Total Salpingectomy During Abdominal Hysterectomy Preserves Ovarian blood flow and Function

**Corresponding Author:**
Dr. Manal El Behery,
Assistant Professor, Faculty of Medicine, OB & GYNE, 00202 - Egypt

**Submitting Author:**
Dr. Manal El Behery,
Assistant Professor, Faculty of Medicine, OB & GYNE, 00202 - Egypt

---

**Article ID:** WMC00707  
**Article Type:** Original Articles  
**Submitted on:** 22-Sep-2010, 04:24:48 PM GMT  
**Published on:** 22-Sep-2010, 04:43:16 PM GMT  
**Article URL:** [http://www.webmedcentral.com/article_view/707](http://www.webmedcentral.com/article_view/707)  
**Subject Categories:** OBSTETRICS AND GYNAECOLOGY  
**Keywords:** Salpingectomy, Hysterectomy, Ovarian Reserve, Doppler  
**How to cite the article:** Nouh A , El Behery M , Alanwar A , Seleim B . Total Salpingectomy During Abdominal Hysterectomy Preserves Ovarian blood flow and Function . WebmedCentral OBSTETRICS AND GYNAECOLOGY 2010;1(9):WMC00707  
**Source(s) of Funding:** None  
**Competing Interests:** No conflict of interest
Total Salpingectomy During Abdominal Hysterectomy Preserves Ovarian blood flow and Function

Author(s): Nouh A , El Behery M , Alanwar A , Seleim B

Abstract

Aim: To evaluate the effect of total salpingectomy on ovarian reserve and function during abdominal hysterectomy.

Method: Twenty five patients undergoing total abdominal hysterectomy for dysfunctional uterine bleeding were randomly allocated into two groups; group (I) 13 patients undergoing total abdominal hysterectomy with bilateral excision of both tubes. Group (II) 12 patients undergoing classical method of total abdominal hysterectomy. Antral follicles count, ovarian volume, ovarian stromal blood flow and serum FSH, LH were evaluated preoperatively and 6,12 months postoperatively.

Results: A significant increase in ovarian stromal blood flow was observed 6 months post operatively in both groups with significant decrease in pulsatility and resistance indicies (PI&RI), antral follicle count were significantly higher in group (I) compared to group (II) with no significant changes in FSH, LH levels in both groups. Twelve months postoperatively group I showed significantly higher antral follicles count, larger mean ovarian volume and increased ovarian stromal blood flow than group II.

Conclusion: Complete excision of tubes with caution not to damage the ovarian vascular structure during abdominal hysterectomy may preserve ovarian blood flow and function.

Introduction

Oophorectomy during abdominal hysterectomy in a premenopausal woman with sufficient ovarian reserve is still subject to debate, since this may cause sudden hormonal imbalance, aggravation of menopausal symptoms, and decrease of libido[1]. Hysterectomy alters intraovarian blood flow and may impair ovarian function [2]. However, it is not clear whether tubal conservation at time of hysterectomy has any impact on ovarian blood flow, which has dual blood supply from terminal ascending branch of the uterine and corresponding ovarian artery [4, 5]. Strandell A et al. studied the effect of prophylactic salpingectomy on ovarian response in IVF treatment and found no impairment of ovarian response after prophylactic salpingectomy [6] moreover; Sezik M et al [7] suggested that complete removal of fallopian tube has no advantageous effect on ovarian blood supply during abdominal hysterectomy. Xiangying H et al found that the total blood supply to the ovary was reduced after hysterectomy due to loss of blood coming from uterine arteries and advised not to remove the uterus in patients for whom other conservative measures can be performed, otherwise new technique must be followed to keep an intact artery network as possible between oviduct and ovary for patients requiring hysterectomy (8). Furthermore, Repasy et al [9] found that 35% of post-hysterectomy patients without tubal excision developed hydro-salpinx or tubo-ovarian cysts causing symptoms that led to additional surgery. Although rarely encountered, the occurrence of post-hysterectomy carcinoma in the preserved fallopian tube has been reported (10, 11). We speculate that resection and near-complete excision of the tubes during hysterectomy with protection of ovarian vasculature could preserve the blood supply to the ovary and protect against further tubal complication later on. The aim of this study was to evaluate the effect of total salpingectomy on the ovarian blood flow and function during total abdominal hysterectomy.

Methods

This prospective randomized study was conducted on 25 attendant of outpatient clinic of Obstetrics and Gynecology departments, Zagazig University Hospital, from January 2009 to January 2010. All patients were scheduled to total abdominal hysterectomy without oopherectomy due to dysfunctional uterine bleeding. Patients were classified randomly into two groups. Group I consisted of odd numbers of patients (n = 13) and were subjected to total abdominal hysterectomy with bilateral complete excision of the tubes. Group II included an even numbers of patients (n = 12) for whom the classical approach of hysterectomy was...
performed. Informed written consent was taken from all participants, and the study was approved by the local hospital ethics committee of Zagazig University.

Inclusion criteria which were (i) age 40-43 years, (ii) absence of menopausal symptoms, (iii) baseline FSH value of 5 cm$^3$. Patients were excluded if they had (i) hormonal treatment and or hormonal contraception for the last 6 months; (ii) history of previous pelvic surgery; (iii) any cystic or solid ovarian mass >10 mm.

Trans vaginal ultrasonographic examination by same observer with was carried out for all patients using (GE healthcare, voluson 370 pro V, Austria )medical system equipped with 7.5 M Hz vaginal probe. On the first half of the cycle, mean ovarian volume was calculated by taking the mean value of the two ovary measurements, using the ellipsoid formula (volume= width x length x depth x 0.5233) [12]. Antral follicle count (follicles measuring 2-8 mm was obtained in two dimensional planes[13]. Color directed pulsed Doppler mapping was used to visualize ovarian stromal blood flow. The high-pass filter was set at 50 to 100 Hz, blood flow waveform were obtained by positioning the Doppler cursor on colored spot, indicating ovarian arterial flow. Ovarian artery signals have low velocity and high impedance. At least five consecutive cardiac cycle were obtained and resistance index (RI) and pulsatility index (PI) were obtained.

Blood samples were extracted from all patients for hormonal assay (serum FSH, LH). LH, FSH were measured by ELISA kits (cat NO.KIF 40570 and4023, respectively, Medix Biotech Inc: USA, with sensitivity < 0.5 m lu/ml.

For group 1 Fallopian tubes were bilaterally dissected and freed completely from the underlying mesosalpinx through avascular window in the broad ligament, beginning from infundibular portion of the tubes, this was accomplished by bites of Kocher clamps placed parallel to and as close as possible to fallopian tube, followed by incision with scissor, free–tie ligature of 0 delayed absorbable suture was placed, caution was given not to damage the underlying vascular structures. Fallopian tubes were resected with the uterus. The mesovary was cut and ligated with the mesosalpinx in such a way that the lateral portions of the mesovary where the infundibulopelvic fold and the ovarian vessels reach the organ remain intact and the medial part of it, along with ovarian ligament was cut.

For group II clamping the ovarian ligament together with the tube and infundibulopelvic ligament as near as to uterus, fallopian tubes were removed partially leaving behind the neighboring para-ovarian tissue.

The patients were followed up 6 and 12 months postoperatively. Transvaginal ultrasound examinations were done at presumed follicular phase (when no follicles beyond the diameter of 10 mm were visualized to be sure that the patients were in early follicular phase) to detect the number of antral follicles and ovarian volume calculation. Doppler study to ovarian stromal blood flow was done. Blood extraction to evaluate the level of serum FSH and LH from all participants was done.

Statistical analysis

Statistical analysis was carried out using SPSS version 11.0 for Windows (SPSS Inc., Chicago, IL, USA). Changes in outcome measures between the groups following normal distribution were tested by Student’s $t$-test, paired $t$-test and Freidman test for independent variables and those not following normal distribution by Mann–Whitney $U$-test , Changes within the groups in repeated measurements were analyzed by Wilcoxon’s signed rank test. A value of $P \leq 0.05$ was considered significant.

Results

Twenty five patients participated in this study, all were scheduled for abdominal hysterectomy due to dysfunctional uterine bleeding. Table (1), showed no significant difference between the both groups regarding age, body mass index, parity, preoperative mean ovarian volume, early follicular antral follicles count, serum FSH, LH, and ovarian stromal Doppler indices.

Table 2, showed no significant increase in ovarian stromal blood flow at 6 and 12 months postoperatively in group I, and a significant increase in ovarian volume 12 months post operatively. While in group II, the ovarian stromal blood flow was significantly increased at sixth months postoperatively but was significantly reduced at 12 months post-operative as compared with preoperative value. The antral follicles count was significantly reduced both 6 & 12 months post-operatively in group II. When comparing the two groups with each other, 6 months post-operatively group I showed significantly higher antral follicle count, 12 months postoperatively group I showed significantly higher antral follicles count, mean ovarian volume, and ovarian stromal blood flow.

Discussion

Abdominal hysterectomy is one of the most common gynecological procedures performed in clinical
practice. Resection of the ovaries during abdominal hysterectomy is the most challenging part of the operation; some studies demonstrated that ovarian preservation during hysterectomy may not occasionally avoid ovarian failure or menopausal symptoms [14, 15]. Whether salpingectomy affects ovarian function remains controversial issue.

In this study we found a significant increase in ovarian blood flow in both groups 6 months postoperatively reflected by decrease in RI and PI values. Our findings run in agreement with a previous study that regards the decrease in ovarian artery pulsatility index as a compensatory response because the total blood supply to the ovary was reduced due to loss of blood coming from uterine arteries (8). Furthermore, Nahas and coworker [2] studied the effect of total abdominal hysterectomy on ovarian blood supply in women of reproductive age and concluded that there was reduced PI values suggesting a decrease in the resistance of flow in the ovarian arteries However 12 months postoperatively we found a significant decrease in ovarian stromal blood flow in group II with increase in RI &PI values. Ovarian volume, serum FSH & LH were not significantly changed 6 months postoperatively in both groups, Fanchin et al [16] and van Rooij et al [17] postulated that serum antimullerian hormone (AMH) level would appear to better reflect the level of ovarian aging than other known markers of ovarian reserve, as basal serum FSH level, inhibin B level and antral follicle count. We use serum FSH, LH, antral follicle count for assessing the ovarian reserve pre- and post-operatively because of the ease and availability

The number of the antral follicles was significantly high in group I who had total excision of the tube 6 &12 months postoperatively. Ovarian volume was significantly higher in group I who underwent total excision of the tube 12 months postoperatively. We suggested that disruption of arterial blood supply of the ovary through clamping the mesovary with infundibulopelvic ligament in group II could affect ovarian function. The ovarian blood flow is the first parameter to be affected, the antral follicle count is also affected early by disrupted blood supply to the ovaries while ovarian volume and hormonal changes are late. This is consistent with the results of Chan C et al [3] who studied the effect of salpingectomy on ovarian reserve in term of ovarian volume, antral follicle count, and stromal blood flow in women undergoing laparoscopic or laparotomic salpingectomy for tubal ectopic pregnancy, and they stated that ovarian ultrasound parameters were similar after salpingectomy on the normal and on the operated side, however decreased ovarian blood flow after laparoscopic but not on laparotomic salpingectomy. These finding might emphasize the implication of the surgical technique and method for protection of future ovarian reserve.” They explained these results as a “higher degree of tissue trauma resulting from tubal surgery was associated with impaired ovarian function, as it is possible that during open surgery it was easy to place the surgical clamp very close to mesenteric border of the affected tube and hence limit damage to blood vessels in the mesosalpinx. In contrast during laparoscopic salpingectomy, bipolar diathermy was the method employed in cauterizing the mesosalpinx; the heat damage could be more as the depth of damage was not limited to excision site”.

Our results can be explained as theoretically ovarian artery forms an arcade-like anastomosis system with the tubal branch of the uterine artery at the junction of the mesosalpinx and the mesovary, close to the hilum of the ovary carless surgery in this area can undoubtedly jeopardize the ovarian arterial blood supply[9]. In turn it can disrupt follicular development and normal steroidal production. So in our study affection of ovarian function which was manifested more 12 months postoperatively in group II mostly due to stretching of the infundibulopelvic vessels with a consequent thrombosis and scarring leading to decreased blood flow to the ovary. These results were in accordance to that found by Chan C et al [3] who stated that there was impaired ovarian blood flow & reduced antral follicle count on operated site shortly after laparoscopic salpingectomy. However Sezik M et al [7] studied the effect of total salpingectomy on ovarian reserve during abdominal hysterectomy and they concluded that complete removal of fallopian tube has no advantageous effect on ovarian blood supply.

In conclusion complete excision of tubes during abdominal hysterectomy with care to preserve the ovarian vascularity may preserve the ovarian function; a second advantage is protection against development of tubal adenocarcinoma or tuboovarian cysts in the lifted tubes. Larger study group is needed to confirm these results.

References


Illustrations

Illustration 1

Table 1: Preoperative baseline data in the study groups.

<table>
<thead>
<tr>
<th>Studied parameters</th>
<th>Group I with total salpingectomy (n = 13) Mean ± SD</th>
<th>Group II without salpingectomy (n = 12) Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age</td>
<td>41.4 ± 1.5</td>
<td>41.9 ± 1.7</td>
</tr>
<tr>
<td>Body mass index</td>
<td>23.5 ± 3.4</td>
<td>25.6 ± 4.8</td>
</tr>
<tr>
<td>Parity</td>
<td>3.4 ± 1.6</td>
<td>4.2 ± 0.9</td>
</tr>
<tr>
<td>Number of Antral follicles</td>
<td>6.5 ± 1.6</td>
<td>5.7 ± 1.5</td>
</tr>
<tr>
<td>Mean ovarian volume (cm³)</td>
<td>7.3 ± 1.7</td>
<td>7.5 ± 1.5</td>
</tr>
<tr>
<td>Early follicular FSH (IU/L)</td>
<td>6.3 ± 1.4</td>
<td>6.5 ± 1.6</td>
</tr>
<tr>
<td>Early follicular LH (IU/L)</td>
<td>4.8 ± 1.3</td>
<td>5.8 ± 1.8</td>
</tr>
<tr>
<td>Early follicular estradiol (pg/ml)</td>
<td>95.2 ± 13.8</td>
<td>93.6 ± 14.6</td>
</tr>
<tr>
<td>PI ovarian stromal vasculature</td>
<td>1.24 ± 0.76</td>
<td>1.47 ± 0.68</td>
</tr>
<tr>
<td>RI ovarian stromal vasculature</td>
<td>0.63 ± 0.18</td>
<td>0.73 ± 0.13</td>
</tr>
</tbody>
</table>

For all studied parameters p > 0.05.

FSH = follicle-stimulating hormone

LH = luteinizing hormone.
Illustration 2

Table 2: Comparison of pre- and post-operative ovarian reserve parameters.

<table>
<thead>
<tr>
<th></th>
<th>Preoperative</th>
<th>6 months postoperative</th>
<th>12 months postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of antral follicles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I (n=13)</td>
<td>6.5±1.6</td>
<td>6.3±1.7b</td>
<td>5.3±2b</td>
</tr>
<tr>
<td>Group II (n=12)</td>
<td>5.7±1.5</td>
<td>4.6±1.6a</td>
<td>3.7±1.2a</td>
</tr>
<tr>
<td><strong>Mean ovarian volume (CM3)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I (n=13)</td>
<td>7.3 ± 1.7</td>
<td>6.5 ± 1.6</td>
<td>8.8 ± 2.3ab</td>
</tr>
<tr>
<td>Group II (n=12)</td>
<td>5.7±1.5</td>
<td>7.1± 0.98</td>
<td>6.3 ± 1.5</td>
</tr>
<tr>
<td><strong>Early follicular FSH (IU/L)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I (n=13)</td>
<td>6.3 ± 1.4</td>
<td>6.4 ± 1.5</td>
<td>6.7 ± 1.7</td>
</tr>
<tr>
<td>Group II (n=12)</td>
<td>6.5 ± 1.6</td>
<td>6.7 ± 1.5</td>
<td>7.1 ± 1.2</td>
</tr>
<tr>
<td><strong>Early follicular LH (IU/L)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I (n=13)</td>
<td>4.8 ± 1.3</td>
<td>4.5 ± 1.4</td>
<td>5.2 ± 0.92</td>
</tr>
<tr>
<td>Group II (n=12)</td>
<td>5.8 ± 1.8</td>
<td>5.9 ± 1.4</td>
<td>6.2 ± 1.3</td>
</tr>
<tr>
<td><strong>PI of ovarian stromal vasculature</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I (n=13)</td>
<td>1.24±0.76</td>
<td>0.97 ± 0.4a</td>
<td>0.84± 0.3ab</td>
</tr>
<tr>
<td>Group II (n=12)</td>
<td>1.47±0.68</td>
<td>0.95 ± 0.34a</td>
<td>1.71 ± 0.46a</td>
</tr>
<tr>
<td><strong>RI of ovarian stromal vasculature</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I (n=13)</td>
<td>0.63 ± 0.18</td>
<td>0.52 ± 0.19a</td>
<td>0.54 ± 0.14b</td>
</tr>
<tr>
<td>Group II (n=12)</td>
<td>0.73 ± 0.13</td>
<td>0.67± 0.4a</td>
<td>1.52 ± 0.3a</td>
</tr>
</tbody>
</table>

a” Significant difference in same group pre and postoperatively
b” Significant difference between both groups postoperatively
Disclaimer

This article has been downloaded from WebmedCentral. With our unique author driven post publication peer review, contents posted on this web portal do not undergo any prepublishing peer or editorial review. It is completely the responsibility of the authors to ensure not only scientific and ethical standards of the manuscript but also its grammatical accuracy. Authors must ensure that they obtain all the necessary permissions before submitting any information that requires obtaining a consent or approval from a third party. Authors should also ensure not to submit any information which they do not have the copyright of or of which they have transferred the copyrights to a third party.

Contents on WebmedCentral are purely for biomedical researchers and scientists. They are not meant to cater to the needs of an individual patient. The web portal or any content(s) therein is neither designed to support, nor replace, the relationship that exists between a patient/site visitor and his/her physician. Your use of the WebmedCentral site and its contents is entirely at your own risk. We do not take any responsibility for any harm that you may suffer or inflict on a third person by following the contents of this website.
Reviews

Review 1

Review Title: Comment on the article by Nouh A et al

Posted by Dr. Mekin Sezik on 14 Mar 2011 03:10:34 PM GMT

Is the subject of the article within the scope of the subject category? Yes

Are the interpretations / conclusions sound and justified by the data? Yes

Is this a new and original contribution? Yes

Does this paper exemplify an awareness of other research on the topic? Yes

Are structure and length satisfactory? Yes

Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience? No

Can you suggest any reductions in the paper, or deletions of parts? No

Is the quality of the diction satisfactory? No

Are the illustrations and tables necessary and acceptable? No

Are the references adequate and are they all necessary? Yes

Are the keywords and abstract or summary informative? Yes

Rating: 6

Comment:
The topic of the manuscript is interesting. Salpingectomy during abdominal hysterectomy (without the removal of ovaries) has recently been a subject of debate. As the ovarian blood supply is dual (i.e. from the branches of the uterine artery and directly from the ovarian artery), preservation of the utero-ovarian branches with total salpingectomy might theoretically preserve the blood supply of the ovaries. However, all of the studies on this topic have not revealed positive results. Another potential advantage of complete fallopian tube removal during hysterectomy might be prophylaxis against subsequent tubal malignancies. Although primary tubal carcinomas are relatively rare, some recent evidence disputes that the initial site for the development of some of the so called epithelial ovarian carcinomas are in fact the tubal epithelium. If this is proven to be true, then total salpingectomy during hysterectomy can have additional benefits for the prevention of clinical ovarian cancers.

Thus, the present preliminary study throws a light on this debate, and concludes that complete excision of fallopian tubes during scheduled abdominal hysterectomies might preserve ovarian blood flow and function.

However, the following points need to be mentioned regarding the manuscript:

1. A statistical power analysis is missing. How did the authors exactly calculate the sample size? If there were no such calculations, what was the power of the study to detect differences (given the number of hysterectomies included)?

2. The presentation of change in parameters over time is confusing. For example, the sentence “Significant difference between both groups postoperatively” is not clear. For better demonstration, the mean values can be plotted onto three separate figures that include values obtained from both groups: 1) No. of antral follicles and mean ovarian volume, 2) FSH, LH, E2, and 3) RI and PI. Therefore, change over time and comparisons among groups can be followed more clearly.

3. Please do not use ampersand logogram in scientific texts.

4. The manuscript needs some language and style editing. The styles of references have spelling mistakes, as well.

Competing interests: None

Invited by the author to make a review on this article? : Yes
Experience and credentials in the specific area of science:
I published on a similar topic, as indicated below.
I am also an active researcher use of Doppler in clinical obstetrics and gynecology, and published several articles on that topic.

Publications in the same or a related area of science: Yes


How to cite: Sezik M. Comment on the article by Nouh A et al[Review of the article ‘Total Salpingectomy During Abdominal Hysterectomy Preserves Ovarian blood flow and Function ’ by ]; WebmedCentral 1970;2(3):REVIEW_REF_NUM589
Disclaimer

This article has been downloaded from WebmedCentral. With our unique author driven post publication peer review, contents posted on this web portal do not undergo any prepublication peer or editorial review. It is completely the responsibility of the authors to ensure not only scientific and ethical standards of the manuscript but also its grammatical accuracy. Authors must ensure that they obtain all the necessary permissions before submitting any information that requires obtaining a consent or approval from a third party. Authors should also ensure not to submit any information which they do not have the copyright of or of which they have transferred the copyrights to a third party.

Contents on WebmedCentral are purely for biomedical researchers and scientists. They are not meant to cater to the needs of an individual patient. The web portal or any content(s) therein is neither designed to support, nor replace, the relationship that exists between a patient/site visitor and his/her physician. Your use of the WebmedCentral site and its contents is entirely at your own risk. We do not take any responsibility for any harm that you may suffer or inflict on a third person by following the contents of this website.