

Does prophylactic bilateral salpingectomy during pelvicoscopic hysterectomy increase perioperative morbidity?

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Summary

Purpose of investigation: To compare the safety of additional salpingectomies in patients undergoing laparoscopic hysterectomies for benign indication. *Materials and Methods:* The study was conducted in the Ortenau Klinikum Offenburg (Baden-Württemberg, Germany). Classical laparoscopic hysterectomies were performed between 2010 and 2011 and a prophylactic salpingectomy was added thereafter. The authors analysed the postoperative complications until 2013 according to the Clavien-Dindo scale in performing a logistic regression model adjusted on potential confounders. They also analysed other surgery outcomes such as operative time, duration of the hospital stay, and the blood loss during the surgery. *Results:* Over 301 patients were retrieved from the records. Postoperative complication rates were not different between the two groups (13.8% versus 14.2% patients, OR = 0.93 [0.47 – 1.84], p = 0.84). Other outcomes were also not different. *Conclusion:* Prophylactic salpingectomy performed during a laparoscopic hysterectomy for benign conditions seems to be safe and recommended. Prospective studies especially with respect to the magnitude of the prophylactic effect are needed.

Key words: Prophylactic salpingectomy; Ovarian cancer prevention.

Introduction

Ovarian cancer represents a gynaecological tumour entity with a comparably poor prognosis because the disease is mainly diagnosed in advanced stages due to the lack of reasonable means of early detection. Especially sonography and CA 125 serum levels are not recommended in general practice [1–3]; on the contrary they lead to unnecessary surgery and thus increase patient morbidity without affecting ovarian cancer mortality. As a result there have been multiple efforts in order to reduce cancer incidence; these include the suppression of ovulation and prophylactic surgery. Prophylactic oophorectomy systematically performed during hysterectomy for benign pathology reduced the risk of ovarian cancer but increased cardiovascular risk [4, 5]. Thus, prophylactic surgery was mainly restricted to patients with confirmed hereditary background of the disease.

About ten years ago, it has been shown that the fallopian tubes could play a pivotal role in the pathogenesis of serous tubal, ovarian or peritoneal cancers with a “p53 signature”. The initial lesions of ovarian cancer, called serous tubal intra-epithelial carcinoma or “STIC”, were found first in genetically predisposed women [6, 7] and later in more than the half of those women with an epithelial ovarian cancer, regardless of genetic predisposition [8–11]. Immunohistochemical studies [9, 12–17], confirmed that STIC and serous ovarian carcinoma are similar, and concluded that nearly 75% from them developed secondarily to a primary

tubal lesion [18–21].

This information offered new perspectives and prophylactic salpingectomy was introduced as a new option for the prevention of ovarian cancer [22–32]. However, the question is whether it is justified to perform this type of surgery as a sole measure. Its invasiveness imposes significant risks to the patient whereas as ovarian cancer remains rare, with an incidence from 14/100,000 each year in developed countries. Surgery with this unique indication may have a positive benefit-risks balance only for patients with an increased risk of cancer and it remains unclear whether there is an advantage over bilateral salpingo-oophorectomy in this subgroup of patients. In women without any hereditary risk, salpingectomy may only be performed in cases when surgery is necessary for other reasons, for example in cases of hysterectomies. It is well known that many practitioners already perform prophylactic salpingectomies in cases of necessary hysterectomies [33]. The benefit is very difficult to prove because ovarian cancer is rare and occurs late, but a large population-based cohort study suggests that it exists. However, there are only few studies on the immediate risks of the procedure, and the benefit-risks balance remains in the end unclear. Thus the present authors decided in 2011 to perform a systematically salpingectomy during hysterectomies and would like to report their experience.

The main objective of this study was to compare the safety of a salpingectomy during a hysterectomy for benign indi-

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Table 1. — Patient characteristics.

Characteristics	Group 1: standard hysterectomy	Group 2: with salpingectomy	<i>p</i> -value
No. of patients	153	148	
Age at diagnosis, years, no. (%)		0.35	
≤ 45	72 (47.1)	57 (38.5)	
46 - 50	54 (35.3)	61 (41.2)	
> 50	27 (17.6)	29 (19.6)	
Indication			0.68
Abnormal uterine bleeding	118 (77.6)	110 (75.3)	
Other	34 (22.4)	36 (24.7)	
Missing	1	2	
Surgery type			0.61
TLH	114 (74.5)	114 (77.0)	
LASH	39 (25.5)	34 (23.0)	
Uterus weight, grams			0.43
≤ 100	6 (6.6)	5 (6.7)	
101 - 500	76 (83.5)	62 (83.8)	
> 500	9 (9.9)	7 (9.5)	
Missing	62	74	
Adhesiolysis	18 (11.8)	25 (16.9)	0.20

TLH total laparoscopic hysterectomy;
LASH: laparoscopic subtotal hysterectomy.

cation. Primary outcome was the complication rate according to the Dindo classification; the authors also evaluated surgical time, blood loss, and duration of hospital stay.

Materials and Methods

This descriptive study was conducted in the Ortenau Klinikum Offenburg (Baden-Württemberg, Germany). This hospital is a tertiary care center with 742 beds and an obstetrical unit with a neonatal intensive care unit. Approximately 2,000 children are born annually at this center.

Inclusion criteria

All patients who underwent pelviscopic hysterectomies (total laparoscopic hysterectomy, TLH or laparoscopic subtotal hysterectomy, LASH) between January, 1st, 2010 and March 31st, 2014, were included and identified by the authors' clinical software system. Salpingectomy was performed from September 2011 onwards. Patients operated before underwent a simple laparoscopic hysterectomy with adnexal preservation (group 1), and patients operated afterwards underwent additional salpingectomy (group 2). Salpingectomy was performed by coagulation and dissection of the tube with a bipolar specific system. Fallopian tubes were removed together with the uterus.

The authors excluded women with any other planned surgical intervention at the same time. They also excluded all patients who were diagnosed with cancer at histological examination ($n = 9$), which might have changed the follow up. No patient was carrying a known BRCA or HNPCC mutation.

Data collection and variable definition

Data were extracted from hospital records for each patient. Complications were defined according to the Dindo-Clavien classification [34]. Only those occurring during the hospital stay or those requiring an subsequent hospital stay were recorded. Blood

Table 2. — Surgical outcomes.

Characteristics	Group 1: standard hysterectomy	Group 2: with salpingectomy	<i>p</i> -value
Surgery time, min*	131 (106 - 166)	114 (93 - 151)	0.007
Intraoperative complications, no (%)			
Injuries, overall	5 (3.3)	5 (3.4)	0.99
Bladder	1	4	
Bowel	0	0	
Other	4	2	
Conversion to laparotomy	2 (1.3)	4 (2.7)	
Blood lost, ml			0.008
< 500	90 (92.8)	97 (85.1)	
> 500	7 (7.2)	17 (14.9)	
Missing	56	34	
Hospital stay, days*	4 (4 - 5)	4 (4 - 5)	0.11
Postoperative complications (Dindo), no (%)			0.49
None	131 (86.2)	127 (85.8)	
Grade I - II	19 (12.5)	16 (10.8)	
Grade III - IV	2 (1.3)	5 (3.4)	

* Median (interquartile range).

loss and presence of adhesions were taken from the surgery report. Uterine weight was taken from the pathology report, when available. Postoperative anaemia was considered as a complication when the change in haemoglobin levels exceeded 1.5 mg/dl (many women had a previous anaemia due to abnormal uterine bleeding). The procedures used in this retrospective study were in accordance with the guidelines of the Helsinki Declaration on Human Experimentation and the Good Clinical Practice (CGP).

Statistical analysis

A descriptive analysis of the included patients was first performed. Patients' characteristics were compared using Chi square or Fisher's exact tests. Multivariate analysis for the complication rate was performed using a logistic regression model: any complication versus no complication, according to the Dindo classification (0 versus any other). Variables with unadjusted *p*-values < 0.15 were entered into the model: presence of adhesions, indication of surgery, and surgical type. Bilateral tests were computed, and the significance level was set at 0.05; OR and 95 % IC were calculated. R 3.1.1 [35] was used to perform statistical analysis.

Results

The characteristics of the 301 patients included in the study are summarized in Table 1. The authors recorded 153 (50.8%) patients who underwent a standard hysterectomy (without salpingectomy, group 1) and 148 (49.2%) who underwent a salpingectomy concomitant to the hysterectomy (group 2). All characteristic data were similar in the two groups ($p > 0.05$ for all variables).

Primary endpoint analysis: overall postoperative complications

In the present panel, the authors analysed the postoperative complication rate, according to the Dindo classifica-

Table 3. — Multivariate analysis (variable effect on main outcome: any complication).

Variables		Univariate analysis			Multivariate analysis		
		Hazard ratio	IC (95%)	p-value	Hazard ratio	IC (95%)	p-value
Type of surgery	Standard hysterectomy, with salpingectomy	ref. 1.03	0.54 - 1.99	0.926	ref. 0.93	0.47 - 1.84	0.84
Indication	Abnormal uterine bleeding, others	ref. 1.78	0.86 - 3.56	0.12	ref. 1.79	0.85 - 3.67	0.12
Surgery type	TLH	ref.		0.01	ref.		0.015
	LASH	0.29	0.09 - 0.77		0.31	0.09 - 0.81	
Adhesiolysis	No	ref.		0.01	ref.		0.012
	Yes	2.93	1.32 - 6.22		2.87	1.27 - 6.21	

tion (no complications versus any). The authors did not find a difference between the two groups, in bi- (Table 2) and multivariate analyses (Table 3), with respectively, 86.2 and 85.8 % of patients without any complication.

Secondary endpoints

Regarding the secondary outcomes, there was neither statistically nor clinically relevant difference between the groups for operative time and postoperative hospital stay. Details are provided in Table 2. The authors found more major blood loss, but they had many missing values (respectively, 40.5% and 50.0%), which make this result difficult to interpret.

Conversion to laparotomy was necessary in two cases in group 1 because of the uterus size. There were four conversions in group 2: three because of the uterus size and one because of major bleeding.

Discussion

This study shows that hysterectomy with salpingectomy did not lead to more complications than hysterectomy without salpingectomy. These findings are consistent with the rare studies evaluating the complications of this procedure in the recent literature. Minig *et al.* [36] and Morelli *et al.* [37] showed that operation time and estimated blood loss was not different. Complication rate was similar by McAlpine *et al.* [38], Vorvergk *et al.* [39], and Minig *et al.* [36]. Ghezzi *et al.* [40] studied postoperative infections in 282 patients and made an assertion that preservation of the fallopian tubes at the time of hysterectomy even resulted in higher risk for postoperative infectious morbidity ($p = 0.01$), but they did not evaluate other complications. The complication rate was lower after LASH in the present panel, but as the patients were not randomized, an indication bias is not to exclude.

Hospital stay duration was similar in the present two groups, as reported by other authors [37,41] ($p = 0.11$). Blood loss was however, significantly different in the present panel, but the authors had many missing values, and this difference was not reported by other authors [37, 38, 41, 42]. Furthermore, blood loss was not measured exactly and was only an estimate by the surgeon.

Operation time was also different in the present groups, and also not reported by other authors [37, 41, 42]. It could partly reflect the learning curve from the surgeons in the present study, as the operations without salpingectomy were performed before those with salpingectomy.

In the literature, other outcomes were taken in account to evaluate the morbidity reliable to a salpingectomy. The incidence of adnexal pathologies requiring surgical reoperation was lower by Vorvergk *et al.* [39]. Ovarian reserve was evaluated by Morelli *et al.* [37], expressed as the difference between three months postoperative and preoperative values value of anti-Müllerian hormone (AMH), follicle stimulating hormone (FSH), antral follicle count (AFC), mean ovarian diameters, and peak systolic velocity (PSV). Findley *et al.* [42] also measured the AMH value, before and after surgery. Sezik *et al.* [43] compared pre- and postoperative serum FSH, luteinizing hormone (LH), estradiol values, ovarian volume estimation by transvaginal ultrasound, and ovarian stromal blood flow Doppler velocimetry during the early follicular phase. In all these studies, no difference was found between the groups with or without prophylactic salpingectomy.

Conclusion

The authors did not find an increased complication rate when performing a comparison to a hysterectomy alone, and may say that salpingectomy in combination with hysterectomy is a safe procedure. Prospective studies are yet needed to demonstrate the efficacy of the procedure with respect to its primary goal – the reduction of ovarian cancer incidence and mortality.

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