rural lower or middle socioeconomic strata families as assessed by the Modified Kuppuswamy scale. The mean parity levels were similar for the two groups (4.10 vs 4.30, p=0.5385).

Most common indication for surgery across both the groups was fibroid (33% and 30%) followed by AUB and PID in 26.67% patients each.

Most of the patients in both the groups in the study underwent TAH or total abdominal hysterectomy. However, NDVH and VH were also performed in a significant number of patients across both the groups.

The mean operative time was close to an hour for both the groups (53.50±5.64 minutes for the patients with BS and 51.03±5.98 minutes for the patients without BS). The difference was not significant statistically (p=0.1052). Elmantwe et al in their Egypt based study showed that the groups did not differ significantly regarding operative outcomes such as operative time, operative bleeding and hospital stay according to ITT and PP analyses.[11]

The average blood loss was 451±26.31 ml for the BS group of patients and 450±31.51 ml for the patients without BS. This was also not a significant difference statistically (p=0.8943). Tehranian et al showed that There was no difference in the mean operative time (mean difference 0.33, 95% CI-22.21 to 22.86, p<0.92), mean blood loss (mean difference-0.66, 95% CI-15.8 to 14.46, p<0.97), and post FSH (mean difference 0.34, 95% CI-1.2 to 1.88, p<0.65) between both groups.[12]

The baseline AMH levels were 1.20 ng/ml for patients withbilateral salpingectomy and 1.29 ng/ml for patients without bilateral salpingectomy. It was seen that the AMH levels fell across both the groups as well as there was no significant difference between the two (2) groups statistically.

Song et al showed that Baseline characteristics were similar between groups. There were also no differences in surgical outcomes, such as operative time, operative bleeding, hospital stay, or complications between groups. The decline rate in AMH was 18.6% (interquartile range (IQR) 2.6-46.8%) in the opportunistic salpingectomy group and 10.4% (IQR 2.6-46.8%) in the no-salpingectomy group, with no significant difference between groups (p=0.593).[16]

Huang et al in their study on-effect of modified laparoscopic salpingectomy on ovarian reserve: Changes in the serum antimüllerian hormone levels‖ showed that no significant change was detected in serum antimüllerian hormone at 3 months after surgery compared to preoperative level (p=0.857). Similar changes were observed for the basal follicle-stimulating hormone (p=0.102) and estradiol (p=0.233) level.[13]

The baseline LH levels were 7.22 and 7.27 IU/L for the two groups with no significant difference. The average LH levels were seen to increase in the follow up period across both the groups, but the difference was not significant statistically at any given follow up time point.

Tehranian et al showed that serum AMH levels decreased at 3 months after hysterectomy in all patients (pre AMH 1.32±(0.91); post AMH 1.05±(0.88), p<0.001), the salpingectomy group (pre AMH 1.44±(0.94); post AMH 1.13±(0.86), p<0.001), and no salpingectomy group (pre AMH 1.2±(0.9); post AMH 0.97±(0.92), p<0.001). The rate of decline of AMH levels after surgery did not differ between the two groups (25% (17-33%) vs. 26% (15-36%), p=0.23) among the women with salpingectomy versus without salpingectomy, respectively.[12]

The baseline LH levels were 7.22 and 7.27 IU/L for the two groups with no significant difference. The average LH levels were seen to increase in the follow up period across both the groups, but the difference was not significant statistically at any given follow up time point. The LH levels were 10.64 IU/L and 10.79 IU/L at the 3rd month follow up and 15.32 IU/L and 16.22 IU/L at the follow up 6th month.

The baseline FSH levels were 7.58 IU/L and 6.84 IU/L for the two groups. A comparison of the FSH levels at the preoperative baseline and follow up 3 months and 6 months was done. It was seen that there was no significant difference between the two groups at any of the time points (p>0.05). The average FSH levels were seen to increase in the follow up period across both the groups.

The baseline FSH levels were 7.58 IU/L and 6.84 IU/L for the two groups. It was seen that there was no significant difference between the two groups at any of the time points (p>0.05). The average FSH levels were seen to increase in the follow up period across both the groups.

It was seen that the baseline ovarian volume was 12.26 cc and 12.06 cc for the two groups of patients. The ovarian volumes stayed the same across the follow up period for both the groups suggestive of no significant difference or change.

Morelli et al compared 158 patients retrospectively. A group of patients underwent hysterectomy without salpingectomy, and another group was women who had hysterectomy with salpingectomy. In their study, no significant difference was observed between the two groups based on the levels of hormones AMH, FSH, antral follicle count, and the mean ovarian volume and peak systolic velocity was same in both groups.[15]

Asgari et al in their Iran based study showed that the mean AMH levels were not significantly different at baseline (1.44 ng/mL vs. 1.2 ng/mL) and at 3-month postoperatively (1.13 ng/mL vs. 0.97 ng/mL) among women with salpingectomy versus no salpingectomy. At 3-month follow-up, in both groups, postoperative AMH levels were significantly lower and FSH levels were significantly higher than before surgery.[12]

Less number of cases, limited period of study and COVID pandemic were the major limitations of our study. Thus, larger and a greater number of cases are required to further validate the results.

CONCLUSION

Based on the observations we were able to understand that hysterectomy coupled with bilateral salpingectomy had minimal or no statistically significant impact on the ovarian reserve which is different to that observed in patients without Salpingectomy.

We conducted this study on patients with benign disorders. None of these patients reported any disorder suggestive of malignant transformation or malignancy. No intraoperative complication was seen or conversion to open surgery was seen in the study.

The findings were in alignment with the major literature published in this domain both nationally and internationally.

Larger studies with randomisation and blinding would be needed to further validate the findings.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Dutta DK, Dutta I. Abdominal Hysterectomy: A New Approach for Conventional Procedure. J Clin Diagn Res. 2014;8(4):OC15-8.
2. Siddiqui N, Pitkin J. Menstrual disturbances. Obstetr Gynaecol Reprod Med. 2007;17(5):154-62.
3. Robert F Casper, Robert L Barbieri, William F Crowley, Jr, Kathryn A Martin. Clinical manifestations and diagnosis of menopause. 2021.
4. Stricker R, Eberhart R, Chevailler MC, Quinn FA, Bischof P, Stricker R. Establishment of detailed reference values for luteinizing hormone, follicle stimulating hormone, oestradiol, and progesterone during different phases of the menstrual cycle on the Abbott ARCHITECT analyzer. Clin Chem Lab Med. 2006;44(7):883-7.
5. Kwon JS. Ovarian cancer risk reduction through opportunistic salpingectomy. J Gynecol Oncol. 2015;26(2):83.
6. Kwon JS, McAlpine JN, Hanley GE, Finlayson SJ, Cohen T, Miller DM et al. Costs and benefits of opportunistic salpingectomy as an ovarian cancer prevention strategy. Obstet Gynecol. 2015;125(2):338-45.
7. Minig L, Chuang L, Patrono MG, Cardenas-Rebollo JM, Garcia-Donas J. Surgical outcomes, and complications of prophylactic salpingectomy at the time of benign hysterectomy in premenopausal women. J Minim Invasive Gynecol. 2015;22(4):653-7.
8. Mummert T, Gnugnoli DM. Ectopic Pregnancy. StatPearls Publishing. 2022
9. Minig L, Chuang L, Patrono MG, Cardenas-Rebollo JM, Garcia-Donas. Surgical outcomes and complications of prophylactic salpingectomy at the time of benign hysterectomy in premenopausal women. J Minim Invasive Gynecol. 2015;22(4):653-7.
10. Yuan Z, Cao D, Bi X, Yu M, Yang J, Shen K. The effects of hysterectomy with bilateral salpingectomy on ovarian reserve. Int J Gynaecol Obstet. 2019;145(2):233-8.
11. Elmantwe AN, Elnory MA. Impact of prophylactic bilateral salpingectomy on ovarian reserve in women undergoing vaginal hysterectomy: A randomized controlled trial. EBWHJ. 2020;10(2):150-61.
12. Tehranian A, Zangbar RH, Aghajani F, Sepidarkish M, Rafiei S, Esfidani T. Effects of salpingectomy during abdominal hysterectomy on ovarian reserve: a randomized controlled trial. Gynecol Surg. 2017;14(1):17.
13. Huang D, Zhu Y, Chen J, Zhang S. Effect of modified laparoscopic salpingectomy on ovarian reserve: Changes in the serum antimüllerian hormone levels. Laparoscopic Endoscopic Robotic Surg. 2019;2(1):8-11.
14. Asgari Z, Tehranian A, Rouholamin S, Hosseini R, Sepidarkish M, Rezainejad M. Comparing surgical outcome and ovarian reserve after laparoscopic hysterectomy between two methods of with and without prophylactic bilateral salpingectomy: A randomized controlled trial. J Can Res Ther. 2018;14:543-8.
15. Morelli M, Venturella R, Mocciaro R, Di Cello A, Rania E, Lico D et al. Prophylactic salpingectomy in premenopausal low-risk women for ovarian cancer: primum non nocere. Gynecol Oncol. 2013;129(3):448-51.
16. Song T, Lee SH, Kim WY, Heo EJ, Kim TJ. Opportunistic salpingectomy does not affect ovarian reserve or surgical outcomes in patients undergoing laparoscopic myomectomy. Gynecologic and obstetric investigation. 2017;82(5):468-74.

Cite this article as: Singh S, Bhavana R, Chaudhary R, Dhama V. Effect of bilateral salpingectomy with hysterectomy on ovarian reserve. Int J Reprod Contracept Obstet Gynecol 2022;11:1185-90.